

Supersonic Research In the U.S. Navy

By Rear Admiral Charles A. Nicholson, USN

In the Fairchild Pegasus

AS YET, there is no assurance that we can live permanently at peace with all nations of the world. For national safety, we must exert our efforts to remain abreast, at least, of other nations in air strength. To do that, it is necessary to increase our understanding of the physical and engineering laws which govern the behavior of aircraft at speeds in the neighborhood of the speed of sound and as far above the speed of sound as it appears practicable to investigate at this time.

The necessity for greater speed stems from the very natural and basic axiom that, all other things being equal, the faster airplane will be able to get to its destination quickest and will be able to overtake or outdistance an adversary.

When World War II ended, the fastest operational airplane was the German Me262, a jet fighter-bomber capable of 550 mph top speed. Its effectiveness against our bombers was several times as great as the Fw 190 which was a reciprocating engine powered fighter in the 400-mile-an-hour class. Today, the world's speed record is 670.9 mph, which is held by Major Richard Johnson, USAF, in a North American F-86 experimental jet fighter.

Presently available types of jet engines give us sources of almost unlimited power. It is no longer true that a bomber or an attack plane must be the slow lumbering work horse of the past. Now a bomber can be as sleek as a fighter. The past disparity in their speeds is fast dwindling. Our current fighters will do well to have 50 mph greater speed than the latest

jet bombers. Until other means of defense against very fast attacking airplanes is developed, we must continue to increase the speed of our fighters. Similarly, greater speed must be built into our attack aircraft since speed might become their greatest defensive asset.

The present world record of 670.9 mph is approximately 85 per cent of the velocity of sound under the conditions which prevailed during the flight. As the speed of sound is approached the airplane is confronted with increasing effects of the phenomenon of **compressibility**.

At speeds below approximately 70 to 80 per cent of the speed of sound, the energy which the airplane imparts to the molecules of air in moving them out of its way is transferred into additional velocity of the air molecules. The true velocity of the air molecules with respect to a point on the airplane is then the sum of the airplane speed plus the additional speed of the air. When the sum of these two speeds is equal to the speed of sound a compression wave of air results. Its occurrence is so rapid that it is called a compression **shock wave** and the general term for it is known as the onset of compressibility. It manifests itself to the airplane in a fairly rapid increase of resistance to motion through the air.

The drag rise is not the only problem associated with the onset of compressibility. The conditions which bring on shock waves exist in what is called the transonic region, or from about 0.8 the speed of sound to about 1.3 times this speed. One can readily

imagine that the flow of the air about the airplane in this velocity region is not steady or uniform. Consequently, the kind of flow which is normally present around the wings to furnish lift and around the tail surfaces to give control forces, no longer exists. The lift on the wings might drop off to such low values that the airplane cannot maintain its altitude.

Control surfaces which behave in a normal and desirable manner at low speeds might become useless and might conceivably impart a motion to the airplane opposite to that intended. To overcome these problems, it is necessary to investigate many kinds of airfoil contours, wing shapes, tail shapes, and bodies in order to discover the types which will give us desirable characteristics for the entire speed range in which they must operate. The relative location of wings, bodies and tail surfaces to one another as well as the manner in which they cause interaction with each other are extremely important and must be investigated.

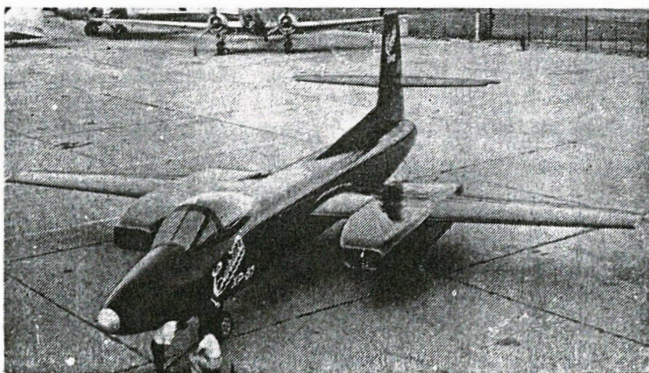
The power plants which will most likely be used in operational aircraft in the transonic region are essentially engines which increase the velocity of a quantity of air that passes through them, thereby producing a thrust. Here again we are confronted with many problems, the answers to which will require a great deal of investigation. The design of air intakes and exits, compressor and turbine blades, and combustion chambers are a few of the problems.

As the airplane moves through the air at very high speeds, the friction of the air molecules against it causes a rise in temperature. Cooling means must be provided to avoid roasting the pilot and crew. Enabling personnel to bail out from a very high speed airplane is also a serious problem.

