

The Aircraft Industry at Work

THE MEMBER FIRMS OF THE INDUSTRY: WHO THEY ARE AND WHAT THEY DO

It is impossible to measure accurately the full value of the contribution to the strength of Canada's Aircraft Industry that is made by the great many firms who play secondary roles as sub-contractors, equipment manufacturers, repair and overhaul organizations, and suppliers. To say that the importance of any one is paramount would be neither correct nor fair. Though the sizes of their plants vary from bare working space up to hundreds of thousands of square feet, and the numbers of their employees range from a mere handful to thousands, each forms an integral part of the structure of Canada's Aircraft Industry. In the pages that follow, brief outlines are given of the activities of many of the companies who are playing vital parts in building up and maintaining Canada's air defence forces.

Lucas-Rotax

PRODUCTION of all the items which Lucas-Rotax Limited is under contract to manufacture is now well advanced, with deliveries being made on a regular basis, this company reports.

These manufacturing operations are, of course, being carried on at the 120,000 sq. ft. Lucas-Rotax plant at Scarborough, Ontario, near Toronto, which now employs approximately 700 persons (an increase of some 200 in the past year). In production at present are the Orenda fuel system, the Nene fuel system, the electric starter for the Nene, the starting panel for the T-33AN Silver Star, magneto parts, and spares for Rotax and Lucas equipment in use in Canada.

In recent months Lucas-Rotax opened a new 12,000 sq. ft. service and overhaul plant at Montreal. Construction of this plant adds to the company's modern testing facilities for dealing with the up-to-date aircraft equipment being manufactured at Scarborough. The Montreal service and overhaul centre is equipped to overhaul, repair, and test all types of gas turbine fuel systems and electrical

equipment. Sufficient adjacent property has been purchased to allow for possible future expansion of the buildings at Montreal.

At Scarborough, apart from the large defence commitments, this organization is prepared to undertake the manufacture of electrical equipment for aircraft and fuel system equipment for gas turbines for customers in Canada and abroad. The manufacturing plant is said to have an expansion potential of 400 per cent on present capacity.

As is well-known, Lucas-Rotax is affiliated with two parent British organizations, Joseph Lucas (Gas Turbine Equipment) Limited, and Rotax Limited. The products made by Lucas-Rotax are at present items designed and developed by the parent firms in the U.K. In order that such equipment meets specific Canadian customer requirements, Lucas-Rotax maintains an engineering staff at Scarborough whose job it is to adapt basic designs to Canadian needs.

Aviation Electric

CONTINUED growth of its broad and varied program of manufacture, repair and overhaul and sales of an extensive selection of aircraft instruments, accessories and ancillary equipment, was the feature of the past year of activity at Aviation Electric Limited, Montreal. Plant facilities were increased by another 20,000 sq. ft., bringing the total plant area to 100,000 sq. ft. Besides this, a branch has been opened at Vancouver International Airport.

Though long known in the aviation field in Canada as one of the foremost instrument and accessory overhaul organizations, it is only since 1952 that Aviation Electric extended its scope to take in manufacturing operations as well. Included in this firm's production list are accelerometers, magnetic compasses, rate of climb indicators, synchro pressure indicators, and synchro pressure transmitters, all of which are made under license from Eclipse-Pioneer Division of Bendix Aviation Corporation.

Plans are also being acted on to produce the Kelvin & Hughes Turn and Slip Indicator, Mk. 2, under a licensing agreement with Kelvin & Hughes, Limited, of England. This instrument is to be engineered to Canadian standards (screw threads, etc.). An outstanding feature will be the fact that it will cost only a fraction of the amount at which presently used comparable instruments are valued.

In addition to these major items, Aviation Electric is turning out tachometer drive adapters, throttling valves (for regulating suction to such instruments as the T & B), and oxygen check valves, as well as numerous other small fittings.

Total employment is now over 600, including a large engineering department which is capable of carrying out original design work on instruments, hydraulic equipment, servo mechanisms. Creative design is being done to meet manufacturers' specific instrumentation and hydraulic problems.

Bristol of Canada

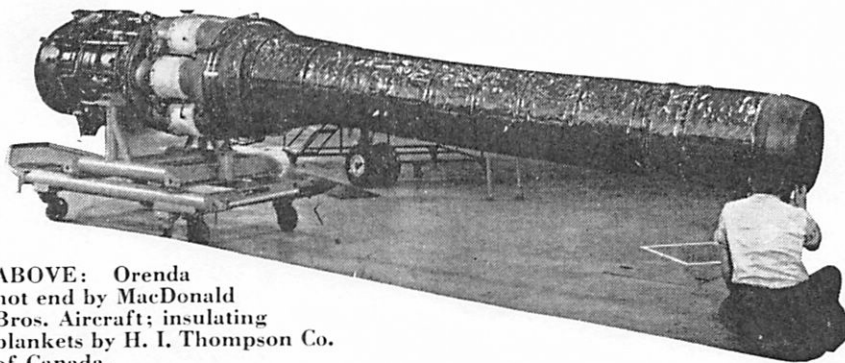
BRISTOL activities in Canada fall into two distinct spheres, one being the sales of the products of The Bristol Aeroplane Company, of England, as well as those of Rotol Limited, and the other being the repair and overhaul of, in the main, aircraft engines.

The sales activity is carried out by The Bristol Aeroplane Co. of Canada Limited, which bases its operations in Montreal. The success of the sales efforts of this company requires no comment other than to point to the fact that Bristol Freighters are now in service with TCA, Associated Airways, Maritime Central Airways, and the RCAF.

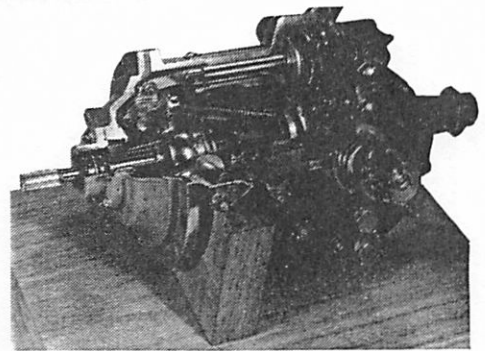
The engine repair and overhaul phase is effected by two companies, Bristol Aeroplane Engines (Eastern) Limited, and Bristol Aeroplane Engines (Western) Limited, the former being located at Montreal and the latter at Vancouver.

Bristol Aeroplane Engines (Eastern): By far the largest, in terms of

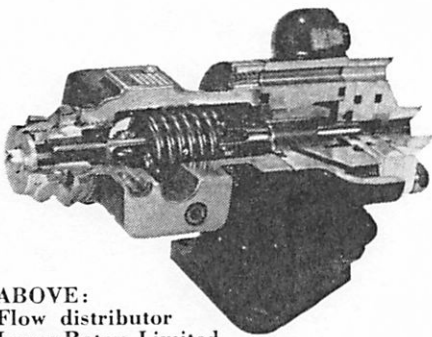
MADE IN CANADA



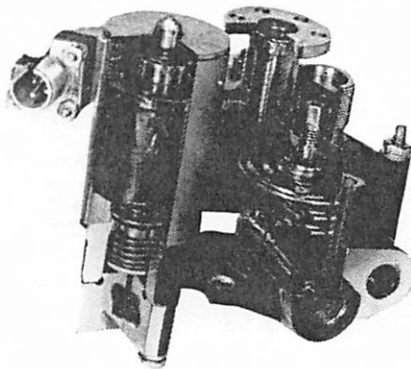
ABOVE: Orenda hot end by MacDonald Bros. Aircraft; insulating blankets by H. I. Thompson Co. of Canada.



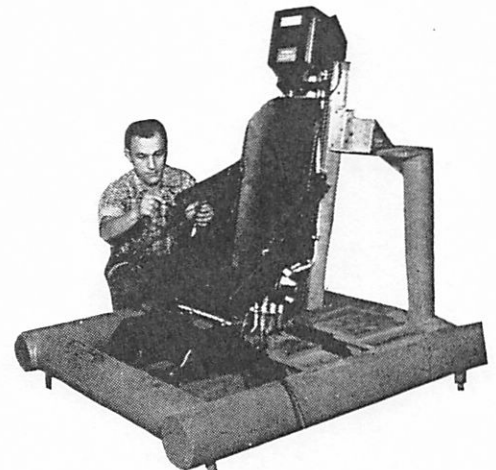
ABOVE: Orenda fuel pump by Lucas-Rotax Limited.



ABOVE: Flow distributor Lucas-Rotax Limited.



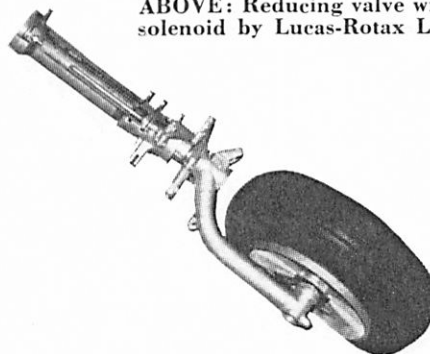
ABOVE: Reducing valve with solenoid by Lucas-Rotax Ltd.



ABOVE: T-33 Ejection Seat by Thor-Canadian Company.



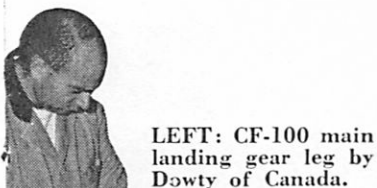
ABOVE: Turbine blade forging by Aluminum Company of Canada.



ABOVE: F-36 nose landing gear assembly by Jarry Hydraulics.



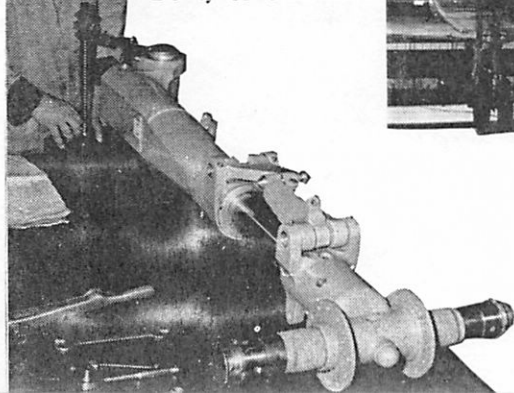
ABOVE: Dunlop CF-100 wheel & brake assembly by Dowty of Canada.



