



The jet-propelled rotor being tested on the fuselage of a Sikorsky R-6. The production model will be quite different.

A PULSE-JET HELICOPTER

America Developing a Short-range Weight-lifter

TORQUELESS single-rotor drive is a problem which has intrigued many helicopter designers. It was the basis of the Isacco conception many years ago, when the designer attempted, not very successfully, to achieve it by mounting Bristol Cherub engines on the blades of his Helicogiro. Before and during the war, the Germans made several types in which this feature was aimed at in different ways: Doblhoff by a central engine driving a compressor which supplied air to jets at the blade tips; Flettner, Nagler and Rolz by small engines in the Isacco manner.

Since the war, American designers have pursued the subject of jet-propelled rotors, Marquardt and McDonnell using ram jets, which require a high rotor-tip speed for efficient work.

The machine illustrated here employs the pulse-jet system which became well but unfavourably known to Londoners from the V1 flying bombs. In this, the explosions are intermittent, air being admitted through small flap-valves opened automatically when the outrush of gases causes a partial vacuum, and closed by the pressure of the next explosion. The XA-5, designed and built by American Helicopter Company,

Inc., of Manhattan Beach, California, is merely a flying test-bed for the rotor and power system, having the fuselage of an old Sikorsky R-6. The production model will look very different, although the rotor will probably retain most of the features of the experimental machine, which is known as "Top Sergeant."

Both the rotor and the pulse-jets were designed by American Helicopter Company. The jets have a diameter of 8.75 in and a length of 44 in. The maximum static thrust is 95 lb, and each jet weighs 23 lb. To this should be added 10 lb for the five accessories: fuel pump, throttle and master shut-off valves, fuel meter, and rotary seal. Total power-plant weight is 56 lb for a static thrust of 190 lb. Firing frequency is 150 pulsations per second. A slotted panel supports 16 laminated steel reeds.

The rotor blades have steel spars to take the centrifugal pull of the jets, while the section is formed of plywood. Rotor diameter is 33 ft to centre line of jets, but the blades are rather wide—namely, 20 in. The tip speed has been chosen to suit the jets and is from 300 to 325 ft/sec.

SUNDERLAND'S SORTIES ON THE YANGTSE

THE Air Ministry has released some information on the flights made by an R.A.F. Sunderland to assist H.M.S. *Amethyst* on the River Yangtse. Captained by F/L. K. H. Letford, D.S.O., D.F.C., the aircraft left its base at Kai Tak on April 1st to fly direct to the sloop, but a diversion order from H.M.S. *London* caused it to touch down at Shanghai. Admiral Madden then requested that an R.A.F. doctor, a Naval doctor and medical stores be transported to *Amethyst*, so the Sunderland took off again later the same day, located the ship and alighted nearby. There was no sign of Communists, and Nationalist troops were digging-in on the south bank. A sampan had taken F/L. Fearnley, one of the M.O.s, aboard when shelling began, and the aircraft was forced to take off down-wind, and down a 7-kt current.

With the intention of evacuating wounded members of the ship's company, the Sunderland flew to *Amethyst* again the following day. A Communist battery was seen to have moved to a position only 2,000 yd from the ship, instead of 3,000 yd, as was previously believed. Visual signalling to the ship was unsuccessful, and the Sunderland again touched down alongside. Accurate shell and small-arms fire began immediately. The dinghy for transferring the sailors to the flying boat had been swept away at touch-down and hits were made on the flying boat, which was forced to take off. Remaining in the area for 45 min, it saw *Amethyst* get under way and steam out of range of the Chinese guns. At Naval request, the aircraft made a 1½ hr reconnaissance of Chenchiang. A patrolling Mosquito was seen, whereupon all the Sunderland's guns were manned. Returning to Shanghai, it sighted six Mustangs, and lost height to 200 ft. Small-arms fire broke out again from the ground, one bullet ploughing through the second pilot's tunic sleeve. The flying boat climbed to cloud-base level, and when the rear gunner reported that a twin-engined aircraft was following, ascended into cloud, where it remained for the rest of the journey.

On April 23rd, the Navy asked for a reconnaissance of the river up to Nanking. Some four miles from the former naval base of Kiang Yin, and flying at 400 ft, the Sunderland was hit by machine-gun fire. The port main tank was holed and fuel streamed out, filling the hull with petrol fumes; the rear turret also became "U/S." As the fuel load was low, the Sunderland returned to Shanghai, where it was found that an aileron control was nearly severed, and 300 gallons of fuel had been lost. One bullet had lodged in the navigator's computer. No casualties were suffered among the crew. Maintenance of the Sunderland during its stay at Lung Wha was greatly assisted by the staffs of B.O.A.C. and Messrs. Jardine Matheson.

INTERNATIONAL GLIDING CONGRESS

DURING the first week of the Paris Aero Show delegates from some sixteen nations attended the second congress of OSTIV (Organisation Scientifique du Vol à Voile), held at the Aero Club de France.

On the opening day of the congress, May 3rd, M. Allez (president of the A.C.F.) received the Secretary of State for Air, M. Moreau, and a number of speeches followed, including a most informative one by M. Jarlaud, the well-known sailplane designer of the Arsenal de l'Aeronautique. On the Wednesday and Thursday a dozen-odd papers were read, some in English and some in French, followed by translations in other languages. On the Friday there was a general assembly and election of new officials, and on the Saturday the delegates visited the Beynes gliding centre, where the latest French sailplanes were demonstrated to them.

British interests were represented at the congress by M. Jacques Cochemé. The Organisation will meet again in Sweden next year.