

# Canadair...

## A VITAL LINK IN CANADA'S AIRCRAFT INDUSTRY

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Editor, Aircraft and Airport



Montreal—The aircraft industry in Canada is Big Business, no matter which way you look at it, and right now the biggest builder in the industry is Canadair Limited at Cartierville airport, just outside Montreal.

As builders of the Canadair Four, the Dominion's first airliner entry in the international market, Canadair Limited is carrying the multi-million dollar ball for Canadians in the bid for world recognition as a first-line air power.

This month Canadair completes delivery of the last of 20 North Star versions of the DC-4M2 airliner for Trans Canada Air Lines, and this, together with delivery of 24 DC-4M's to the Royal Canadian Air Force, brings to conclusion a \$28,400,000 contract which had its beginning nearly two years ago under the original Crown Company.

### New Freighter Version

That much is history, but already the next chapter is in the writing, and in addition to the newest version of the might four-engine transport, the C-4 as it is known, Canadair has something else to offer to the airlines and operators of the world.

The C-4F2, last word in flying freighters, will be making its debut on the world market in the not too distant future.

Taking cargo-carrying out of the "trucking" class and putting it right on the top priority list, the C-4F2 is

completely pressurized and air conditioned, as fast as the finest passenger ship, and built to give "service plus."

In announcing the C-4F2 cargo version of the C-4, T. J. Emmert, vice-president of Canadair, assured us that his firm is by no means relaxing its efforts in development of Canadian types. He reiterated the recent statement of President H. Oliver West, that Canadair "is in the aircraft business to stay," and that Canada is destined to become a major contender for world aircraft business.

### Type Needed Now

"In introducing the C-4F2 we feel that we are making available to world operators a cargo-carrying aircraft of a type which they need right now," Mr. Emmert stated. "Use of the aircraft for cargo has streamlined business with an ultra-fast express service, and the C4F2 as a cargo carrier represents the ultimate in this direction."

While full details of the C-4F2 are not yet available for publication, we were privileged to see preliminary figures which show that the cargo version of the versatile Canadair Four will pack a payload of 22,434 pounds for 2,150 miles at altitudes in excess of 20,000 ft. and deliver the goods "tree-ripe," "garden-fresh" or whatever phrase the progressive shipper cares to use.

An alternative combination suggested for longer hauls of bulkier cargo is 13,520 pounds payload, which can be

carried 3,880 miles—also at high altitude and still arrive in first class condition.

The C-4F2, which is equipped with the Rolls Royce Merlin 624 power plant, the same engine as used in the C-4, has slightly lesser range because the average weight is up, but by being able to take advantage of higher altitudes with full protection by the all-over pressurization, shows an unusually high average speed for a cargo-carrying aircraft.