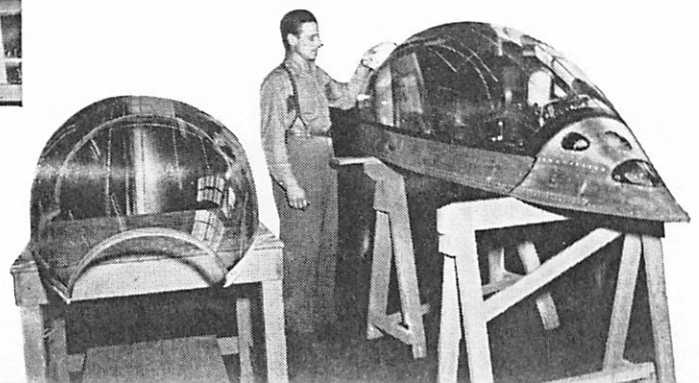
LEFT: CF-100 main landing gear leg by Dowty of Canada.



ABOVE: CF-100 plastic nose radome by Brunswick-Balke-Collender Company.



RIGHT: Cockpit canopies by Crystal



physical properties and volume of business, of the affiliated Bristol companies in Canada, this firm moved into a modern 155,000 sq. ft. engine overhaul facility in Montreal North during July of last year, and employment at this new plant has risen to nearly 750, as compared to 550 at the old location.

This figure is expected to rise to approximately 900 when the Wright R-3350 Turbo-Compound overhaul program is in full swing. This work is being carried out on behalf of the RCAF, which uses these engines in its Fairchild Packets, and will also take in TCA's Turbo-Compounds, which are used in the air line's new Super Constellations. Work continues on the overhaul of Rolls-Royce 622 and Packard 224 series Merlin powerplants for North Stars and Lancasters respectively; also Packard V-1650 Merlins for Mustangs; Wright R-2600 series for Avengers and Mitchells; Wright Cyclone R-1820 series and Whirlwind R-760 and R-975 series; Bristol Centaurus 18 series for the RCN's Hawker Sea Furies, and Bristol Hercules 634 series for Bristol Freighters.

Recently completed was a new test house, which is said to be the largest of its kind in Canada and capable of handling engines up to 5,000 h.p. It is also capable of adaptation for the testing of turboprop engines.

Bristol Aeroplane Engines (Western): This company occupies a modern 32,000 sq. ft. plant at Vancouver International Airport. Employing about 175 persons, it overhauls Pratt & Whitney and Wright engines for the RCAF as well as for a number of commercial operators in Western Canada. It is also engaged in the overhaul of all types of propellers, carburetors and fuel injectors for both the RCAF and civil operators.

A former activity was the overhaul of Bristol Centaurus engines from RCN Sea Furies, but this work is now handled by the Eastern affiliate company.

Dowty of Canada

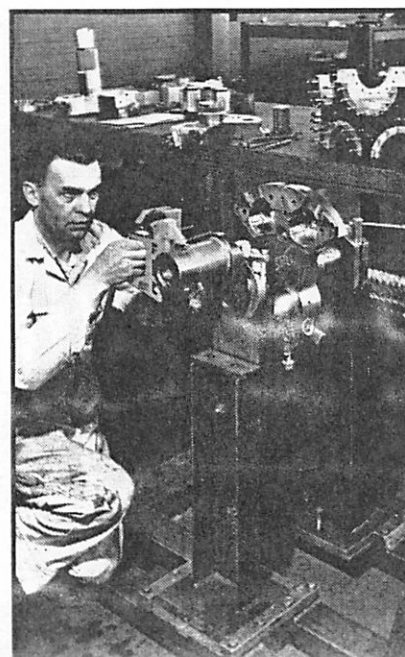
HIGHLIGHT of recent months for Dowty Equipment of Canada Limited was the opening of a new manufacturing plant at Ajax, Ontario, close to the site of its original factory, which continues in use. The new plant added 20,000 sq. ft. of



Aviation Electric Limited technician is shown checking the optical system of a Type B3 driftmeter on a collimator stand, only driftmeter test stand of its kind in Canada, AEL says.



Above, CF-100 stabilizers made by Chatco Steel products; Below, mechanic at Bristol Aeroplane Engines (Western) Ltd. fitting a crankshaft.



plant area to Dowty's Ajax facilities, bringing the total to 70,000 sq. ft.

Now in its fourteenth year of operation, the Canadian firm produces special hydraulic and mechanical equipment for aircraft, turbine engine, mining, and general industrial purposes. While up till now the main emphasis has been on aviation products, steps are being taken to penetrate the market for hydraulic and mechanical devices in the Canadian mining, industrial, and farm fields.

Dowty reports that the current dollar volume of its aircraft business is divided approximately one-third to repair and overhaul of equipment for established RCAF, RCN, and civilian aircraft, together with the supply of spare parts for the same equipment. The balance of the business is provided by the design, development and production of equipment for newer Canadian aircraft, including the CF-100 and the Beaver. The whole operation involves some 15 different types of aircraft and 300 different units. Dowty also produces Dunlop wheel and brake sets and associated mechanical equipment under license from the Dunlop Rubber Company of England.

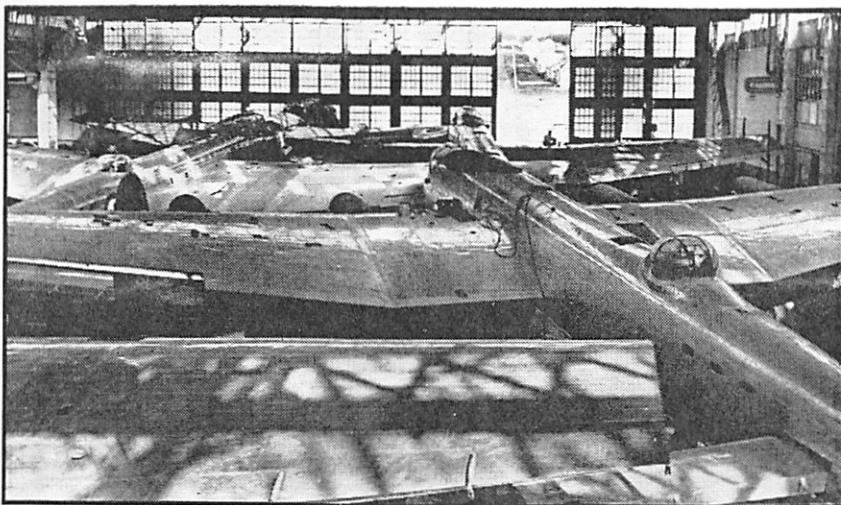
Employment is approximately 350, with an extensive network of suppliers providing work for large additional numbers.

MacDonald Bros.

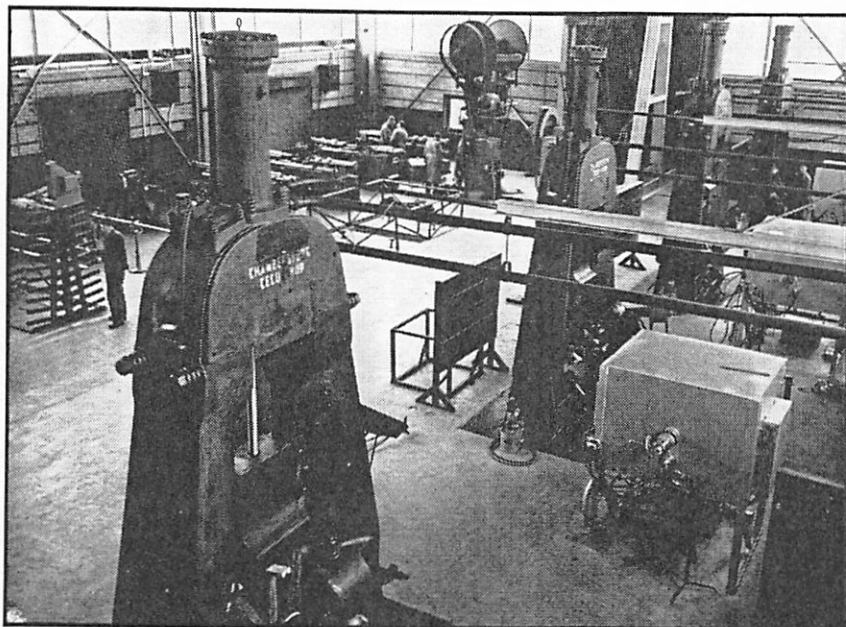
ACTIVITIES at MacDonald Bros. Aircraft Limited, Winnipeg, has reached a levelling-off period and a slowing down of conversion and overhaul of Beech Expeditors. This decline has resulted in a slight reduction in the number of employees from a peak of over 1,100.

The active program is a diversified one, consisting of aircraft overhaul for the RCAF, and manufacturing work sub-contracted from principal aircraft concerns in Eastern Canada. Productive floor space exceeds 200,000 sq. ft., and additional space for expansion as needed has been acquired.

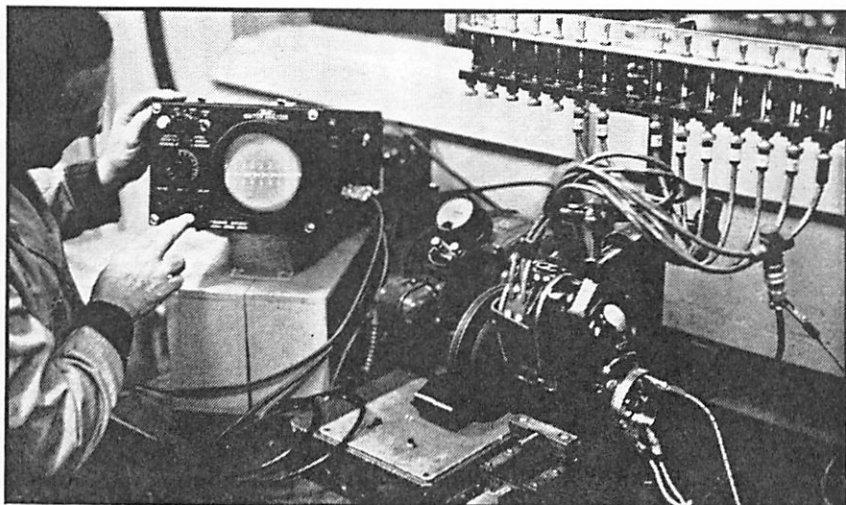
The company is continuing with the major overhaul of C-45 Expeditors and conversion of the C-45 to D-18S trainers for use in navigator and pilot training by the RCAF. Work on F-51 Mustangs has included modification and weatherization for Canadian



Above, Lancaster overhaul and modification is a major activity at the Eastern Passage plant of Fairey Aviation Company of Canada. Below, a general view of the forge shop at Canadian Steel Improvement, showing part of the line of drop hammers, forge furnaces, and, in the background, electric resistance upsetting machines. This company forges turbine blades for the Orenda.



