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APOLLO AEROBALLISTIC TESTS

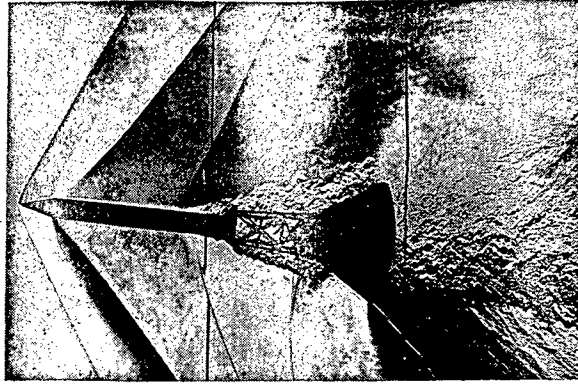
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Scale models of the Apollo command module and the launch-escape vehicle have been fired in the Aeroballistics Range at the Canadian Armament Research and Development Establishment, Valcartier, Quebec, as part of a feasibility study to determine the usefulness of the ballistics range technique for models of the Apollo configuration.

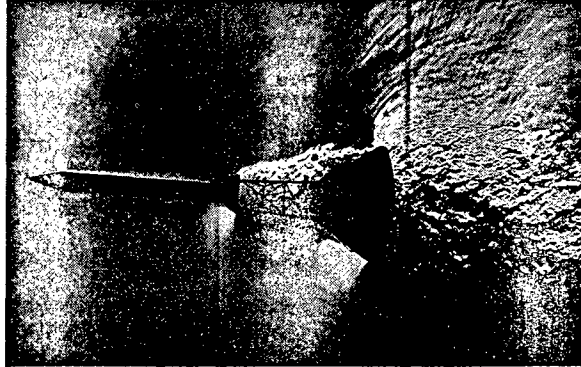
The two models were launched from a standard artillery piece from which the rifling had been removed. Bore is 5.9-in.-diam. Models were encased in a sabot. On emergence from the muzzle, the sabot separates into two pieces and is trapped at the entrance to the range; the model flies down the range alone. Range pressure for all tests is one atmosphere.

Command modules have been launched successfully at a muzzle velocity of 4400 fps (Mach 4) with a corresponding peak launching acceleration of 40,000 g. The launch-escape vehicle models have been fired at 1800 g (Mach 1.2) with the gun fitted with a nozzle device between propellant chamber and barrel which reduces the maximum base pressure or acceleration. The three upper schlieren photos show the module and launch-escape vehicle in flight. Further tests of the latter are planned.

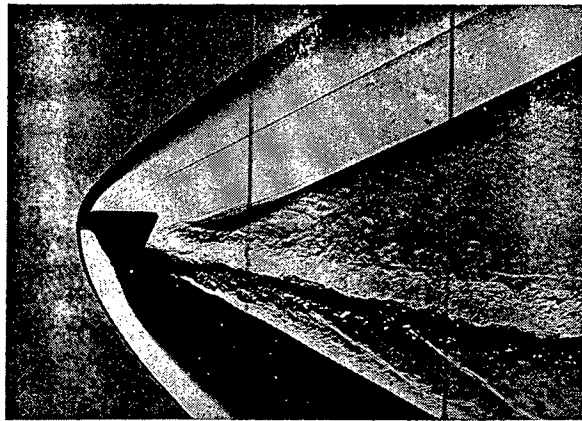
The command module model, with a 3-in.-diam base, is made of aluminum and steel and is hollowed out to give the correct offset center of gravity position. It is set in the sabot at an angle close to the trim value. (See photo at lower right.) The escape tower is constructed of drill rod material silver-soldered together. Sabots are aluminum with a gas seal of neoprene at the rear. Side cuts assure that the combination of ram air and propellant-base pressure will cause them to break open on clearing the gun muzzle.



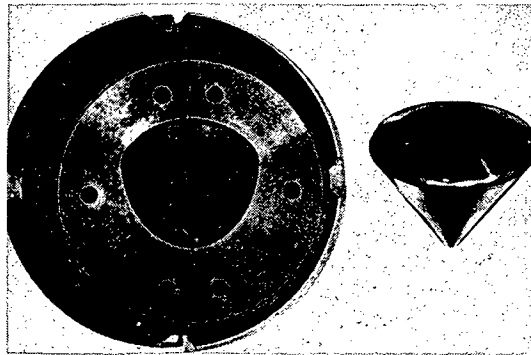
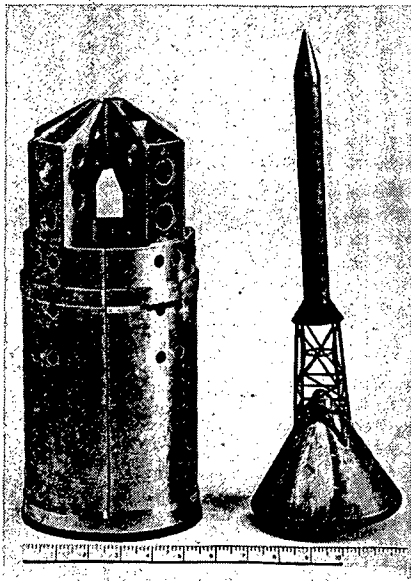
Launch-escape vehicle model at Mach 1.2.



Launch-escape vehicle model at Mach 0.8.



Command module model in flight at Mach 2.



Model of the Apollo command module and sabot-seating arrangements for it in recent tests conducted at CARDE are pictured above. At left is the launch-escape vehicle model with its sabot. Photo distinctly shows one of two cuts in sabot to assure break-open. Dark area at base is neoprene gas seal.