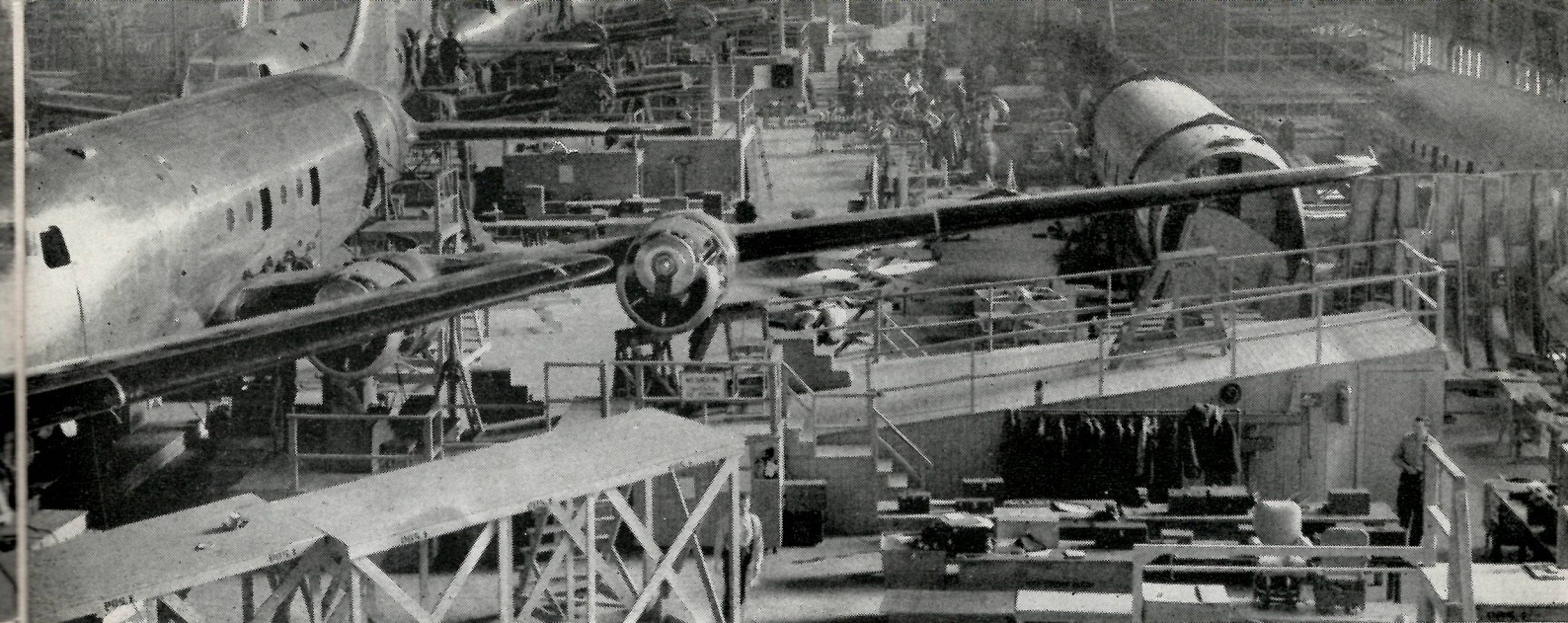
With the entire ship pressurized, perishable cargoes such as fine fruits, flowers, vegetables and even eggs may be carried at high altitudes above the weather with absolute safety. Complete air conditioning of the ship also allows for refrigeration to be used, or special temperatures to be maintained for carriage of livestock or other cargoes requiring protection against the cold.

Though the C-4F2 is the newest of the Canadair line, it does not mean that the C-4 airliner is going to be neglected when it comes to representing Canada's aviation industry abroad.

Not only is domestic interest in the Canadair Four being maintained at a high level, but following European demonstration tours by this ship, inquiries indicate more than casual interest in the United Kingdom, Switzerland, Australia, Iceland, South Africa, the Argentine and other South American countries as well as Europe generally.

IN DEDICATING THIS SECTION TO CANADAIR LIMITED, AIRCRAFT AND AIRPORT AGAIN





Most promising indication that the C-4 is going to represent Canadian industry abroad, is the fact that this ship was suggested, and received considerable support in the U.K. House of Commons, as being the most practical solution to the operational and financial troubles of British Overseas Airways Corporation. While this deal is not the subject of comment by either the Corporation or Canadair, it is the logical solution to the uneconomical operation record of BOAC.

#### **Financing Simplified**

In this connection, it is learned that purchase of C-4's for BOAC could very easily be undertaken with considerable financial benefit to the British government-operated line. Not only is the ship equipped with Merlin 624 engines, which are supplied by Rolls Royce from England and could be paid for in Sterling (which would represent better than 18% of full cost of the ship) but these aircraft could be purchased under a plan that allows substantially all of the cost to be paid from a considerable portion of which comes from Canadian Trade.

Such an arrangement for payment, designed as a stimulus to the Canadian aircraft industry, is not restricted to any one company, but is extended to any qualified purchaser who has a need for this type of aircraft and is a responsible operator.