An Aviation Electric technician is shown checking a Type SB9RN Magneto on a magneto test stand and observing its performance on a Bendix ignition analyzer. Overhaul of magnetos is just one phase of Aviation Electric's varied operation, which now includes manufacture of a line of instruments.



operation. Supplementary to the airframe overhaul program, MacDonald Bros. is manufacturing quantities of Mustang and Mitchell spare parts for the RCAF under license from North American Aviation Inc.

A feature of the modification work on both Mustang and Beech aircraft is the replacement of existing radio communication equipment with units of modern design. In addition to this work on airborne units, the electronic department carries out, for the RCAF, overhaul of ground station communications consisting of transmitting and receiving apparatus.

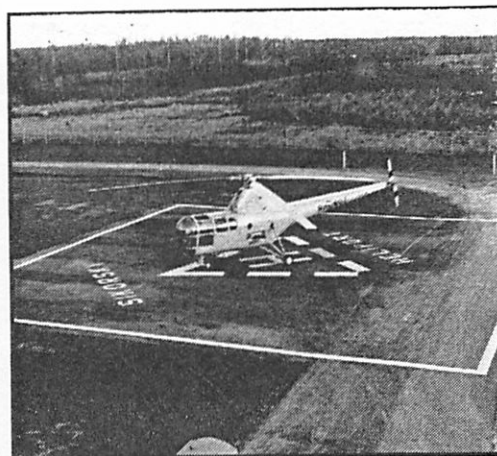
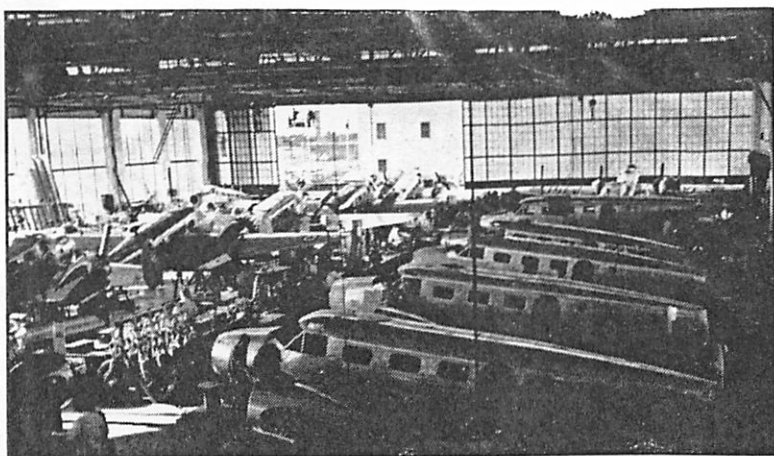
Manufacture of precision turbojet engine components for high temperature application is currently being carried out under sub-contract from Avro Canada, and Rolls-Royce of Canada. This work involves production of sheet metal components comprising the exhaust portion or "hot end" of the Orenda and exhaust unit for the Nene. Other components are being built for piston-type engines, including the exhaust tail-pipe assembly for the Beaver and exhaust stacks and shrouds for Mustang and Mitchell aircraft.

As a special service, MacDonald Bros. Aircraft maintains a mobile field crew of aircraft mechanics who travel between various RCAF stations in Western Canada. One of the main functions of this group is to activate aircraft which have been in storage, or to inhibit engines and otherwise prepare for storage aircraft which the RCAF removes temporarily from service.

The company was first incorporated 23 years ago for the purpose of manufacturing seaplane floats under license from Edo Corporation, New York. Float production has been continuous since that time with recent production being largely for The De Havilland Aircraft of Canada for DHC-2 Beaver and DHC-3 Otter aircraft. Quantities of Edo Model 58-4580 floats for the Beaver have been manufactured in Winnipeg for the past six years.

Northwest Industries

"STRATEGICALLY located for service" is Northwest Industries Limited, Edmonton, which is engaged in the repair and overhaul of a wide variety of types of aircraft and employs a staff numbering more than 700.



Most recent highlight for this company was the beginning of work on a sub-contract from Canadair Limited for the repair and overhaul of RCAF T-33's based in Western Canada. Early in 1954 the first aircraft arrived at Northwest Industries' base on Edmonton Municipal Airport, thus marking the entry of this firm into the jet era of the aviation industry in Canada.

The bulk of the work being carried on at the present time in the company's three large hangars (totalling approximately 200,000 sq. ft. in area) is for the Department of Defense Production. This includes contract work on RCAF Mitchells, Dakotas, Harvards, and Fairchild C-119 Packets, as well as T-33's.

Overhaul and repair work for commercial aircraft is also undertaken, with complete service being available on Douglas DC-3's (Northwest is a Douglas authorized service centre for DC-3 aircraft), Fairchilds, Lockheeds, Bristols, Bellancas, or any other type of aircraft.

The facilities available are extensive and include: a complete electronics department; instrument department; fabric shop; hydraulics shop; accessories department doing specialized work; a powerplant build-up shop; sheet metal shop; and an assembly shop carrying out the normal functions of repair and overhaul.

Increased operations has meant the enlarging of several of the departments. The instrument department has been expanded to the extent where it is now able to overhaul more than 800 varied instruments a month, all conforming to RCAF and DoT requirements.

The engineering department has moved into more spacious surround-

The Expeditor overhaul & modification line at MacDonald Bros. (left) is still busy; right, this RCAF S-51 has just been overhauled by Canadian P & W, from whose heliport it is about to make a take-off.

ings with its enlarged staff. This department is capable of any type of design modification to an aircraft or any of its various systems. The accessories department, too, has moved to newer and larger quarters, where it continues to provide complete overhaul and repair service on fuel, oil, and hydraulic pumps, starters, generators, inverters, spark plugs, and Janitrol heaters.

Fairey of Canada

THE LARGEST aircraft industry component east of the Montreal area is The Fairey Aviation Company of Canada Limited, which is situated at Eastern Passage, N.S., near Halifax. Less than a mile separates the Fairey plant from the RCN's Naval Air Station, HMCS Shearwater.

A major plant expansion program completed in 1952 raised the total plant area to 208,000 sq. ft., of which some 175,000 sq. ft. are available for production. Employment reached 860 early in 1953 and has now climbed to some 950, representing all the trades and skills peculiar to the aircraft industry.

Conversion of RCN Avengers (first conversion order, now complete, involved 74 of these aircraft) and RCAF Lancasters continue to be the major program, though overhaul and repair of Navy Sea Fury and Avenger aircraft is carried on without interruption. The plant is capable of handling as many as ten Lancasters at once and most of the time this

many are on hand for conversion to navigation trainers or for modification to latest RCAF standards.

The machine shop, said to be the most modern and best equipped in the Maritimes, is occupied chiefly with the manufacture of modification kits and aircraft spares. This machine shop, though not outstanding as to size, contains machinery for milling, grinding, honing, lapping, etc. Among the more specialized types of equipment are a nitriding furnace, a 20-l projector, surface measurer with C.L.A. recorder, high-speed furnace, diaform wheel grinding machine, and up-to-date crack detection devices, as well as a variety of electro-plating and heat treat facilities.

A separate machine shop for the manufacture of the Hydro-Booster—a hydraulic flying control actuating unit for the CF-100—has been completed and Fairey reports that work in this department is proceeding satisfactorily.

The design organization has now been built up to a staff approaching 40 persons. It contains a good blending of all the various specialized skills required for the company's present needs, and those of the immediate future. The staff has been selected with an eye to providing a proper foundation on which to expand further.

Standard Aero

EXISTING RCAF contracts covering the repair and overhaul of aircraft engines and accessories are sufficient to keep Standard Aero Engine Limited, of Winnipeg, busy through 1955. In addition, this company handles a continually increasing volume of similar work for commercial operators from coast to coast, though geographical location

dictates that most of Standard Aero's commercial customers should be situated in the area west of Fort William.

During the past year, additional floor space has been acquired and new test equipment obtained to meet the demands of jet-propelled aircraft. Plant area has been increased by about 5,000 sq. ft. to a total of 45,000, this being made up mainly by two large buildings, one of which is the main overhaul shop of some 25,000 sq. ft. Number of personnel has risen slightly from 150 to 175.

The largest engine the company

Canada could so quickly become accepted as an important part of Canada's aircraft industry is due in some part to the fame of its American parent, which has bequeathed to its Canadian progeny a name to be reckoned with in aeronautical, as well as marine, circles.

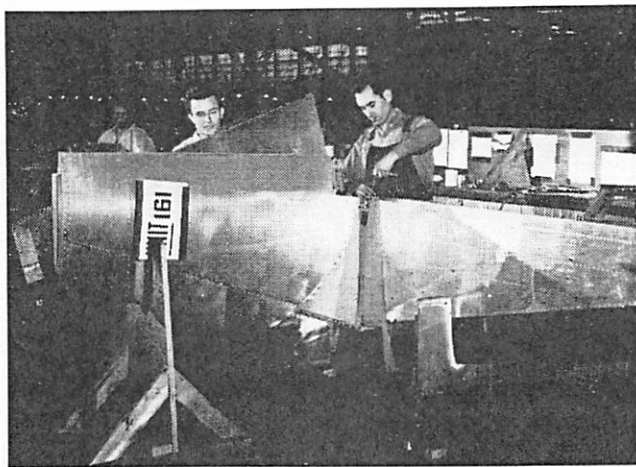
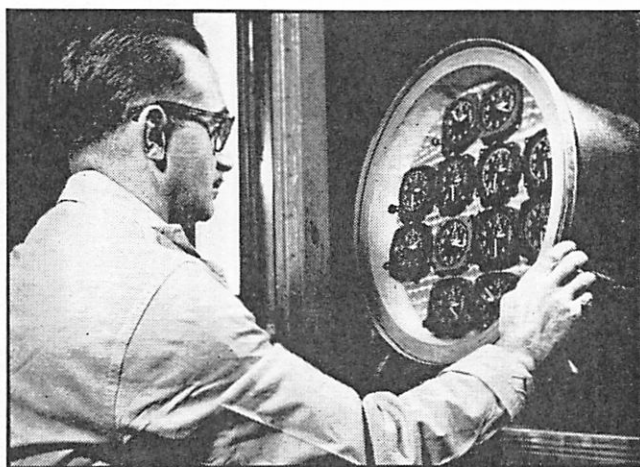
At the same time, this should not detract from the excellence of the achievement of those in Canada who nursed the Canadian company out of the embryonic stage to its present position as a quantity producer of an extensive line of aeronautical instruments.

and purposes, the company is under complete Canadian management.

