

MORE ABOUT JET PROPULSION

Features of the Caproni Campini : A New Heinkel Scheme

By G. GEOFFREY SMITH, M.B.E.

WORLD-WIDE publicity has been accorded to the public demonstration flights of an Italian jet-propelled aircraft already referred to in *Flight*. Italian propaganda has naturally made the most of the success, with the result that the radio and the Press of many countries have given prominence to the Rome-Milan flight. Nevertheless, little has been disclosed regarding the propulsive system or the construction of the craft.

Italy is very busy experimenting with future types. Signor Gaspare Santagelo said as much in discussing development and production of aircraft in Italy, and emphasised that their practical value would become evident in the near future if research was maintained. He then especially mentioned the Caproni-Campini jet-propelled aircraft. Briefly describing the machine, he stated that a nozzle duct runs along the entire length of the fuselage. In the forward portion of this duct an axial compressor driven by an engine produces a pressure increase which creates an airflow towards the aft portion of the duct. This air stream first absorbs heat in cooling the engine and is then joined by the engine exhaust gases which further increase its thermal value. The expansion towards the exit is intensified by the addition of liquid fuel which is injected and ignited in the vicinity of the discharge nozzle. It will be noted that the usual heat losses involved in cooling the engine and in discharging the exhaust gases to atmosphere are in this system avoided.

Rearward thrust is, therefore, created by the blower, on the one hand, and by the expansion of the air and gases situated behind, on the other. The force exerted by the stream, or jet, is the product of its mass and velocity. Fundamentally, a

SCEPTICS have tended to dismiss the subject of jet propulsion of aircraft as a dream of the future. The present notes regarding the first successful public demonstration of an Italian jet-propelled machine should dispel any ideas that jet propulsion is merely an armchair flight of imagination. The first description of a proposed Heinkel plant reveals the interest of another Axis partner in this method of propulsion.

force acting in a given direction exerts an equal and opposite force. It is this reaction which propels the aircraft.

This method of propulsion reveals its advantages, particularly at speeds approaching the velocity of sound, he added, but he gave no suggestion that such speeds had been accomplished on the machine under consideration. The intake duct in the nose of the machine would appear to be of divergent section to build up pressure in the air stream at the expense of velocity. As a result, the velocity of the air at the blower intake would be lower than the flying speed, and thus the impeller blades can operate at a higher degree of efficiency than the airscrew blades of conventional aircraft power plants.

A Radial Engine Used

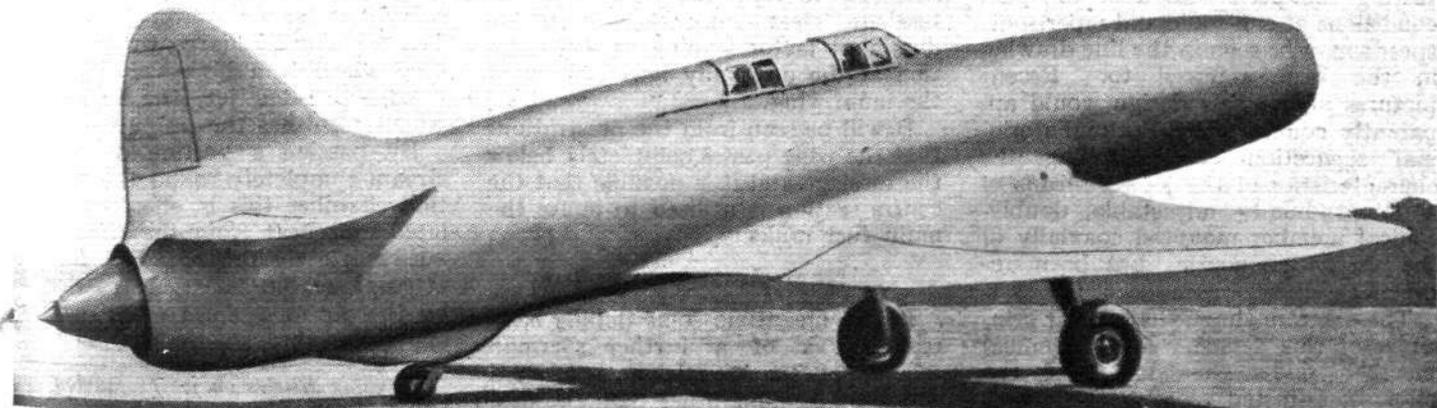
From another foreign source it was learned that the engine employed in the Caproni-Campini was of Isotta Fraschini manufacture. Merely as a hazard it may be suggested that the unit referred to may be of the "Astro 7c40" type, a seven-cylinder, air-cooled, supercharged radial having overall dimensions of 47in. diameter and 44in. length. Normally, its rated output is 440 h.p. at 2,000 r.p.m. at an altitude of 4,000 m. (13,120ft.). Possibly its performance has been improved, as in the jet propelled machine it draws its air supply from the stream leaving the main blower, which is at

some pressure above that of the surrounding air.

It will be recalled that an earlier Campini design, a drawing of which was given in *Flight* of August 28th, 1941, also employed a radial engine to drive the compressor. In that instance, however, the engine was located before the compressor. One school of designers, particularly Italian and Swiss, holds the opinion that a reciprocating engine should furnish motive power for the compressor in order that advantage may be taken of a relatively high compression ratio for the more efficient combustion of the fuel and also for the convenience of using a known and fully developed type of power unit. There is a considerable degree of justification for this viewpoint; but, as the series of *Flight* articles last year showed, the trend in other countries would seem to be towards a gas turbine located after the combustion chamber or chambers.

High Speed Not Attempted

A Spanish aviation journal gives a review of the Campini machine which was flown from Milan to Guidonia, Rome, on Sunday, November 30th, 1941. It was piloted by Col. Mario de Bernardi, the veteran Schneider Trophy ace, and a Capt. Pedace was the second occupant. On arrival at Guidonia the designer explained that high speed had not been attempted on this first public flight. Actually 2½ hours were taken for the journey, but this included a stop of unspecified duration at Pisa. The average speed was about 130 m.p.h. No reason was given for the break in the journey, but the critical suggestion has been advanced that the stop was necessary for refuelling. It is rumoured that the rate of fuel consumption is, at present, relatively high. The machine is now, it is understood, being subjected to



This side elevation gives a good impression of the large diameter, rocket-shaped fuselage which functions as the main air duct.