That the Canadair Four is a worthy offering by Canada to world airlines is evidenced by the unqualified success

### **Builder of Canada's first transport aircraft, Canadair Limited announces another great aircraft in the cargo field—The C-4F2, fully pressurized version of the Canadair Four marks Canada's entry into yet another phase of the world aviation market**

of the DC-4M North Star types with Trans Canada Air Lines.

With five aircraft, TCA was able to schedule 11 round trips a week between London and Montreal last summer, representing utilization of just under 10 hours a day. Since that time even higher utilization has been achieved. In fact, reporting last December on trans-Atlantic operations, TCA had made 339 eastbound and 338 westbound crossings of the Atlantic in 237 days.

Since that time, the pressurized version of the North Star has been delivered to TCA; and even greater performance feats are expected from this faster and more powerful aircraft. During last year, the Mark II's were successful in chalking up three new speed records, two on the trans-Atlantic runs, and one across Canada.

A Canadair Four, on the ocean routes, flew from Montreal to London in 10 hours and 30 minutes, and from Shannon to Montreal in 12 hours and 57 minutes. A TCA North Star crossed Canada from Vancouver to Montreal in six hours and 52 minutes.

Development of the Canadair Four, and its forerunners, the DC-4M series, is an interesting story in itself. Far from being a modified or improved version of the well-known Douglas DC-4 type, the Canadair Four, is, in fact, a true Canadian design built with an eye not only to Canadian needs, but to service on world routes.

#### **Transition Traced**

The transition starts with the C-54GM, which is a military version of the familiar C-54 with Merlin engines and interior refinements, which was built to RCAF specifications. It was fitted with the new civil Merlin 620 power plants, and had a gross weight of 73,000 pounds.

Next step was introduction of the DC-4MI, which was basically a C-54GM, structurally strengthened by addition of certain DC-6 components to increase the gross weight to 78,000 pounds, and fitted with a commercial interior. This model was an interim aircraft, and was supplied to TCA as a stop-gap for the trans-Atlantic ser-



vice until the custom-built DC-4M2 was ready.

It was in the DC-4M2 that the change became most noticeable, as Canadian designers used principally the DC-6 structure for the fuselage and inner wing section, and turned out a pressurized version. In most respects this aircraft is almost identical structurally to the DC-6 except that it is actually 80 inches shorter in the fuselage.

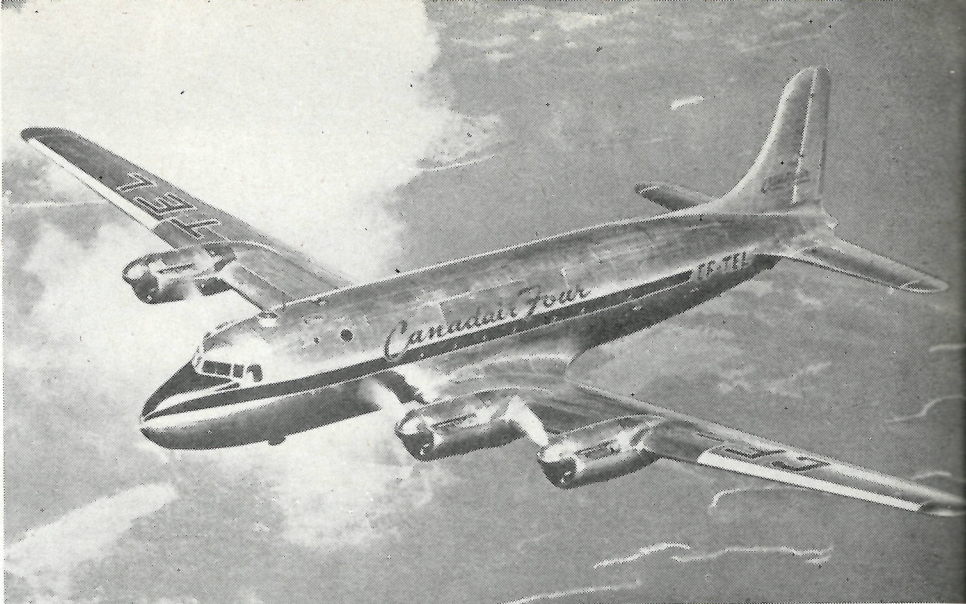
In this model, too, the more powerful Merlin 622 engines were installed and Hamilton Standard three-bladed propeller replaced the four-blade used on the DC-4MI, resulting in a gross weight increase to 80,200 lbs. with increased performance and load carrying ability and a considerable reduction in cabin noise level. Considerable development work is also being done with the three-bladed Curtiss electric propeller.