Canadian Aviation Electronics

A PRODIGY in a field where prodigies are as commonplace as pretty girls in Hollywood, Canadian Aviation Electronics Limited nevertheless is an outstanding example of what is popularly described as "unparalleled growth."

Starting from scratch in May, 1947, in a hangar at St. Hubert Airport, near Montreal, CAE has grown from a three-employee operation as an electronic jack of all trades to a major



overhauls is the 600 hp P & W R-1340, since its specialty is the repair and overhaul of engines in the lower horsepower ranges. For the RCAF it carries out overhauls on D.H. Gipsy and P. & W. engines, as well as on more than 200 different types of accessories. It overhauls these types of engines for commercial operators as well, plus such other well-known makes as Continental, Franklin, Lycoming, Jacobs, etc.

Standard is Western Canada distributor for a wide variety of premier aviation products and says that at Winnipeg and Vancouver it carries the largest and most diversified stock of aircraft and accessory parts in Canada.

Sperry of Canada

SPERRY GYROSCOPE Company of Canada Limited is a comparative newcomer to the Canadian scene, having been formally established as recently as the latter part of 1950. However, in spite of the comparative youth of the organization, it has grown impressively in size and scope. The fact that Sperry of

Left, Kollsman altimeters being calibrated at Sperry Gyroscope Ottawa Limited. Right, the complete fin & rudder and stabilizer & elevator assembly for the T-33 is manufactured by J. H. Connor & Son Limited of Hull, P.Q.

Facilities of Sperry Gyroscope of Canada include an 85,000 sq. ft. manufacturing plant at Montreal and a comprehensive instrument repair and overhaul centre at Ottawa which is operated by an affiliate company known as Sperry Gyroscope Ottawa Limited. In addition to these two main establishments there are district offices at Vancouver, Halifax, and Port Colborne, Ontario, through which sales and service are effected to the aircraft and marine industries.

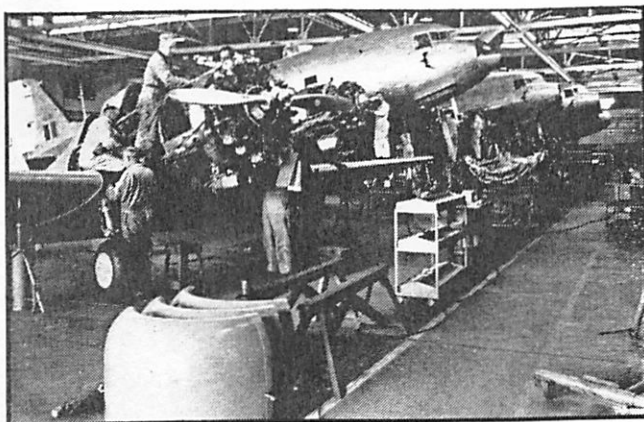
During the initial stages of establishing the instrument manufacturing operation in Canada, a number of key posts were filled by personnel from the U.S. associate. As time went on, these were progressively replaced by Canadians, with only a few U.S. personnel remaining in the company in advisory capacity. The present situation is that to all intents

organization employing nearly 1,000.

This astonishingly versatile firm performs a diversified line of work including a variety of custom jobs for the Armed Services; electronics, pneumatics, and hydraulics for industry; production of television sets and combination radio phonographs for the consumer market.

Of most interest to the Aircraft Industry is the CF-100/4 flight simulator, which CAE has designed and is manufacturing under a licensing agreement with Curtiss-Wright Corporation, whose Dr. Richard Dehmelt holds the basic patents on flight simulators using the particular principles involved. Other major projects have included the installation of Canada's radar defence circuits across the Arctic, fire control research, etc. The company's engineering research department is prepared to undertake original design or product development in aerodynamics, electronic computers, pulse and radar techniques, recording devices, servomechanisms, telemetering, fire control, guided missiles, and so on.

CAE has recently completed a



130,000 sq. ft., \$3,000,000 plant at Montreal (\$1,000,000 for land and buildings, balance for equipment) which will be used to carry out such projects as those mentioned. Aside from the Montreal facilities, other plants for repair, overhaul, and production are located at Winnipeg and Vancouver.

Canadian Steel Improvement

CANADIAN Steel Improvement Limited, of Etobicoke, Ontario, is a modest organization which has been working so hard since it put its forging plant into operation early in 1952, that it has not been able to pause long enough to blow its own horn.

A subsidiary of The Steel Improvement & Forge Co. of Cleveland, Canadian Steel Improvement occupies a 60,000 sq. ft. plant employing approximately 300 persons.

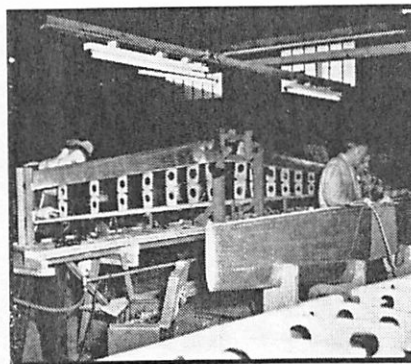
Since the opening of this plant in February, 1952, the company has turned out nearly 2,000,000 forgings in some 25 different designs for Canada's Aircraft Industry. Initial production was aimed at making the Canadian industry self-sufficient for turbojet turbine and compressor blades. Today, it has been expanded to embrace other aircraft forgings such as burner covers, struts, cams, joint plates, gear blanks, and rings.

To produce Orenda turbine blades, this firm forges Atlas stainless steel so close to finish size that only polishing of the blade's surface and some machining on the root is required. Blades are rough-forged to shape by drop hammers; final sizing, for precision blades, is achieved by coining. Some of the tolerances met are $\frac{1}{2}$ of 1° on twist from base to tip, .006" total on overall length, etc.

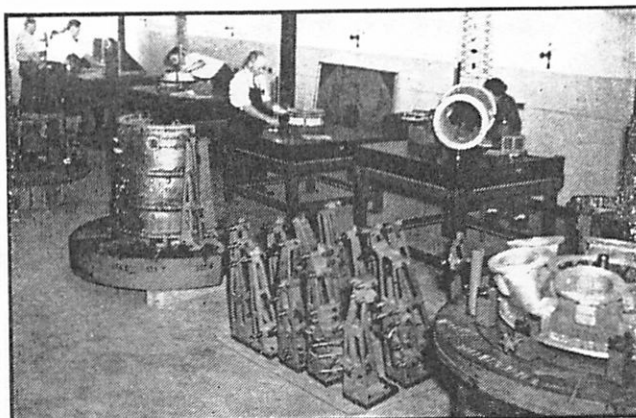
Left, Harvard and Dakota overhaul at Northwest Industries; right, Orenda light metal castings are produced by Light Alloys Limited, Renfrew, Ont.



Above, T-33 rear fuselage production at Roy Industries Limited; below, Beaver tailplane under construction at Sanderson Aircraft Limited, Malton.



Aware that the quality of the finished product depends largely on the quality of raw materials and tools, as well as the processors' skills, this firm manufactures the dies in its own shops. In addition, a large staff of experienced tool designers and aircraft engineers is available for customer service. This enables buyers such as Avro Canada, Lucas-Rotax, Rolls-Royce, Canadian Flight Equipment



and others, to submit preliminary drawings which are developed to create a forged part with the optimum strength-weight ratio for specific jobs.

Aircraft Industries of Canada

ONE OF the most versatile aircraft shops in Canada is operated by Aircraft Industries of Canada Limited, an affiliate of The Babb Company (Canada) Limited. Located at St. Johns, P.Q., Aircraft Industries operates an 85,000 sq. ft. plant through which an amazing variety of types and sizes of aircraft is constantly passing.

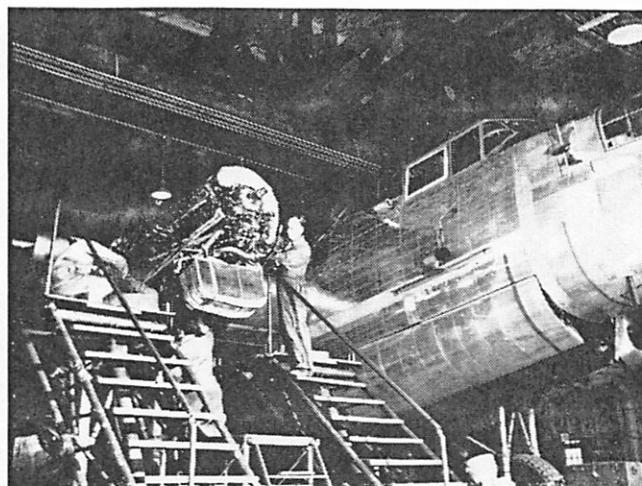
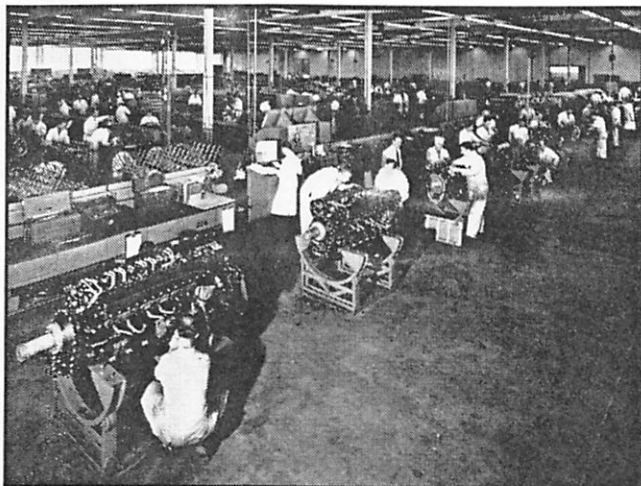
A major project continues to be the repair and overhaul of RCAF Harvards, as well as Cansos and Dakotas. On the civil side, Aircraft Industries has been carrying out overhauls and conversions on such aircraft as the Grumman Mallard, Lockheed Lodestar, Beaver, single and twin Beech, Norseman, Cessna, and Aero Commander. Some of the conversion work involves rebuilding stripped, or military types, into plush executive aircraft. The company is DoT approved to handle aircraft of up to 35,000 lbs.