Those are some, but by no means all of the questions which must be answered to permit us to operate at transonic speeds. It must be stated, however, that no physical phenomenon is known to exist which would preclude flight at or in the neighborhood of the speed of sound. Speeds of twice and three times this speed have been attained by various types of missiles.

Supersonic speeds, which is the term generally applied to velocities of 1.3 times the speed of sound and above, present obstacles, but not necessarily barriers, of much greater magnitude than those in the transonic region. Many of the perplexing questions which must be answered by research for successful airplane design

(Continued on page 42)



The Curtiss-Wright XF-87 Blackhawk, powered by four Westinghouse 24C jet engines mounted in pairs under each wing, is designed for all-weather operation in the 600 mph class. A feature is the side-by-side seating of the two-man crew for operating efficiency.

Oct 48

TCA Canada-Bahamas Airline Pact Signed

An agreement Canada and the United Kingdom providing for the inauguration of an air service by Trans-Canada Air Lines between Canada and the Bahamas has been announced by the External Affairs Dept.

The agreement took the form of an exchange of notes amending the agreement for air services between Canada and British territories in the west Atlantic and Caribbean areas.

A spokesman for TCA said that no date has yet been fixed for inauguration of the service. He said that Nassau would likely be the terminal point of the service.

NAPC Convention At Vancouver

The Northwest Aviation Planning Council will hold its twelfth international convention in Vancouver on September 19, 20, 21, 1948.

This council is sponsored by the Vancouver Board of Trade and it is the first time

in ten years that the convention is to take place in Canada.

The program is being planned with much co-operation from the United States and Canadian aviation authorities.

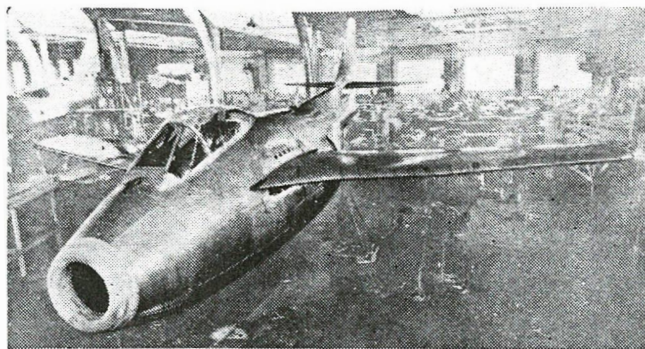
Sir Hubert Wilkins will be one of the distinguished speakers and his participation in early aviation is well known to all interested in that subject.

Saskatchewan Govt. Gets New Beaver

A new de Havilland Beaver has been purchased by the Saskatchewan Government Airways, government-owned company in Prince Albert, bringing to 19 the number of planes being used in the province's northern development program.

In addition to the new Beaver, the government airways' fleet consists of five Norsemen aircraft, two Wacos, three Stinsons, three Ansons, a Canso flying boat, and four Tiger Moths.

Swedish Jet Fighter Has British Engine



Saab-29.

Construction of Sweden's first jet fighter plane, the Saab-29, was begun about two and a half years ago. The design, settled after discussions with the Air Force, was a single seater, single-engine fighter having a speed exceeding 625 mph. The plane was to be equipped with an English jet engine of the Havilland "Ghost" type developing a thrust of about 5000 lb.

At the time in question very scanty information was avail-

able in Sweden in connection with such high speeds, and consequently a very comprehensive research and testing program has been carried out side by side with the work of design.

The plane is provided with a pressurized cabin, and a catapult seat. The cockpit canopy can also be jettisoned by an explosive charge.

The first test 29 is at present undergoing extensive ground tests prior to the first flight.

IN THE BLAZING MONTH OF AUGUST--



BRITISH AVIATION INSURANCE COMPANY LIMITED

MONTREAL

TORONTO

VANCOUVER

Cotton Fibre Wicks For Static Reduction

Installation of cotton fibre wicks on the wings and empennage of all Capital Airlines aircraft to aid in the elimination of static was announced recently.

A total of 15 wicks, known as "static discharge wicks," is attached to the trailing edges of the wings, elevators and rudder of each aircraft.

Each wick is approximately 12 in. long and consists of cotton fibre soaked in silver oxide. Static created by air disturbances and friction is conducted and discharged from the wing and fuselage surfaces by the wicks thus eliminating static interruptions in radio reception.

U. S. Weather Ships For Canadian Arctic

In his first announcement since assuming ministerial responsibility over Canada's Meteorological Services, Honorable Lionel Chevrier, Minister of Transport, recently issued the following statement:

Three United States ships—

a Navy icebreaker, a Coast Guard icebreaker and a Navy cargo ship—will proceed to Canadian Arctic waters this summer to resupply the existing weather stations which, as previously announced, have been jointly established there by the Canadian and United States Governments and to reconnoitre sites for further weather stations to be jointly installed next year.