### The Canadair Four

With the experience gained in construction of the three earlier models, Canadair engineers brought forth the Canadair Four, which is the ship now being offered to world buyers as Canada's answer to dependable and economical airline operation.

The C-4 incorporates most of the tried and proven basic features of the DC-6 design, and in addition includes many refinements inspired by study of airline operators' demands and known needs.

**PILOT'S COMPARTMENT**—Though it looks complicated, the instrumentation of the Canadair Four is simplified to the N'th degree.



**BEAUTY A-WING**—This flight photograph of the Canadair Four brings out its clean lines.

### Performance

Take-off S/L	2900 ft.
(80,200 lb.)	
Landing S/L	2760 ft.
(68,000 lb.)	
Max. Cruise	333 mph.
(crit. alt.)	
Top speed	345 mph
(max auw, no flap)	
Stall	124.3 mph.
Stall	81.9 mph.
(60,000 lb., 40° flap)	

Powered by the more powerful, improved Rolls Royce Merlin 624 power plants (rated at 1760 hp for take-off, an advance of 35 hp as compared to the Merlin 620) and incorporating additional proven DC-6 airframe and operating system features, the C-4 offers decreased weight empty, increased payload, higher speed and further reduction in cabin noise level with resultant increased comfort.

This latter feature is accomplished by adoption as standard the three-bladed high activity factor propeller which brings about use of a .42 reduc-

tion gear ratio rather than the .47 reduction gears used with the four-bladed propeller. This changed propeller configuration also gives improved flight performance.

Another Canadair triumph is the design of a special exhaust manifold, which has not only drastically reduced the noise level, but has increased speed and performance by a clean-sided nacelle instead of the former multi exhaust stacks. This new type of exhaust system was worked out by Canadair engineers at Cartierville, and it is expected it will be applied not only to the Merlin 624, but to earlier Marks of the engine now in service.

Another feature to be found in the C-4, is a new system of ducting the cooling radiators, which cuts down the surface and cooling drag and, is anticipated, will increase the performance of the ship by at least three per cent.