The staff of 300 are employed in a number of shops which cover every phase of activity involved in aircraft repair, overhaul, and modification work.

Canadian Flight Equipment

IN PRODUCTION by Canadian Flight Equipment Limited at its Cobourg, Ontario, plant is the Martin-Baker Mk. 2 Automatic Ejection Seat, which is used in the CF-100/4. This company also produced the Mk. 1 version of the Martin-Baker seat, which is installed in earlier versions of the CF-100.

Canadian Flight Equipment also has a plant at Campbellford, Ontario,



which is equipped with shops for machine work, sheet metal, and fabric. At Campbellford, an ejection seat training tower is being produced under an RCAF contract.

The company holds North American manufacturing rights for all products of Martin-Baker. This includes the new lightweight ejection seat (weighs only 50 lbs.) developed in the U.K. by Martin-Baker. According to Canadian Flight Equipment, the potential market for this seat in North America is very promising, and a number of aircraft manufacturers in the U.S. have already shown their interest. The lightweight seat retains all the well-known and well-tried features of current Martin-Baker seats and like the Mk. 2, safe ejections can be made at heights as low as 200 feet.

Genaire Limited

AT THE present time, Genaire Limited, located at St. Catharines Airport, is engaged in the overhaul of airframe and armament components, as well as the manufacture of various types of training aids and ground handling equipment. The

Left, Merlin assembly line at new plant of Bristol Aeroplane Engines (Eastern); right, Lancaster overhaul by Canadian Pacific Air Lines (Repairs) Limited at Calgary.

company also does considerable work in the civil aviation field by way of repair, maintenance, and overhaul of aircraft to DoT requirements.

Genaire employs approximately 200 men in a working space of 26,000 sq. ft., and is fully equipped to cope with all problems relative to aircraft maintenance and overhaul.

Owing to a rapid expansion in its electronics section, Genaire has recently announced the formation of an associated company known as Avionics Limited (See page 91), which will handle matters related to the field of electronics and communications, and whose headquarters will be located on the outskirts of Niagara-on-the-Lake, Ontario.

Jarry Hydraulics

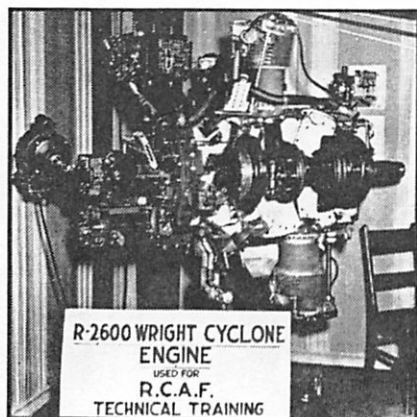
AN ACTIVE participant in the Aircraft Industry is Jarry Hydraulics, Montreal, a division of Jarry Automobile Limited. Jarry became associated with aircraft component manufacturing during World War II when it produced many of the parts for such Canadian-made aircraft as the Helldiver, the Anson, Bolingbroke, Harvard, and Mosquito.

Jarry Hydraulics resumed operations in 1950 when the shops were restocked with close to a million dollars'

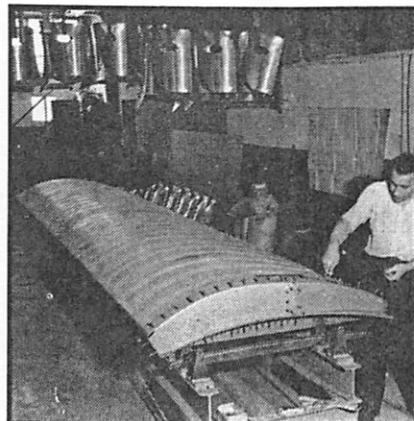
worth of new machine tools. Facilities were set up to provide manufacturing capacity for the hydraulic components in the Sabre, for which Jarry received a sub-contract from the prime contractor, Canadair Limited.

Included in these components are the complete nose gear assembly, dive brake actuator, aileron actuator, accumulator assembly, nose gear actuator, cylinder assembly for the main landing gear down lock, dive flap actuator, "all-moving" stabilizer actuator, the cylinder assembly for operating the main landing gear, and the compensator assembly. By the end of 1953, more than 18,000 such hydraulic assemblies had been delivered, all ahead of schedule.

Jarry had licensing agreements covering the production of Sargent valves in Canada, as well as the exclusive rights for the manufacture of Pulsometer fuel pumps for the whole of North America. A third agreement has been completed with French and British Messier, under which Jarry Hydraulics holds Canadian manufacturing rights for a 4,000 p.s.i. hydraulic system and landing



Left, a typical sectioned engine by Field Aviation for RCAF ground training. Right, a radar antenna parabola under construction by Thor-Canadian Limited, Toronto.



gear. Other negotiations are in progress to provide first-class engineering design facilities in Montreal.

Thor-Canadian

THOR-Canadian Company Limited, of Etobicoke, near Toronto, has been manufacturing aircraft ejector seats for the past two years under contract to Canadair Limited. During this period Thor has produced more than 1,000 pilot ejector seats and is continuing to turn out these seats for both the F-86 Sabre and the T-33 Silver Star.

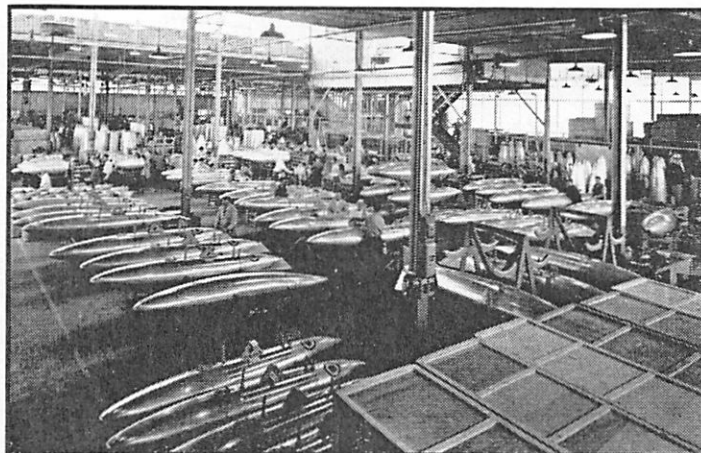
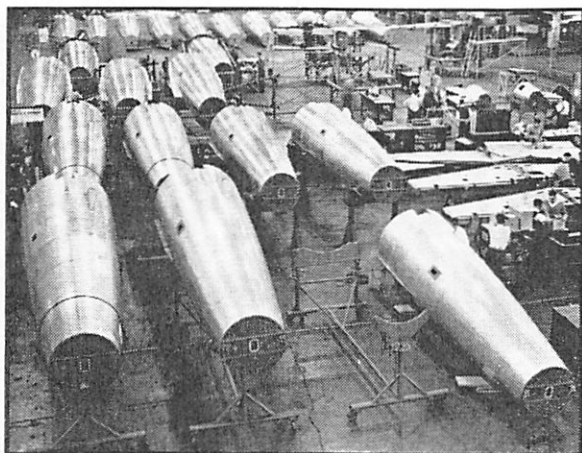
Thor is manufacturing the seats in its recently opened plant in

Canada company. Western Propeller Company Limited, of Edmonton, began operations a few years ago, offering aircraft operators a repair and overhaul service for propellers and associated equipment. Western Propeller was until recently the only commercial organization in Canada which specialized exclusively in this very important phase of aircraft maintenance.

In September of last year, this firm acquired a new 15,000 sq. ft. shop. Employing 55 persons, Western carries out complete overhaul and repair of RCAF propellers and governors for the entire mid-west

turbojet. The job of turning out these units was originally sub-contracted to Canadian Acme Screw & Gear Limited, which had long been active in the production of automotive-type gears.

To handle the project, Canadian Acme established a separate division, York Division, which later became York Gears Limited, a subsidiary of Russell Industries. Included in the units produced by York Gears are, for the Series 10 engine used in the Sabre, the power take-off, bevel drive, oil pump drive, and auxiliary drives for the tachometer and hydraulics; for the earlier series produced and in produc-



Etobicoke Township, just west of Toronto. Seventeen acres of property allow for ample expansion. Some 35 craftsmen are employed in the actual assembly operations of the ejector seat and, in addition, the services of the machine shop, press shop, and tool room are utilized. Approximately 10,000 sq. ft. are devoted exclusively to this phase of Thor's operations. Economy in space is achieved through the use of the most up-to-date equipment, including overhead storage on a conveyor system. All tools, dies, jigs, and fixtures required for the manufacture of the T-33 seat were produced by Thor.

In addition to the manufacture of ejector seats for Canadair, Thor manufactures two types of radar antenna parabola. Thor also produced the tools and fixtures required for the manufacture of this specialized equipment.

Western Propeller

THE PROVISION of a highly specialized service has resulted in success for one Western

Chatco Steel Products Ltd., Tilbury, Ont., makes these CF-100 rear centre section fuselages (left), while Hussmann Refrigerator Co., Brantford, Ont., constructs F-86 drop tanks (right).

area. Size of the propellers overhauled ranges from the wooden fixed-pitch models from Auster AOP lightplanes to the big four-bladed Hamilton Standard units from Fairchild Packets.

The company also handles the majority of commercial overhaul work available in Western Canada. Other activities include the manufacture for the RCAF of wooden propeller cases for two, three, and four blade propellers. A stock of Hamilton Standard repair parts is maintained, and the Company is an authorized distributor for Hartzell, McCauley, Flottorp, and Sensenich propellers.