Canadian representatives will participate in the expedition.

Far East Travel Ban Lifted by U. S. Govt.

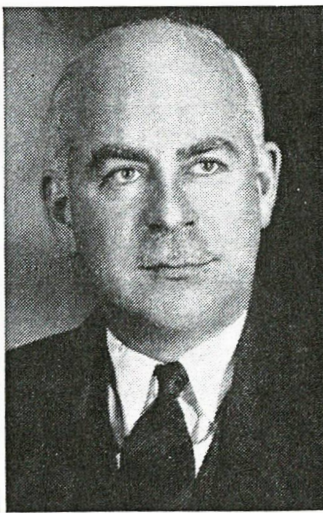
The U. S. State Department has notified Pan American World Airways that restrictive orders have been lifted on pleasure travel to New Zealand, Australia, the Fiji Islands, New Caledonia, Shanghai, the Philippines, Hongkong and Siam.

Previously, it was almost impossible to obtain tourist passports to some of these countries and difficult to obtain them to others, due to restrictions growing out of World War II and present unsettled conditions.

Canadian Executives at Aero Medical Convention



Dr. J. W. Tice



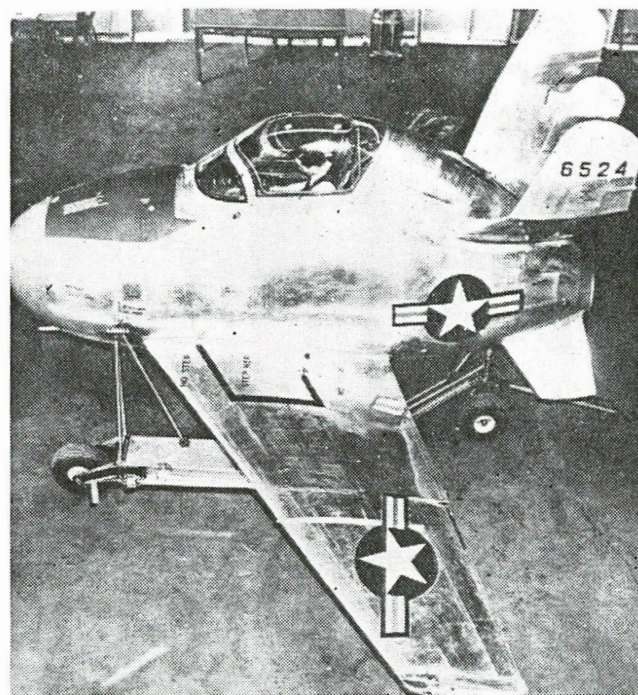
Dr. K. E. Dowd

Dr. J. Winfred Tice, C.B.E., president of the Aero Medical Association, and Dr. Kenneth E. Dowd, chief medical officer of Trans-Canada Air Lines, are the two Canadian members of the Executive Council of the Aero Medical Association which met in Canada for the first time on June 16th, 17th and 18th.

Dr. Tice, former wartime Director of Medical Services for the RCAF, is at present Consultant for the Institute of Aviation Medicine at Toronto.

Dr. Dowd, formerly Chief Medical Consultant for the RAF Ferry Command, is a fellow in the American College of Surgeons.

Parasite Jet Fighter Made Ready For Fired Flight



—Press Association Photo.

McDonnell XF-85

Shown above mounted on a special dolly, the McDonnell XF-85 prototype is being readied for its first flight drop from the belly of a B-29.

The barrel-shaped craft requires the special dolly because of the absence of a landing gear. Powered by a Westinghouse J-34 axial-flow, turbo-jet engine developing 3,000 lb. thrust, the odd craft is designed to fold its wings and fit inside the bomb-bay of a Convair B-36.

The pilot sits atop the engine in a pressurized cockpit, and the hook which attaches the plane to the bomber retracts into a flush-sealed compartment in the top of the nose. The swept-back wings have a 21-ft. span.

The quintuple tail fin assembly is designed to give maximum flight stability and still permit the aircraft to fit in the B-36 bomb-bay.

Flight tests are scheduled for this summer.

Periscope Sextant Replaces Astrodome

The beginning of the end has been reached for the plastic bubble over the navigator's station in U. S. airliners.

No longer will the navigator have to stand in the little transparent blister protruding above the metal surface of the plane and take his sextant readings on celestial bodies. A new development is eliminating the need for the long-established astrodome popularly known as the "bubble" or "blister."