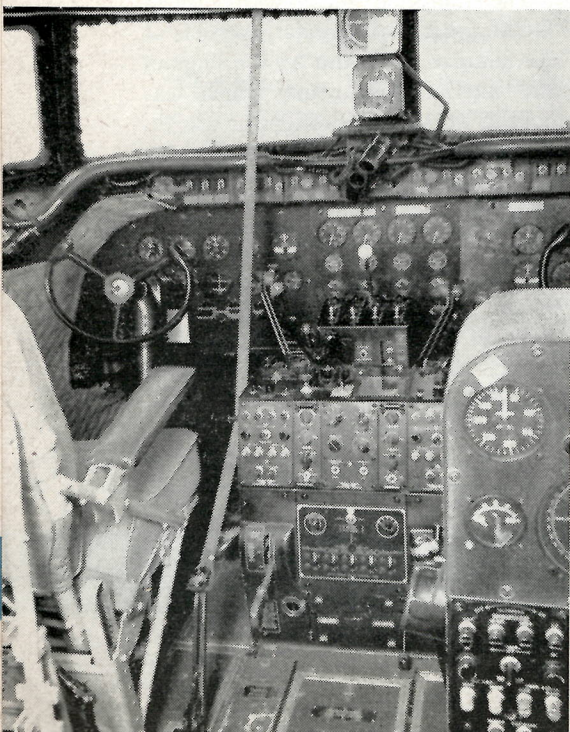
### Three Models

The passenger version of the C-4 is being offered in three models. The newest of these, the sleeper version, has been added to the previously announced 40-passenger and 48-passenger types. All these models are rated at top speeds of 345 mph. and have a service ceiling of 30,000 ft.

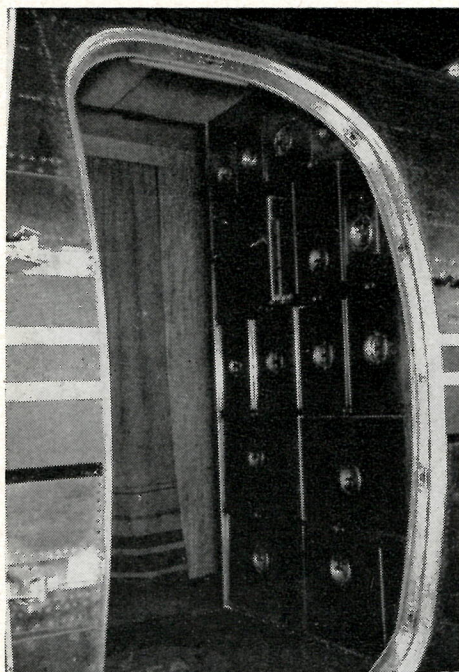
With this selection of models, the proven performance figures, and (a price substantially lower than any competitive type) the Canadair Four Presents a very attractive picture to world airline operators. Not only is the price a particularly strong inducement, but the C-4 has a remarkably

### Dimensions

Length	93 ft. 5 in.
Span	117 ft. 6 in.
Tread	24 ft. 8 in.
Height	27 ft. 6 in.
Wing area	1457 sq. ft.
Wing loading	55.04 lb./sq./ft.
(To gross weight)	
Power loading	11.39 lb./sq./ft.
(To gross weight)	







**GALLEY**—Very important place on any ship, the galley is the ultimate in design for efficiency on the Canadair Four, as is shown here.

high ratio of maximum payload to empty weight—32.5%—and its critical altitude of 26,000 feet is somewhat higher than competitive types.

Turning full attention to production of the C-4, Canadair marks completion of a phase of development which concludes this month with delivery of the last of the TCA order for Mark II North Stars. Completion of this contract is evident, in itself, of the high state of efficiency governing production at the plant.

The prototype North Star, or DC-4M1, flew in July of 1946, and delivery of the first of those aircraft was made late that same year when some of the machines were made available to TCA for crew training purposes.

#### Deliveries In March, 1947

Deliveries of completed aircraft ready for service were started in March, 1947, and would have been completed in less than a year if they had not been held up by modifications directed to the DC-6 in the interests of fire protection.

Not only have all applicable Douglas modifications been incorporated in the M-2 aircraft as they come off the production line, but all ships delivered previously have been returned to the factory and modified as necessary.

In addition to all modifications suggested for the DC-6, and necess-

ary for the M-2, Canadair has also incorporated special precautionary modifications found necessary by Canadair and TCA engineers. Of these, most important has been the installation of separate fire extinguishing systems for engines and airframes, each of which has two charges, which doubles the required fire protection offered the ship.

While Canadair engineers are, guided by the demands of the customer, they are not slow to make recommendations of their own, or to incorporate features which they feel will add to the safety or utility of the aircraft.