York Gears

AN IMPOSING contribution to Orenda engine production is being made by York Gears Limited of Toronto, which employs 1,200 persons on the production of gears and gear boxes for Avro Canada's big

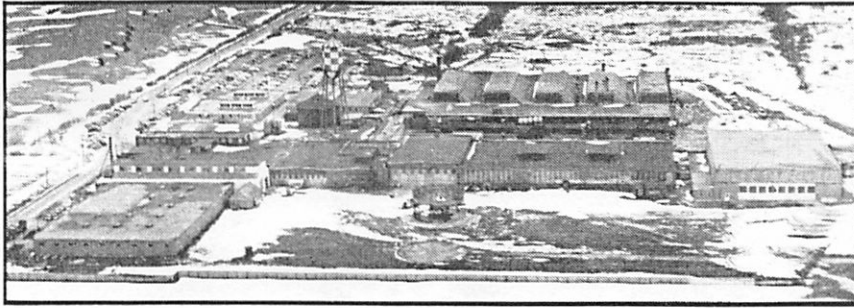
tion for the CF-100, the power take-off, bevel drive, auxiliaries drive, oil pump, a.c. accessories.

The high standard of precision to which this Company must work is illustrated by the information that the standard turned surface finish is 63 micro inches, while one job has a two light-wave finish.

Fleet Manufacturing

FLEET, a name that is almost as old as aviation in Canada, has in the last year shown new life and vigour in its activities, harbingers of the role that this company foresees for itself as an increasingly important component of Canada's Aircraft Industry.

The fortunes of Fleet, which was first known as Fleet Aircraft Limited, reached a peak during World War II, but in the post-war period the organization almost foundered on the rocky shoals of peacetime business. During one period that lasted several years, Fleet dropped out of the Aircraft Industry entirely, turning to the production of consumer goods and similar



AVIATION SUB-CONTRACTS are keeping Fleet Manufacturing's plants busy.

items. At this time, the name was changed to Fleet Manufacturing Limited.

From the low ebb of those years Fleet has bounded back with new strength. To a substantial degree, Fleet's new stability and bright future stem from a management agreement reached with Canadair Limited early in 1953, when two top Canadair executives, Herman L. Eberts and B. Daniels, were sent down to the Fort Erie, Ontario, plant to reorganize and revitalize the administration.

This management agreement has since been terminated and Fleet has returned to independent status and independent financing. However, with the cancellation of the agreement, both Mr. Eberts and Mr. Daniels elected to associate themselves with Fleet permanently. Mr. Eberts is now president and general manager, while Mr. Daniels is manufacturing manager.

The recent improvement in Fleet's fortunes is reflected in the annual statement for the year ending September 30, 1953, when a net profit of \$401,264 was reported. The year previous there was a net loss of \$32,350, a figure that was probably influential in the decision to sign the

management agreement with Canadair.

The company is now back in the field it knows best—the Aircraft Industry. Activities are centered around sub-contracts with three major aviation firms, Canadair Limited, Avro Canada, and Republic Aviation Corporation, as well as with two giants of the electronics industry, Canadian General Electric, and Northern Electric.

For Canadair Limited, Fleet makes the following items for the F-86: main wing leading edge and trailing edge assemblies; main wing front and rear spar assemblies; top and bottom wing skin assemblies; rear fuselage assembly; centre wing box assembly; plus plastic parts and components. For Avro Canada, the Fort Erie firm manufactures CF-100/4 ailerons and flaps and associated spares, as well as a number of other classified assemblies. The Republic Aviation contract calls for the production of F-84F Thunderstreak nose wheel landing gear drag braces and spares for same.

For both Northern Electric and Canadian General Electric, Fleet is making radar antenna and tower assemblies (complete with derrick). These assemblies comprise basic equipment for the aircraft control and

warning installations that form the so-called radar network in Canada's Northland.

Apart from these major projects, Fleet is also manufacturing aircraft parts and assemblies for Hussman Refrigerator Company, Thor-Canadian Company, Precision Gear (Canada), and Genaire Limited.

To handle this wide variety of precision work, Fleet has a 277,000 sq. ft. plant that is adequately provided with machine tools and other equipment for the manufacture and assembly of aircraft and aircraft components. There are currently about 850 employees.

With an eye to the necessity for keeping these facilities busy in the future, Fleet has been investigating the possibilities of entering into the helicopter manufacturing and sales field, and is presently negotiating with certain of the major U.S. helicopter manufacturers for the licensing of their products. One such manufacturer is Doman Helicopters, Inc., of Danbury, Connecticut.

Roy Industries

THOUGH hard hit by the cancellation of the T-36 contract, E. Roy Industries Limited has retained a high degree of activity in the aircraft field during the past year.

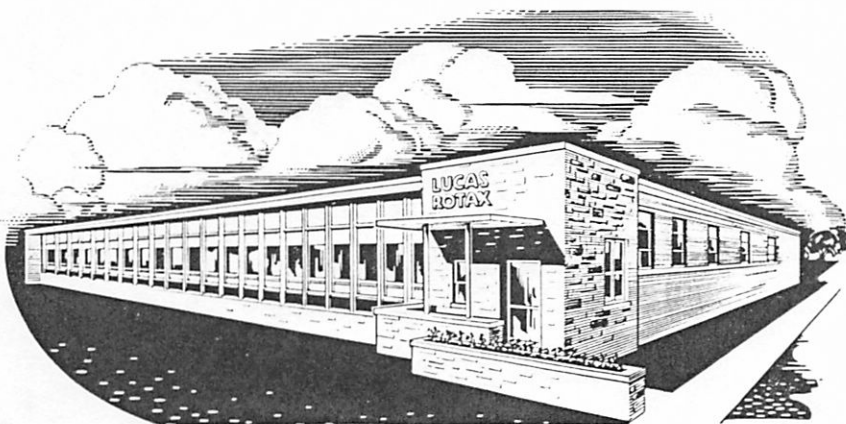
At present the only major project in hand is a sub-contract from Canadair for the production of complete rear fuselages for the T-33AN. In addition, during 1953 this Company completed the fabrication of the tooling for the T-36 rear fuselage, and also completed a number of orders covering the repair & overhaul of such aircraft parts as stabilizers, flaps, ailerons, etc.

Roy Industries, located in L'Assomption, P.Q., has a well-equipped 125,000 sq. ft. plant, much of which is available for aircraft work. The wide variety of shops includes a machine shop which produced all the necessary tooling for the T-33 rear fuselage as well as that of the T-36.

Just prior to the cancellation of the T-36 contract, the number of employees had risen to 725.

Other Companies

• **Aluminum Co. of Canada Limited:** This company is a main source in Canada of light metal products and materials. From the Alcan Kingston

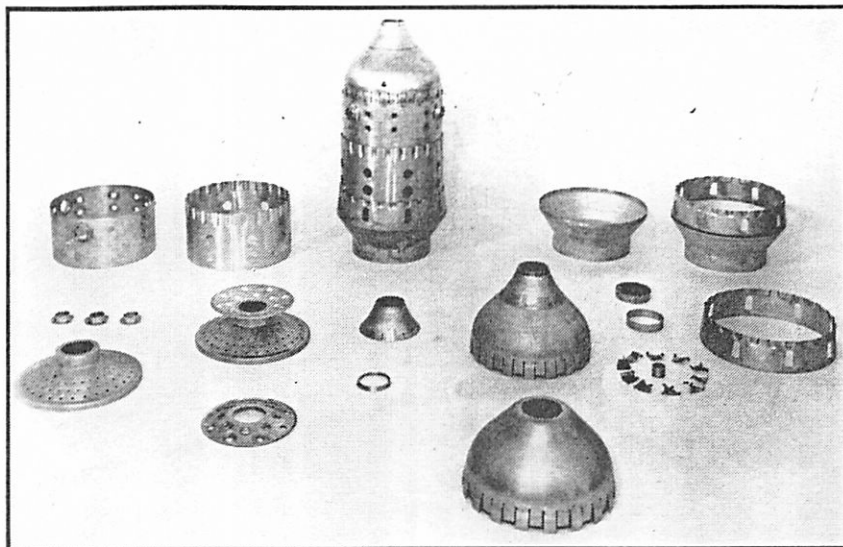


LUCAS-ROTAX recently opened this new overhaul plant at Montreal.

plant comes aluminum sheet and extruded sections, as well as forgings. Quantities of bar and forging stock are produced at the Arvida facilities, while the Etobicoke Works near Toronto continues to turn out magnesium and aluminum die, sand, and permanent mould castings of intricate design. Production facilities of this Company will be considerably expanded with the approaching inception of operations at Kitimat, B.C.

•**CPAL (Repairs) Limited:** Located at Calgary, this subsidiary of CPA operates what used to be the RCAF's No. 10 Repair Depot on behalf of the RCAF. It occupies a number of hangars and buildings on Calgary Municipal Airport, these totalling more than 66,000 sq. ft. Employment, which reached a peak of over 650 during 1953, is now down to about 575. The facilities are devoted exclusively to the inspection and repair of RCAF aircraft of all types, ranging in size up to Lancasters. With the moving of 4 FTS from Calgary to Penhold, the work load for CPAL (Repairs) has been gradually diminishing, since one major function was the performance of routine maintenance operations on the school's Harvards. Function of the base is now reverting to that of a Repair Depot, which was the original intention prior to the sudden organization of 4 FTS at Calgary.

•**Prencos Progress & Engineering Corp. Limited:** Prencos reports that during 1953 it further consolidated its position as the largest Canadian manufacturer of flexible aircraft hoses with detachable and re-useable fittings and self-sealing couplings. As Canadian licensee for the products of Aeroquip Corp. of the U.S., Prencos introduced a range of completely new designs of this type of equipment. To cope with steadily expanding business, new machinery was added at the Company's main plant in Toronto and production facilities were increased by the acquisition of a new building. A research & development laboratory has been installed, equipped to do industrial research and some basic research in hydraulics. Prencos's increasing aircraft business resulted in the entrusting of its aircraft distributor, The Babb Co. (Canada) Limited, with the servicing of civilian air lines and operators.



ORENDA COMBUSTION "Cans" are fabricated by Cockshutt Aircraft Ltd.