The handwriting on the wall for the astrodome was seen in the announcement recently by Pan American World Airways that it is flight-testing a periscope sex-

tant in preparation for its installation on the larger clipper on order.

The periscopic sextant combines in one delicate instrument the periscope, the viewing device generally associated with submarines, and the bubble sextant, long used by airline navigators in determining the aircraft position. Attached to the ceiling of the flight compartment it permits the navigator to scan the heavens without the necessity of climbing into an astrodome. His view of celestial objects is obtained through a small tube which pokes up a few inches through the metal skin of the plane and can be rotated to give a complete picture of the heavens.

RAF Appropriations Reduced £41 Millions

Britain is devoting special training to her bomber forces to enable a substantial weight of air power to be developed at short notice in any area where it might be required, according to British Air Secretary Arthur Henderson.

Submitting his annual air estimate, the Minister budgeted for a reduction in appropriation for the RAF in the next fiscal year of £41 millions from last year.

Mr. Henderson disclosed that re-equipment of fighter squadrons with jet-propelled aircraft was continuing.

Total RAF personnel in the coming year, according to the Minister, will be 325,000—a reduction of 45,000. He added that the RAF was being completely reorganized in an effort to create a new peacetime force designed to cope with Britain's international commitments.

Ontario Govt. Studies Landing Strip Idea

The Ontario Dept. of Highways is studying the possibility of constructing flight strips at highway intersections on the outskirts of

towns and cities which have no landing fields for aircraft, according to an announcement by Premier Drew.

Mr. Drew said that the department is consulting the municipalities to get their viewpoint on the matter.

With the expanding use of aircraft, he added, it is essential that airfields be served by the main highways and this must be a consideration in the planning of future roads.

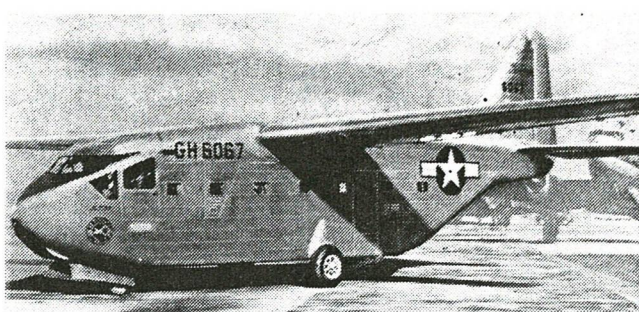
Oshawa Flying Club Has New Directors

At the annual meeting of the Ontario County Flying Club, held recently at Oshawa, Ont. Ed. G. Storie was elected president for the coming year.

Other officers for the year are: W. Hart, vice-president; Cyril Scholfield, treasurer; T. K. Creighton, Geo. Hart, W. J. Langmaid, C. A. Wrenshall, A. S. Burr and Frank Grindley were elected as directors.

It was decided that the annual air show will be held on May 29 this year. Last year the show, the first to be sponsored by the club was held in September.

New All-Metal Assault Glider



CHASE XCG-18A AVITRUC

Capable of carrying 8,000 lb. of cargo, 30 fully equipped combat troops or 24 patients on litters, the all-metal glider pictured above claims amazing performance and safety features. A new airfoil design, which has the appearance of a speed wing, attains a remarkable ratio of lift.

One Chase glider, cut loose from its tow plane at 6,000 feet, remained aloft for 52 minutes and actually gained 1,400 ft. on a thermal updraft. Another has been towed successfully by a P-47 Thunderbolt at the normal cruising speed of the fighter.

The Avitric has a span of 86 ft. and a length of 53 ft. It stalls about 60 mph and the fixed tricycle gear gives good ground control.

Airport at Peterboro Almost Completed

Peterborough, Ont., is today closer to having an airport than ever before, according to a recent report.

The present sale of stock in "Skyboro" is reaching such proportions, it appears likely,

to those concerned, that construction on the airport can be started again this spring.

As it stands, the airport is 70% constructed and 70% financed. As soon as the minimum objective of \$90,000 in public stock has been reached the airport will be completed.

\$1250

FULL PRICE

ANSON V's BRAND NEW

NEVER USED BY THE R. C. A. F.

No Old, Worn Out, Time-expired Droopies.
Always hangared. Never stored outside.
Purchased from War Assets ages ago . . .
when the selection was good.

ALL OF THESE HAVE LESS THAN
25 HOURS TOTAL TIME

SEVEN ANSONS ONLY AT THIS PRICE

KASHOWER of OSHAWA

MAINTENANCE AND OVERHAUL

COMPARE ADVANTAGES —

- Modern premises and equipment.
- Landing strip AND seaplane base facilities.
- Experienced, licensed personnel.
- Railroad siding at shop.
- Design and installation of structural modifications.
- Approved by the Department of Transport for overhaul of fabric and metal-clad aircraft.