#### Tour of Plant

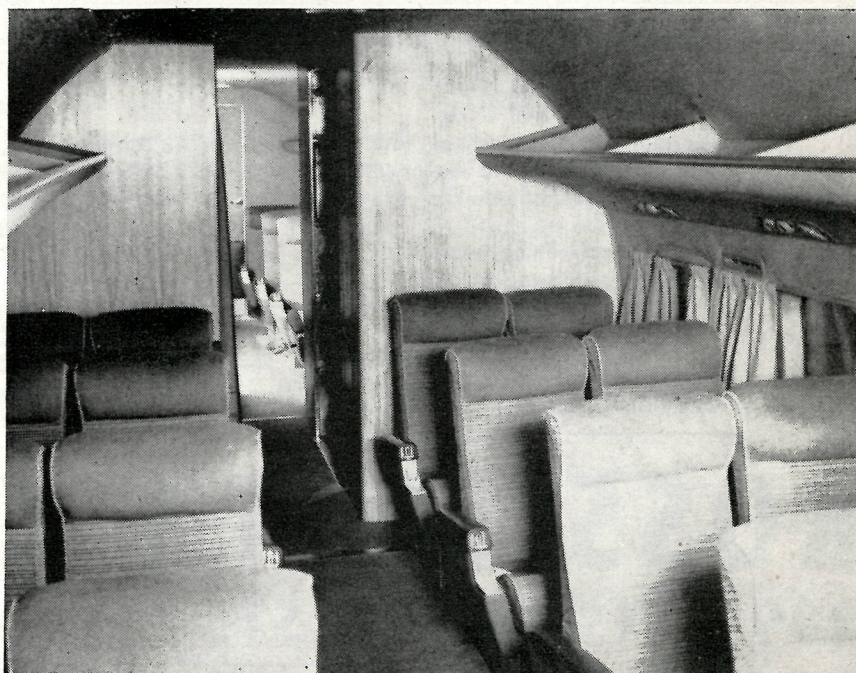
In a trip through the vast Canadair Limited plant at Cartierville, we learned that the building of an aircraft such as the Canadair Four is no small task—and Canada's aircraft industry is, literally, big business.

Actually, the first move in building an aircraft does not come from the builders, but comes in the form of specifications as agreed to by the customer, and Canadair or as learned from a careful survey of the needs of the field to be served.

This applies no less in the building of a modern skyliner than it does in planning a bush plane for the Canadian north. The customer must be satisfied.

These specifications, as they evolve

**INTERIOR**—General view of the forward cabin, looking past the galley into the aft compartment.



#### Weights

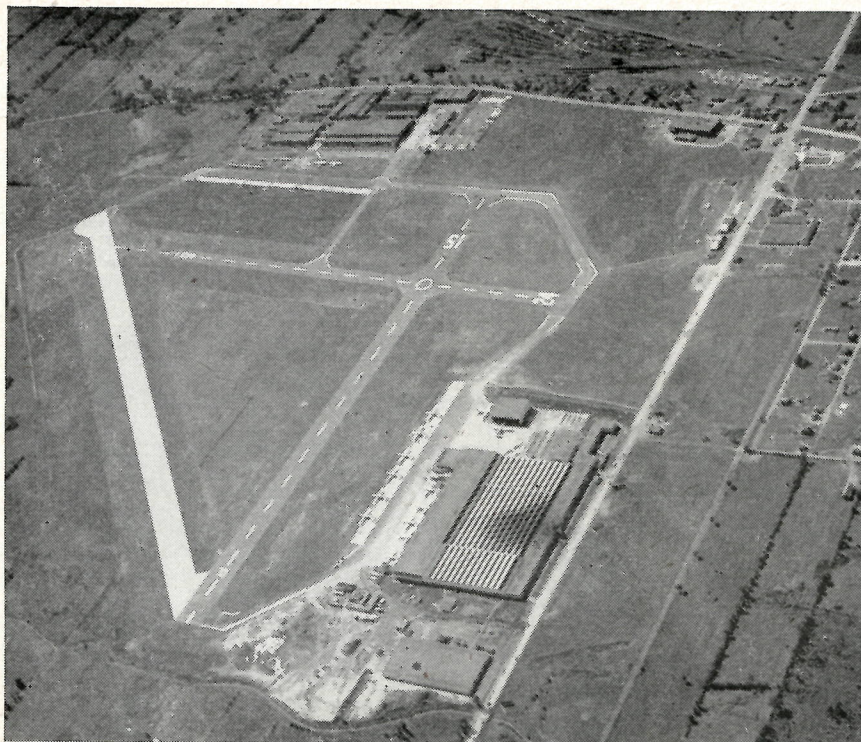
Max. To	80,200 lb.
Max. landing	68,000 lb.
Max. gross wt. (zero fuel)	63,000 lb.
Manuf. wt. empty (40 pass.)	45,444 lb.
Manuf. wt. empty (48 pass.)	45,620 lb.
Max. payload (40 pass.)	14,758 lb.
Max. payload (48 pass.)	13,851 lb.
Useful load (40 pass.)	34,756 lb.
Useful load (48 pass.)	34,580 lb.

