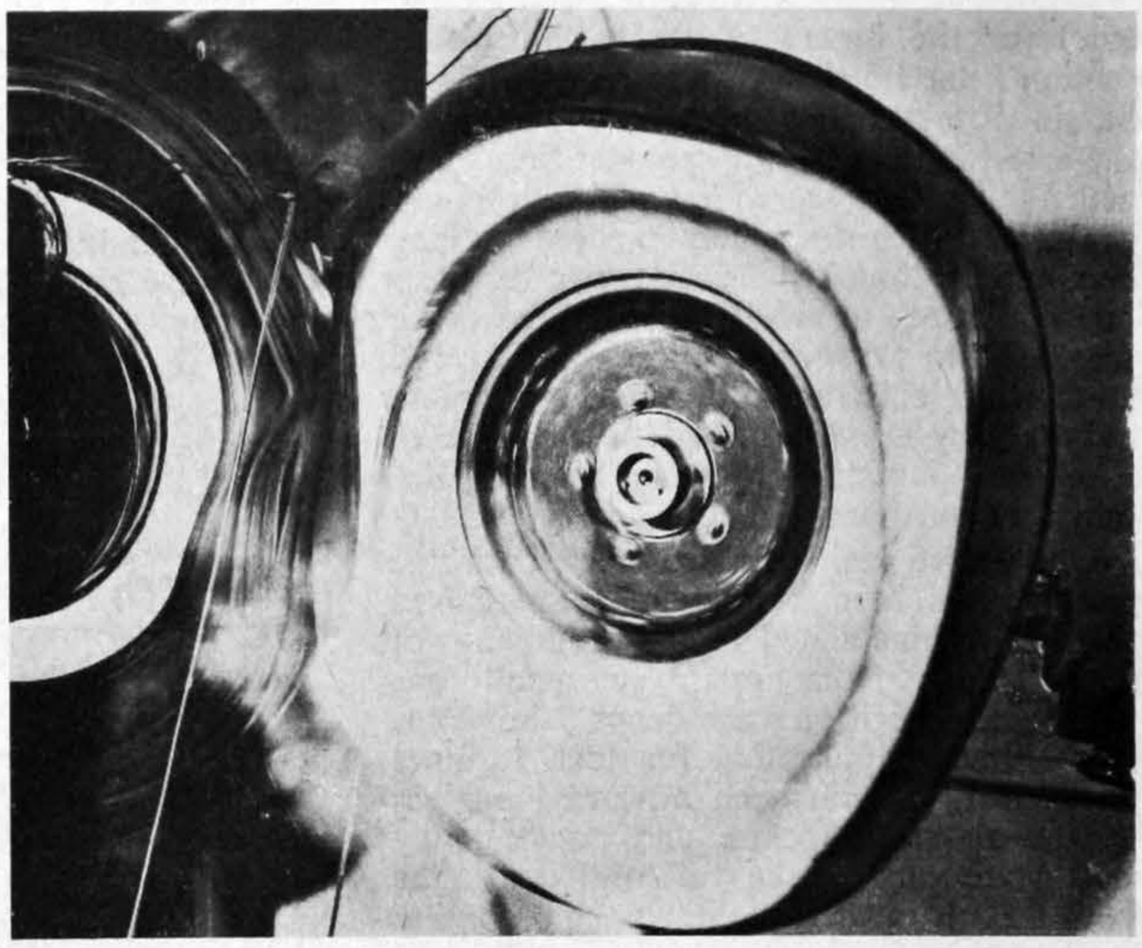
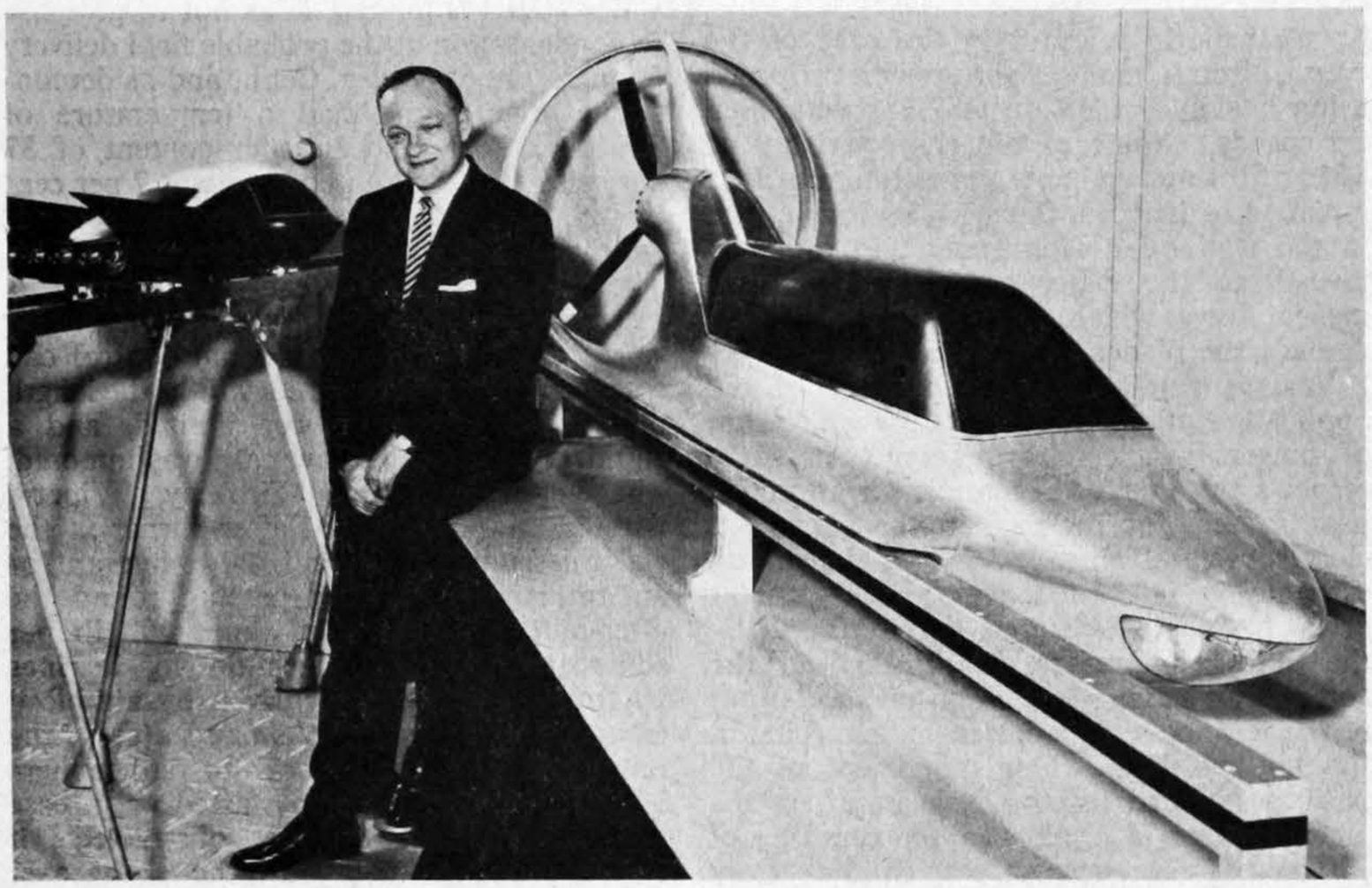
Locomotion