— THEN CALL OR WRITE

NICKEL BELT AIRWAYS LIMITED

Maintenance and Overhaul Service

Longueil, Que., Phone PLateau 6693 Loc. 21

The NEWS OF CANADIAN AVIATION

COMMERCIAL MILITARY CIVIL

VOLUME 21

TORONTO, CANADA, JANUARY, 1948

No. 1

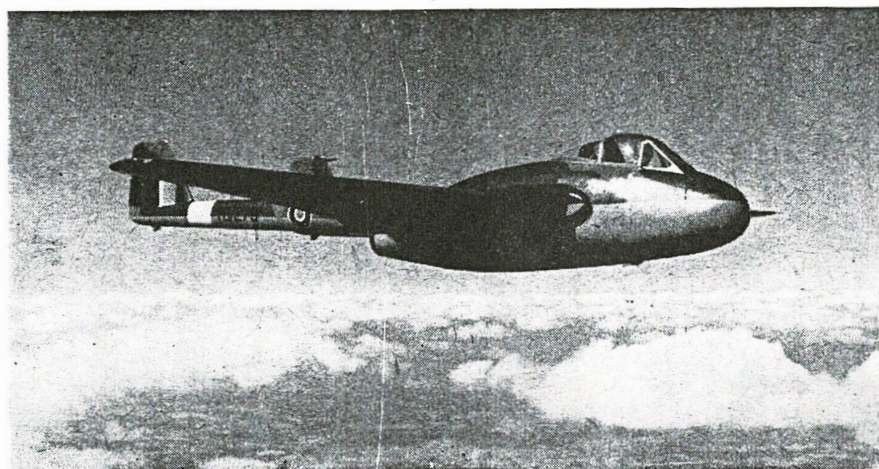
First RCAF Vampire Fighters Here

Vanguard of a jet-propelled fleet to equip RCAF interceptor and auxiliary fighter squadrons, 12 of 85 de Havilland Vampires have arrived in Canada. At press time it was expected that the first of the RCAF jet planes would be assembled and in flight early in January.

The Vampire II, powered with a Goblin III gas turbine engine of 3,500-lb. static thrust, has a maximum speed of approximately 540 mph at sea level. Its maximum climb is 5,000 fpm. Recommended climbing speed is 285 mph, decreasing 15 mph for every 10,000 ft. Operational ceiling is 44,000 ft.

Two 100-gal. drop tanks can be fitted to supplement the 330-gal. internal fuel capacity of the aircraft. Because of aerodynamic considerations, it is recommended that the speed be limited to 535 mph up to 4,000 ft. and to Mach .75 above that altitude. Operational ceiling is 44,000 ft. At high speed, fuel consumption is 310 gal./hr. Still air cruising range is 904 miles. Duration is 1.65 hours.

Stalling speed at 8,000 lb. all-up weight is 80 mph with undercarriage and flaps down, 93 mph with everything up. At 10,000 lb. all-up weight, the



The D-H Vampire will equip RCAF interceptor and auxiliary squadrons. The first of 85 Vampires ordered from England have arrived in Canada.

stall as above is 92 mph and 104 mph respectively.

A nucleus of 100 engine mechanics has been trained at the de Havilland plant near Toronto while a similar group of airframe mechanics are now under instruction. This training is under supervision of Reg. V. Corlett, graduate of a Vampire maintenance course in England. These mechanics will train students now on course at RCAF technical training schools.

Training of the first group of RCAF flying instructors on Vampires will be entrusted to

S/L W. M. Foster, DFC, of Guelph, Ont., who recently was graduated with top honors from the RAF Test Pilot School at Farnborough, England. The instruction will be given at the RCAF Central Flying School, Trenton.

As further Vampires arrive, this nucleus of instructors will train pilots for testing jet aircraft under Canadian conditions at the RCAF Experimental and Proving Establishment. They will also train the pilots of the Regular Force who are attached to the Auxiliary Squadrons throughout Canada.

signing the pact. In the case of the Canadian-Peruvian agreement, this would apply, for example, to the carrying of passengers to and from the United States.

Report Bell XS-1 Through Sonic Barrier

A report that the Bell XS-1, a rocket-propelled single-seater, had breached the sonic barrier recently has been denied by U.S. officials.

The report stated that the first flight made by a man at a speed greater than that of sound was at Muroc Air Base, California. At the controls of the XS-1 was Capt. Charles Yeager, who made the run that was timed by radar at altitudes of 40,000 to 70,000 feet.

