

## The Canadian Industry . . .

engaged in the development of advanced types of rotary and static power-units for missile applications over the past few years. One of the turbine-type power units is now in production for the Sparrow 2. The division's manufacturing facilities are backed up by full development and test laboratories. In addition to power-supply requirements for Canada and the U.S.A., the division has concentrated on infra-red development for missile applications and the detection of near-terrestrial bodies and, to meet new requirements, special types of airborne electro-mechanical equipment, airborne computers, transistors and magnetic amplifiers have been designed.

The company's Engine Division has continued to operate as in previous years, with the overhaul and repair of 310 Orenda engines forming the main volume of work last year. A small number of Ghosts were also overhauled, and other engines processed have included Gipsy Queen 70s and 30s and the power-egg assemblies for the CS2F.

**DHC.2 Beaver** April 26 of this year marked the tenth anniversary of the first Beaver delivery, since when the total number produced has risen to over 1,250. By December 31 last there were 1,169 in service. At the time of *Flight's* visit to Downsview last month, Beaver No. 1,260 was approaching completion for the Royal Canadian Mounted Police. On many types of landing gear—floats, skis and amphibian—Beavers were operating in no fewer than 58 countries by the end of last year.

**DHC.3 Otter** A larger development of the rugged Beaver, the Otter has been in production since 1951 and almost 300 have been completed to date. Military orders have accounted for about 70 per cent of these. The 126th Otter off the production line made a historic polar flight of 1,450 miles nonstop across Antarctica early in January: among recent new customers for the type have been the air forces of India, Chile and Indonesia.

A modified Otter has recently been the subject of advanced aerodynamic STOL research by D.H.C. engineers for the Defence Research Board. Statically mounted on a large tubular framework, this aircraft may be followed by a second experimental STOL Otter which will carry out flight tests.

**DHC.4 Caribou** The largest original product of de Havilland Canada, the Caribou is a twin-engined utility aircraft designed to carry a 3½-ton payload and to take-off and land on short, improvised airstrips. Powered by two Pratt and Whitney R-2000 engines, it incorporates full-span double flaps, and rear-loading doors (which may be opened in flight for parachute drops or quick ground disembarkation of troops). As a civil transport, it is designed to carry 27 passengers and baggage.

The first Caribou flew for the first time only three weeks ago, on July 30, and the second machine is due to fly in mid-September. A further 15 aircraft, to be produced next year, will complete the initial batch. Five of the 1959 machines have been ordered for evaluation by the U.S. Army; one of the two prototypes will be used for certification trials and engineering development, and the other prototype will be evaluated for the Canadian Army.

The performance of a turboprop version of the Caribou has been analysed by the company, and a preliminary model specification has been written describing this aircraft. The present Caribou has evolved from a "Twin Otter" project which formed the subject of a company design study in 1954. This would have been a 15,000 lb machine (gross weight of the Caribou is 24,000 lb) powered by R-1340 engines.

The high-lift devices on the Caribou are quite complex, although



Among aircraft exported by de Havilland Canada last year were (above) one of a fleet of Otters for the Indian Air Force, and (below) a Finnish Air Force Beaver.



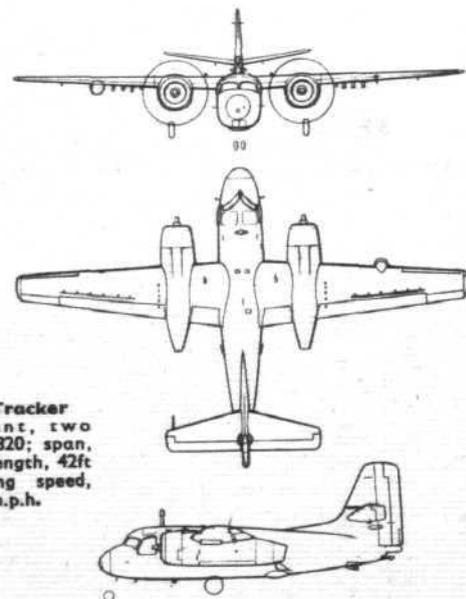
based on an extension of Otter techniques. The final configuration will depend on the initial flight tests, but it is known that lowering or raising the double slotted flaps will automatically alter the tailplane incidence, in order to reduce the trim-change. Another feature is that the travel of the two-piece ailerons, also, is related to flap position, giving maximum aileron effect for low-speed control when flaps are down. Drooping leading-edge flaps are fitted, and the outboard sections of the ailerons also droop.

Estimated performance figures for the Caribou at 24,000 lb include take-off ground-run of 490ft (short field technique) and 885ft (airline technique); distance to clear 50ft obstacle, 840ft and 1,305ft respectively; landing ground-run, 425ft and 565ft; landing distance from 50ft obstacle, 1,000ft and 1,305ft; and climb gradient after take-off (landing gear up) 20 per cent (both engines) and 4.3 per cent (one engine).

With a maximum range of 1,350 miles, the Caribou (freighter version) is designed to carry a 7,180 lb payload over 200 miles, 6,385 lb over 400 miles, 5,590 lb over 600 miles and 4,795 lb over 800 miles, assuming a 7,500ft cruise at 2×750 b.h.p. and a 45 min fuel reserve. The wide c.g. range of the aircraft is designed to allow an unusual variety of cargo loading arrangements.

**CS2F-1 Tracker** The production of the Canadian version of the Grumman S2F anti-submarine aircraft for the R.C.N. is extensively subcontracted throughout the industry, with de Havilland as prime contractor responsible for front fuselage manufacture, assembly of complete aircraft and installation of equipment. Some 55 Trackers had been completed by the end of last month, of which over 40 had been delivered. The remainder were being fitted with improved internal equipment at Downsview, a retro-active modification for all Trackers. Normal delivery rate is two per month, and completion of the contract is planned for 1959.

Below, a CS2F Tracker displays its wing-folding ability.



**CS2F-1 Tracker**  
Powerplant, two  
Wright R-1820; span,  
69ft 8in; length, 42ft  
3in; cruising speed,  
150 m.p.h.