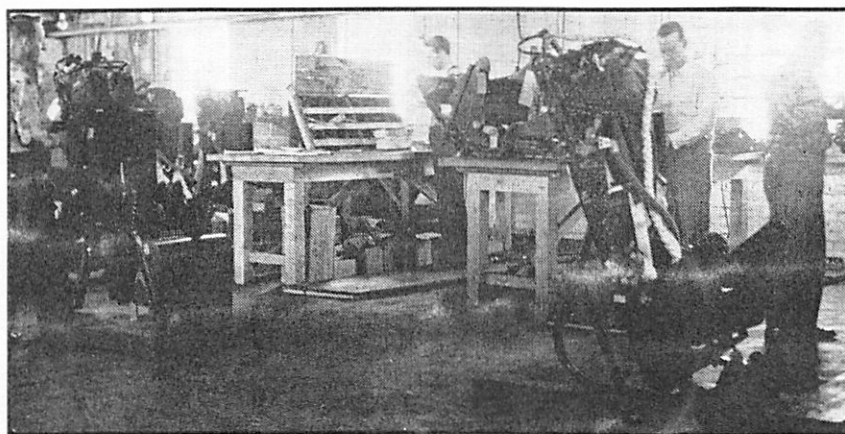
•**Dominion Magnesium Ltd. and Light Alloys Ltd.:** Dominion Magnesium has been established as a prime producer of magnesium since construction of its plant at Haley, Ontario, in 1942. This Company, with its extrusion facilities, and its affiliated firm, Light Alloys, have long been closely associated with the Aircraft Industry. Together they claim to be Canada's largest suppliers of magnesium extruded sections and castings for the Aircraft Industry. Extrusion facilities include a 2,300 ton Loewy press and a 500 ton vertical press, as well as draw bench and centreless grinding equipment. The range of alloys used includes all the standard magnesium alloys as well as the latest high strength zirconium and thorium alloys. Light Alloys, in a new sand casting factory, have available all the latest equipment for production of magnesium and aluminum castings.

•**Inaerco Limited:** Successor to In-

ternational Aeronautical Corporation, this Toronto firm manufactures its own design of re-attachable and pressed-on hydraulic and pneumatic hose fittings, as well as equivalent complete hose assemblies. Inaerco is Canadian licensee for the manufacture of hose assemblies to the design of Bowden (Engineers) Limited, of London, England. Inaerco also manufactures aircraft engine parts and AN and MS fittings. New equipment this year includes large capacity automatic screw machines, precision thread roller, centreless grinding equipment, Vapor Blast, up-to-date optical comparator, hydraulic tracer, etc.

•**Cub Aircraft Company:** Located at Hamilton, Ontario, this organization operates three divisions — electronic, tool & die making and fixture, and fabrication & assembly, which make a wide variety of aviation items under sub-contract to several Cana-

(Continued on page 90)



MARTIN-BAKER EJECTION SEATS come from Canadian Flight Equip. Ltd.

Helicopter Bible

The IATA has announced the publication in book form of the record of its Symposium on Helicopter Operation & Design Requirements.

The book is the product of a unique meeting held during the Sixth IATA Technical Conference at San Juan, Puerto Rico, in which designers and manufacturers of helicopters participated in a complete, objective exchange of information with present and potential users of the rotary wing aircraft, with armed forces, government agencies, research laboratories,

and others.

J. T. Dymont, Director of Engineering for TCA, acted as chairman of the Symposium.

Copies of the IATA helicopter book are available for \$6.00 (U.S.) each on order to the IATA Technical Secretariat, International Aviation Building, Montreal 3.

CANADIAN CAR

(Continued from page 37)

fabricating building of 112,000 sq. ft. The main assembly building,

machine shop and detail fabricating building are all equipped with overhead crane service. Other buildings, some attached to, and others detached from the main buildings, make up a total of 662,000 sq. ft., including office buildings. In addition to these facilities, CanCar owns two hangars at the Fort William Airport, approximately one-and-a-half miles from the main plant, one of 7,000 sq. ft., and the other, a double hangar, of 40,320 sq. ft.

The plant is well equipped with modern metalworking equipment, including a machine shop capable of producing both tooling and production machined parts. Other fabricating equipment includes a group of drop hammers, punch presses, spot welders, hydraulic presses, in addition to the usual sheet metal forming equipment such as brakes, shears, forming rolls, etc. The plant is also well equipped with metal treating processes such as heat treating, cadmium plating, anodizing, etching, etc. In brief, CanCar operates a well-rounded aircraft facility, capable of carrying out all phases of an airframe production program.

INDUSTRY AT WORK

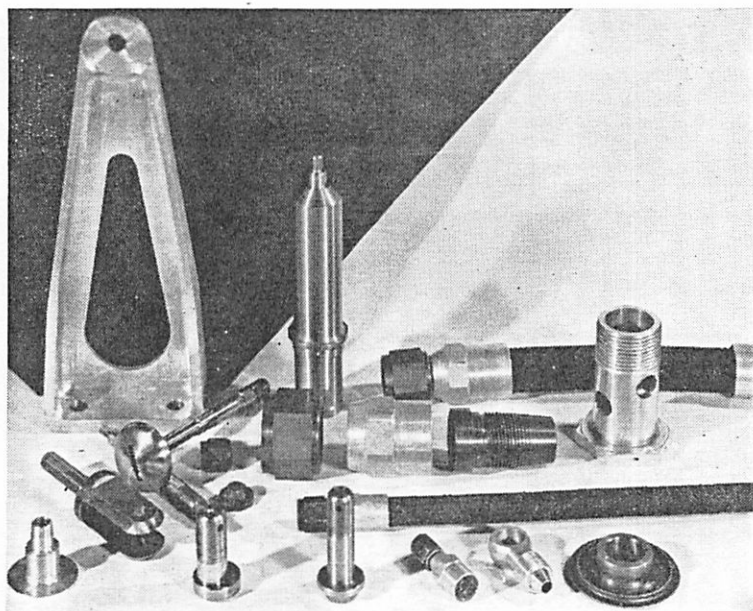
(Continued from page 63)

dian and U.S. companies active in the aircraft field. Plant area is approximately 70,000 sq. ft.

•**Godfrey Engineering Co. Limited:** Godfrey's plant near Montreal has been expanded to accommodate the steadily increasing aviation business handled. The Company manufactures a wide range of aircraft cabin superchargers and cold air units, and, in addition to this airborne equipment, produces ground servicing equipment especially designed for the climatic conditions of North America. Godfrey reports a wide acceptance of its original design pressure cabin testing trolleys, oxygen servicing trailers, hydraulic filling and bleeding units, hydraulic hose testers, and ground air conditioning units. At the Montreal plant the Company offers a comprehensive service of engineering research and design to final manufacture.

•**Thompson Products Limited:** Located at St. Catharines, Ont., Thompson Products operates a 150,000

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sq. ft. plant devoted largely to the production of jet engine parts under sub-contract from Curtiss-Wright and Avro Canada, as well as Rolls-Royce of Canada and Canadian P & W. Employment is approximately 600 and the main items produced are turbojet aluminum compressor blades.

•**Chatco Steel Products Limited:** Chatco employs about 200 in its aircraft division, which holds sub-contracts from Avro Canada for the production of a number of CF-100 components, including the rear centre fuselage section, rear fuselage, upper and lower rudder, upper and lower fin, and elevators. It has been producing all these components, except for the elevators, for Avro Canada since 1951.

•**Cockshutt Aircraft Limited:** This Company is a subsidiary of Cockshutt Farm Equipment Limited and is engaged in the production of combustion system parts for the Orenda and the Nene. In the past year, the plant at Renfrew, Ont., has been expanded by over 7,000 sq. ft., bringing the total plant area available to 107,000 sq. ft. Peak employment in 1953 was 490, and while this has fallen off to about 320 at the present time, an increase is anticipated this year.

•**Enheat Aircraft:** This is the aircraft division of Enamel & Heating Products, Limited, Amherst, N.S., and is another firm that was hard hit by the termination of the T-36 program. With plant space of 120,000 sq. ft. and equipment of all kinds, this modern factory is currently active in

the production and/or repair & overhaul of Lancaster spares. Included in the long list of components thus handled are ailerons, rudders, flaps, elevators, stabilizers, cowlings, fuel tanks, oil tanks, undercarriage components, and hydraulic, fuel, and coolant lines. Other aviation work is projected for the near future.

•**Field Aviation Co. Limited:** With plant space at Oshawa, Ont., of about 40,000 sq. ft., plus an affiliated company at Calgary, Field supplies aircraft maintenance and overhaul & repair services to military and civil operators, as well as components manufacturing for prime contractors. A large proportion of the work at Field involves the provision of routine servicing and maintenance for RCAF piston engine type aircraft from Trenton. Employment is over 200.

•**Found Bros. Aviation Limited:** This Company bases its operations at Malton, where it carries out repair & overhaul work for civil aircraft owners and component repair & overhaul under sub-contract to such prime contractors as Avro Canada.

•**Avionics Limited:** This firm was organized from the electronics division of Genaire Limited in mid-1953. The two firms work closely, with Genaire handling matters aeronautical while Avionics takes care of electronics. At the beginning of 1954, business was sufficient to warrant the acquisition of a 20,000 sq. ft. building near Niagara-on-the-Lake, Ont. Sales agency arrangements have been made with several British and

U.S. manufacturers of electronic equipment and airborne instruments. Avionics numbers among its achievements the development of its own process for manufacturing printed circuits, thus becoming the only Canadian supplier with a successful history

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of production contracts and the only one to have a background in electronics.

•**Goodyear:** The Goodyear Tire & Rubber Co. of Canada Limited is located at New Toronto, Ont., where an aviation section produces most sizes of airplane tires and tubes used in Canada. Facilities to produce Goodyear wheels and brakes in Canada were completed in 1953 and equipment for the Beaver, Otter, Beech 18, Mustang, and T-33, has been in production since last April. The Company also acts as sales outlet for the

wide variety of aviation products produced by its parent company in the U.S.

•**Hussman Refrigerator Company:** Main projects at this Brantford, Ont., plant are the production of external drop tanks for the F-86 and the T-33, and the jet tail pipe assembly for the Sabre 5, all under sub-contract from Canadair. Total plant area is 87,000 sq. ft., which includes a 25,000 sq. ft. extension opened last year and devoted almost exclusively to defence work. The aircraft division employs 320 men.