The biggest surprise of the plane's achievement, according to the report, was the absence of numerous anticipated difficulties near the speed of sound, the so-called trans-sonic range, where the mixed flow of air at subsonic and supersonic speeds is encountered.

Beaver production begins

Production program for the de Havilland Beaver, single-engined bush plane, is now clearly charted at the D-H plant north of Toronto. With 16 confirmed orders on hand and others in prospect, the company expects to produce one aircraft in January, one in February and two in March. The rate will then be stepped up to four a month by the end of the year.

Ontario Provincial Air Ser-

vice has ordered 12 Beavers for 1948 delivery. Customers for single aircraft in 1948 are: Hans Lundberg, Toronto; Laurential Air Services, Ottawa; Saskatchewan Air Lines, Regina; and Giauque Exploration, Yellowknife, NWT.

The Beaver has been approved on floats and is now undergoing D.O.T. approval tests on wheels prior to ski-equipped testing.

Canada-Peru Air Pact Delayed

Negotiations for a bilateral air agreement between Canada and Peru have been transferred from Lima to Ottawa following a disagreement over the fifth freedom, a report stated recently.

The fifth freedom provides that airlines operating between the countries signing the agreement shall not be allowed to carry passengers to countries other than those

Montreal RCAF Veterans Form Skywriting Firm

Canada has its first full-fledged skywriting outfit, an all-veteran organization called Aerial Advertising of Canada. The three-way partnership of Joe McDermott, Bob Shropshire and Don Smith, all young Montreal air force veterans, already has within its grasp two juicy contracts which, when finally signed, will send their smoke-spewing Harvards over every city in Canada.

Not altogether incidentally, the Canadian trio bids fair to break the U. S. stranglehold held on skywriting in this country for years.

Skywriting is flying at its toughest. It takes anywhere from seven to 17 minutes to hang a firm's name in the sky, but enough action is crammed into those few minutes to last most pilots a day.

In a record two months, as contrasted with the accepted average of a year and a half, Joe McDermott, the flying member of the outfit with

about 3,500 hours and an ox-like constitution, has qualified as a skilled skywriter, and placed the fledgling organization on the threshold of big-time success.

The ease with which McDermott, an ex-fighter pilot, mastered the technique is amazing since there are only about 20 qualified skywriters in North America and most of them took a year and a half to learn.

Through experiments they have discovered that the best height for writing is about 11,000 ft. The smoke mixture is driven into the exhaust manifold of the aircraft by a rotary pump at the touch of a switch in the cockpit. Following combustion, it pours out the enlarged exhaust pipe as the thick white smoke that you see in the sky.

● New York area has a new traffic pattern under which the majority of North-South domestic flights will land at La Guardia Field, and the East-West traffic will use Newark Airport.

Northrop Jet Wing Flies

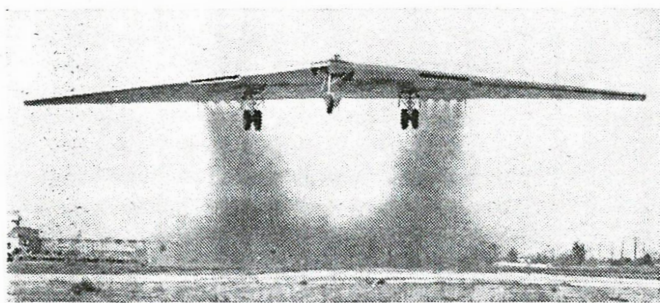
First tests of the U. S. Air Forces mammoth Northrop Flying Wing YB-49 eight-jet bomber at Muroc Army Air Field indicate the giant, 100-ton plane has many performance advantages usually found only in a nimble fighter plane.

While performance data of the sky leviathan remain restricted, indications have come from flight tests already conducted that the YB-49 is capable of setting new performance records for heavyweight airplanes.

Biggest surprise has been the climbing ability of the giant plane. Pilots Max Stanley and Fred Bretcher have sometimes found it

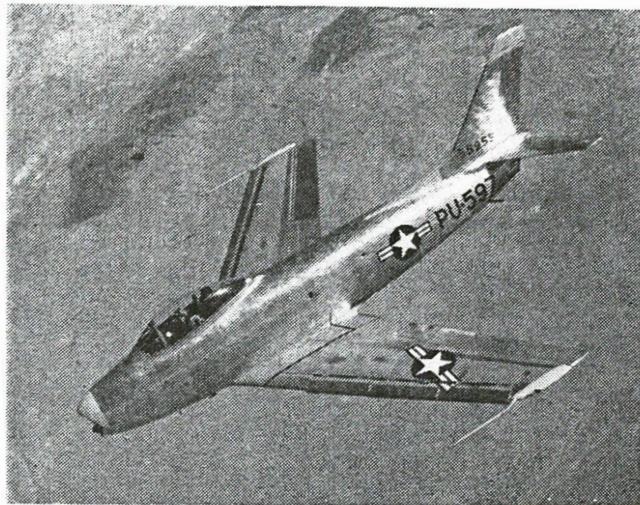
necessary to throttle back on the take-off climb, because the ship accelerates so rapidly there is danger of exceeding the gear-down operational speed before the landing gear can be retracted.