The trend for sources of power to become cheaper and lighter has allowed vehicle performances to increase rapidly, and the wheel, once established on all high-speed vehicles, is now pressed by other systems of motion ; on the fastest earth-borne vehicles, used for imposing high accelerations on aircraft and rocket equipment, the wheel is invariably displaced by steel runners on highly accurate tracks. For many more mundane purposes the tolerance of the wheel to irregularities is invaluable and the stability it provides is indispensable, and the Goodyear Tire and Rubber Company has installed at Akron, Ohio, a tyre testing dynamometer able to impose speeds of over 500 m.p.h.

The machine, built by the Adamson-United Company of Akron, has two modes of operation : tyre-on-tyre for the highest speeds, and tyre-on-drum for speeds up to 320 m.p.h. The 10ft drum is used primarily for aircraft tyres, since it can simulate take-offs and landings ; a stationary tyre can be loaded on to the drum at full speed with a force of 30,000 lb. The tyre-on-tyre unit has tested at 510 m.p.h. the tyres used on the Thompson " Challenger ", the four-engined car which holds the American national land speed record of 332.8 m.p.h. A batch of Goodyear passenger car tyres were tested to destruction by increasing speed under simulated service load, failing at between 297 m.p.h. and 305 m.p.h. ; a failure can be seen RIGHT, the bead of the left-hand tyre having left the wheel rim.





More than thirty years ago Andrew A. Kucher, now Vice President, Engineering and Research, Ford Motor Company, conceived the air-bearing vehicle, supported clear of its tracks by " levitation " on a thin film of air. The passage of a " Levacar " would be virtually frictionless, and while propulsion can be achieved with moderate efficiency at speeds of, say, 500 m.p.h. steering is not easily achieved to the standards of surface vehicles ; hence it is anticipated that such vehicles would be rail-bound.

Two possible forms of " Levacar," propeller-driven and jet-propelled, are seen here in model form with Mr. Victor G. Raviolo, executive director of engineering staff, F.M.C., who discussed these and other developments at the Institution of Mechanical Engineers last month. (See page 931).

For applications where a prepared track cannot be provided, an air cushion vehicle or ground effect machine may prove valuable. Many of these machines float on a low-pressure air cushion contained by a curtain that deflects when irregularities are encountered, but the patents of Mr. C. S. Cockerell are based on both containing and supplying the air cushion with a jet sheet ; the force needed to deflect unit length of the jet to flow parallel to the ground divided by the ground clearance is the pressure differential available. A vehicle with a long perimeter can attain large ground clearances without excessive energy consumption, and could pass over open areas or even hedgerows and rough ground. The prototype " Hovercraft " was built by Saunders-Roe, Ltd., and fitted with an Alvis " Leonides " helicopter power plant compressing air for the jet sheet and the control jets and, later, a Blackburn-Turbometa " Marbore" gas turbine providing forward thrust ; it is seen, RIGHT, in London last week, " hovering " above the River Thames. Notice the sheer forward to keep spray from obscuring forward vision, and the backward-turned intake for the turbine, also the result of the intense spray created when the high-momentum jet passes over the water surface.