•**Irvin Air Chute Limited:** Situated at Fort Erie, Ont., Irvin is Canada's lone manufacturer of parachutes, occupies a 10,000 sq. ft. plant and employs an average of 75, mostly women. Its major customers are the Armed Services, but its products are, of course, also used by civil operators.

•**Piasecki Helicopter Co. of Canada Ltd.:** One of the Industry's newest members, Piasecki has established in a 42,000 sq. ft. plant at Arnprior, near Ottawa, and will supply repair & overhaul services for the Piasecki helicopters in operation with the RCAF.

•**Sanderson Aircraft Limited:** Largest single activity at Sanderson's Malton, Ont., base is the production under sub-contract from de Havilland of nine Beaver components, including the flaps, ailerons, horizontal stabilizers and elevators, and vertical fin and rudder. There are about 65 employees working on this sub-contract and to date over 600 sets of the nine components have been delivered to DH. About 10,000 sq. ft. of plant space is set aside for this activity, while the remainder of the large double hangar which Sanderson occupies is used to provide service and repair & overhaul to executive and itinerant aircraft.

•**Trans-Canada Air Lines:** TCA continues to assist in the defence effort by providing routine maintenance services for RCAF aircraft from RCAF Station Winnipeg, which is the home of No. 1 ANS.

•**Technical Enterprises Limited:** With a 6,000 sq. ft. plant at Malton, Ont., this firm specializes in supplying sales and service of airborne electronic equipment, mainly to executive aircraft owners. It has produced high voltage test sets for the RCAF. These test sets are designed for the testing of "Anstat" antennae test sets in the field. TEL is also licensed to produce in Canada the Anstat line of anti-precipitation static antenna systems and equipment.

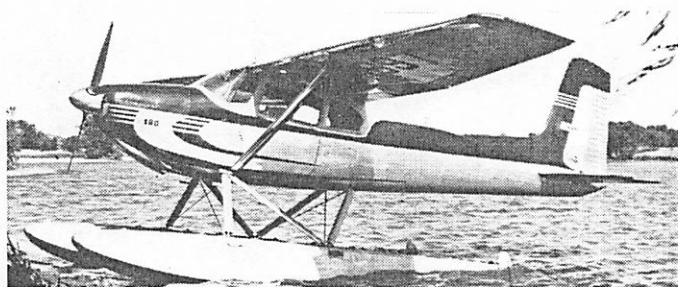
•**Vicom & Co. (Canada) Limited:** A brand new firm of British parentage, this company has established at Kingston, Ont., and plans to produce sub-assemblies of electronic equipment for other Canadian manufacturers. The parent firm in England, Vicom & Co. Limited, has for some time been

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providing the RCAF in Europe with radio, radar, and electrical equipment service. The Kingston plant has 12,000 sq. ft. of floor area.

•**PSC Applied Research Limited:** An affiliate of the Photographic Survey Corporation, this Company specializes in development and production in the aircraft instrumentation field. Much of its work is of a classified nature, but one of its many developments is a fully automatic aircraft ice detector and shedding control system which is currently in use on the CF-100. Located in Toronto, PSC Applied Research employs approximately 200.

•**Stark Electronic Instruments Ltd.:** While Stark, which is located at Ajax, Ont., is best known as a producer of electronic test instruments, it is also a major contractor to the DDP, being engaged in the repair and overhaul of such aircraft instruments as radio compasses, as well as generators, inverters, and so on, for the RCAF.

•**Carriere & MacFeeters:** This well-established company specializes in the service, repair & overhaul of all types of aircraft electrical accessories and for the RCAF performs these oper-

ations on 350 different types of units. Located in downtown Toronto, Carriere & MacFeeters occupies 10,000 sq. ft. of plant space and employs about 70 persons. About 85% of its work is under contract to the DDP while a portion of the remainder is for such firms as Avro Canada, and de Havilland. The Company also has a substantial civil business.

•**Bata Engineering:** This is a division of Bata Shoe Co. of Canada Ltd., Batawa, Ont., and has an active program covering production of aircraft parts and tooling.

•**Also Contributing:** It is impossible to review in detail the activities of every one of the hundreds of companies who play active roles in Canada's Aircraft Industry. There are many others, not previously mentioned, both large and small, who are contributing in varying degrees to the total Aircraft Industry effort in building up Canada's Air Defences. Among these are: Ford Motor Co. of Canada Ltd., Windsor, Ont. (T-33 landing gear and hydraulic units); Canadian Vickers Ltd., Montreal (F-86 main landing gear); Liquid Carbonic Cana-

dian Corp., Montreal (F-86 flying surfaces); Leavens Bros. Ltd., Toronto (aviation supplies); R & M Bearings Ltd., Montreal (bearings of all types); Radio Engineering Products Ltd., Montreal (radios and service); AviQUIPO of Canada Ltd., Montreal (aviation supplies); Canadian SKF Co. Ltd., Scarborough, Ont. (bearings); Aircraft Appliances & Equipment Ltd., Toronto (aircraft accessories); Astrolante Instruments Ltd., Toronto (instrument overhaul & repair); Abercorn Aero Ltd., Montreal (aviation supplies); Crystal Glass & Plastics Ltd., Toronto (plastic components); Bancroft Industries Ltd., Montreal (aviation supplies); Duplate Canada Ltd., Toronto (bullet-resisting windscreens); Atlas Steels Ltd., Welland, Ont. (steel in all types and forms); The Babb Co. (Canada) Ltd., Montreal (aviation supplies); C-H Engineering Co., Toronto and Montreal (aviation supplies); Anthony Foster & Sons Ltd., Toronto (aviation supplies); International Nickel Co. of Canada Ltd., Toronto (nickel alloys of all types); Railway & Power Engineering Corp. Ltd., Montreal (aviation

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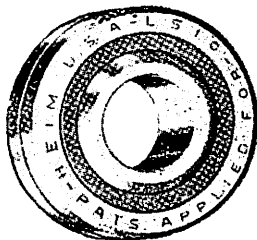
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We will be pleased to supply you with any additional information concerning our facilities.

supplies); **Laurentian Air Services**, Ottawa (rebuilding Wasp Jr. engines for installation in new DH Beaver aircraft); **General Steel Wares Ltd.**, London, Ont. (CF-100 components); **Victory Tool & Machine Co. Ltd.**, Montreal (aircraft parts and tools); **Aircraft Services (Western) Ltd.**, Winnipeg (military aircraft overhaul under subcontract from MacDonald Bros.); **Decca Radar Canada Ltd.**, Toronto (radar and navigation equipment); **High Duty Alloys, (Canada) Ltd.**, Toronto (special light alloy metals in forged, cast, and extruded forms); **Stratoflex of Canada Inc.**, Toronto (flexible hoses with detachable and re-usable fittings, and associated products); **J. W. Lawrence (Canada) Ltd.**, Montreal (repair & overhaul of heat exchange equipment); **B. F. Goodrich Rubber Co. of Canada, Ltd.** (airplane tires, de-icing equipment, etc.); **Dunlop Tire & Rubber Goods Co. Ltd.**, Toronto (tires, rubber seals, components, etc.); **McQuay-Norris Mfg. Co.**, Toronto (manufacturer of parts for piston and jet engines); **Alloy Metal Sales Ltd.**, Toronto (nickel alloys, stainless steels,

aluminum alloys, in all commercial forms and shapes); **T. C. Chown Ltd.**, Montreal (seats, pressure switches float valves, etc.); **Dominion Fasteners Ltd.**, Hamilton (locknuts, lightweight fasteners of all kinds); **Rousseau Controls Ltd.**, Montreal (pumps and valves for fluid and air systems, de-icing and anti-icing controls, etc.); **Simmonds Aeroaccessories of Canada Ltd.**, Montreal (aviation supplies and accessories); **Spartan Air Services Ltd.**, Ottawa (helicopter overhaul under DDP contract); **Walter Kidde & Co. of Canada Ltd.**, Montreal (extinguishing systems, pneumatic systems); **X-Ray & Radium Industries Ltd.**, Montreal and Toronto (instrument dial illuminizing); **Aero Sales Engineering Ltd.**, Ottawa (aircraft ancillary equipment, aviation supplies); **Aircraft Parts & Supplies**, Montreal (aviation supplies and equipment).

DEFENCE PRODUCTION

(Continued from page 39)

earlier contracts had, of necessity, to be let on a cost-plus arrangement. Ad-

ditional experience in the field, acquired during the past few years, now permits negotiations to be made on a firm price or a target basis for a good many of the major contractors.

In brief, the Armed Services develop their operational requirements and determine the type of equipment they require. It is the duty of the Department of Defence Production to effect procurement. In carrying out this role the Aircraft Division has two main objectives: to secure, for the Armed Services quality equipment at economic prices, and to develop and sustain the defence potential of the Aircraft and allied industries.

BRITANNIA

(Continued from page 19)

major points of difference between the MR and the airliner versions.

The MR aircraft, which will be the biggest airplane ever built in Canada, will be both longer and heavier than the transport Britannia. The latter tips the scales at 155,000 lbs. max. gross and has a length of 124 ft. 3 in. in the Mk. 200, Mk. 250, and Mk. 300 versions, which are the most recent.

The transport aircraft is, of course, powered by four Bristol Proteus turboprops rated in the most recent 750 version at 4,150 ehp. In the MR airplane these will be replaced by Wright R-3350 Turbo Compound piston engines, which are now rated at 3,700 hp. for take-off (wet). The RCAF regards the Wright engine as more suitable for the great duration and long range requirements of maritime reconnaissance duties, speed being a secondary consideration. The MR airplane will be heavily loaded with electronic gear, including submarine detecting devices and various types of airborne radar.

No performance estimates on the MR Britannia have been made public.

Data for the latest models of the Britannia are as follows: Wing area, 2,055 sq. ft.; wing loading, 75.5 lbs./sq. ft.; landing weight, 125,000 lbs.; weight less fuel and payload, 80,420 lbs.; capacity payload, 30,000 lbs.; fuel capacity, 6,800 Imp. gal.; payload with full tanks, 20,000 lbs.; range with capacity payload, 3,940 st. miles; range with full tanks plus payload, 5,100 st. miles; max. cruising speed, 389 mph; stalling speed, sea level, 96 mph; take-off field length, 5,750 ft.

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