Testing of the 32,000 h.p. sky dreadnaught already is well into the first phase which extends over several hours of flights. Thrust through the air by eight 4,000 h.p. engines, the YB-49 is built to the efficient Flying Wing design, which eliminates tail, fuselage and protruding engine nacelles. The YB-49 measures 172 ft. from wing tip to wing tip, weighs 88,100 lb. empty and more than 200,000 lb. fully loaded.



Trailing twin-plumes of black smoke, the NORTHROP YB-49 jet bomber gets air-borne on its first flight.

Sweptback Jet Fighter



NORTH AMERICAN XP-86, JET FIGHTER

First aerial photograph of America's first sweptback fighter shows the superstreamlined, jet-propelled XP-86 in flight over the Mojave desert. Exact performance is secret, but the speed is said to be in "excess of 600 mph." The range is over 1,000 miles and the service ceiling over 40,000 ft. It is powered by a GE-Allison J-35 (TG-180) axial flow engine producing 4,000 lb. thrust.

RCAF Search & Rescue Move to Greenwood

The aircraft and equipment of the Search and Rescue Co-ordination Centre, RCAF formerly based at Halifax has been moved to the Greenwood air station in the Annapolis Valley in Nova Scotia.

The co-ordination centre itself, however, will remain at Halifax where the actual co-ordination work will be carried on as previously. Direct lines to Greenwood will be utilized for carrying orders for operations.

● In the United States, the War Assets Administration offers 627 surplus C-46 (Curtiss Commando) cargo aircraft for sale at \$5,000 each.

Ants Fly Safely At 30,000 Feet

The problem of transporting ants by air and keeping them alive during the flight has finally been solved. Previously ants that were shipped by air from Australia to the U. S. for study, arrived at their destination dead because the moisture in the ants' bodies dehydrated at high altitudes in the same way that ink evaporates in a fountain pen.

The solution was to place the ants in an airtight container with just enough moisture and dilute solution of honey to replace the food and moisture content of the ant at the same time.

● The Luscombe Airplane

Corp. has announced that the price of the company's new four-place, all-metal aircraft, the Silvaire Sedan, is \$6,995 U. S. dollars flyaway factory at Dallas, Texas. Deliveries are expected to start in the very near future.

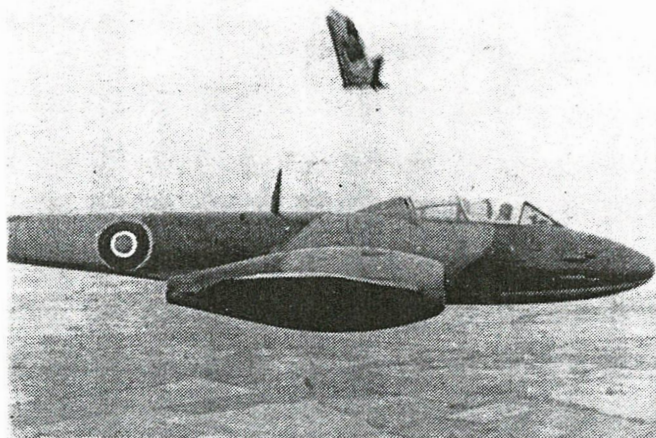
● A new book of "Information Circulars to Civil Air Pilots and Aircraft Owners," covering the period from Jan. 1, 1928 to March 31, 1947, has been issued by the Department of Transport and is available on request.

Says Parachute Jumping Safe for School Girls

Parachute jumping is now a safe hobby for school girls, according to William (Bill) Townsend, veteran jumper from Shelburne, Ont.

Townsend, who completed his jump number 75 recently at Kitchener says that he intends to quit jumping professionally since it is so commonplace now, that there is not enough in it commercially to bother.

Although all his jumps have been successful, the ex-RCAF mechanical engineer refused to say when he would make his last one. He claims that he wouldn't dare pick one jump and label it his last because it may be his all-time last. It's just a superstition he maintains.



A Gloster Meteor firing an ejection-seat at a speed of over 500 mph.