from prospective customer contacts and a study of the field, go to the design office where they are interpreted into a design. From there, the design goes to engineering, where it is broken down into drawings which are issued for detail and assembly.

These drawings, prepared by a group of well-trained hand-picked engineers located in the large, well-lighted and much-windowed office above the tooling workshops, are the signal for advanced material orders which go to the purchasing department.

That part of the business, though it takes only a few short paragraphs to sum up, takes weeks and months of





planning, scheming, testing and heart-break—even before the aircraft is started building.

With arrival of the raw material at hand, the real production begins and another group of skilled workers gets into action.

### The Detail Shops

Before any building may be started, the parts must be fabricated. Great sheets of metal are as putty in the hands of these artisans of the detail shop with their mighty presses, brakes, hammers and other instruments of the trade. In the detail shop are made the pieces and sections which go onto the sub-assembly sections where they are assembled into parts which go onto further assembly to become components of the aircraft, such as doors, cowlings or other sections.

This system of sub-assembly continues through the entire aircraft, including the wing sections and even the fuselage, with all the production bays funnelling the completed components to the main assembly line which returns the length of the shop at the far end of the bays.

Here, with the fuselage as the main component, are attached the wing sections, tail sections, nose sections and all the various components as the aircraft in production moves up the line past the various bays.

Everywhere along the line, and with every operation, are inspectors whose

duty it is to rigidly examine and pass upon every item and pass it according to Department of Transport standards or CAA requirements. This constant check of every piece and every operation continues every step of the way, and when the aircraft comes off the line, a finished product, it is indeed a complete job in every respect.

Once the ship is assembled, it is passed out of the factory and turned over to pre-flight. Here it is thoroughly checked again, given ground tests on all equipment and operations. The engines are run up, the instruments checked, compass swung and brake pressure, radio, hydraulics and every item minutely inspected.

From pre-flight, the machine is passed on to test-flight, all ready to be given final approval before it is delivered. For the initial flight, only four members of the test crew are aboard—the pilot, copilot, flight engineer and radio operator—all Canadair personnel and trained to the minute.

When an aircraft passes test flights and all the snags are caught, it is ready for acceptance by the customer—and believe us, it's a lot harder than it sounds.



**CANADAIR PLANTS**—Aerial view of the main plant and conversion plants of Canadair shows their ideal location. The main plant is in foreground, with the old Noorduyn plant, now used for conversion, at the far side of the field. Close liaison between the two plants results in facilities of either, or both, being put at full command of any operation.

**DIE MAKING**—Preparation of dies for the giant drop hammers is an important business in any industry, and at the Canadair plant it is a highly specialized job. **LEFT**—Pouring mold. **BOTTOM**—Finishing after pouring.