Pilot-Ejection Seats Standard for RAF, USN

Pilot-ejection seats have been adopted as standard fittings in all RAF jet-propelled fighter aircraft. The U. S. Naval air services are also using the device, which has been invented and produced by Mr James Martin, of the Martin Baker Aircraft Co., in England.

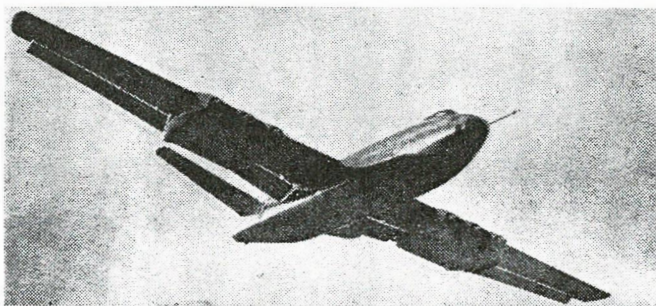
The above photo shows Bernard Lynch, of Martin-Baker Aircraft Co., making a successful leap from a Gloster Meteor travelling at over 500 mph. After jettisoning his cockpit cover, he pulls a blind over his face. This fires a cartridge which ejects him, still sitting in his seat, from the aircraft at a speed of 60 ft. per second. This velocity is necessary to ensure that he will clear the tail plane and fin of the abandoned aircraft.

Eight seconds after ejection a parachute blossoms,

leaving him, still in the seat, floating earthwards in a fast descent. When a suitable height is reached, he drops from the seat and uses his normal parachute in the usual manner.

Ejections have been carried out at over 500 mph at altitudes between 3,000 and 12,000 ft. A descent from 12,000 ft. takes about five minutes, and the force with which the pilot is shot from the aircraft is 23 times the force of gravity.

● Next year's budget for the International Air Transport Association will be \$645,000 it was announced recently. The slight increase over last year's figure will be mainly for new personnel for such projects as a study of joint tariffs and the opening of a liaison office for technical matters in Europe.



MARTIN XB-48, SIX-JET BOMBER

We wish to apologize for an error made in the November issue, when the above picture appeared under the caption—Curtiss XP-87, Four-Jet Fighter. Actually it is a Martin XB-48 six-jet bomber, powered by six GE-Allison J-35 engines, carrying a crew of three and a bomb load in excess of 10 tons. Because of its thin wings, the aircraft is fitted with a tandem landing gear which retracts into the fuselage.

Largest Evacuation By Civil Planes

The greatest civil evacuation by air ever attempted was carried out recently when BOAC and three British charter companies using 23 aircraft, transported 7,000 people from Delhi to Karachi in 11 days.

When the Pakistan Government had taken office, there was an urgent need for the immediate transfer from Delhi to Karachi of its personnel who, owing to the disruption of normal rail services were stranded in the Delhi area.

On receiving the SOS from the Pakistan Government, BOAC immediately solicited the aid of the three charter companies and set out to accomplish the transfer. During the last few days the job was done under adverse conditions, both natural and official.

Except for two Yorks and one Lancastrian all the aircraft, transported 7,000 people were fully furnished passenger machines with every standard of modern air travel comfort aboard. Only on the last two days were some of the aircraft stripped to allow an even greater carriage of personnel. On one journey 82 people were carried in a York and 57 in a Dakota.

Chinese Govt. Buys 150 Mosquito Bombers

Negotiations for the purchase of about 150 surplus Canadian Mosquito fighter-bombers by the Chinese Government have been successfully completed and China will likely pay between \$10 and \$12 millions on the whole deal, it was learned recently.

Between \$5 and \$7 millions of this total will be paid in United States currency, according to the arrangement that has been reached.

The aircraft will be brought from the airfields where they are stored, to the de Havilland Aircraft Co., at Toronto. The company will then, under contract to the Chinese Government, prepart the aircraft for flying duty. This cost is included in the total price.

The actual delivery of the planes to China will be carried out by the company.

● The Eiffel Tower air beacon is now in operation and can be seen for 48 miles.



Experienced aircraft operators know that it **PAYS** to buy and install the **BEST** in maintaining a fleet of airplanes. The **BEST** is the **CHEAPEST** because airplanes make money only when they **FLY**. A plane grounded because some inferior item of equipment has failed or requires service is not earning any **CASH**!

Because of this kind of reasoning, **LEAVENS BROS.** are very happy to be Distributors of **GOODYEAR AVIATION PRODUCTS**. Handling the Goodyear Line is part of the Leavens policy of stocking and selling the **LEADING LINES** in aircraft parts, accessories and materials.

The best-known items in the Goodyear Line are, of course, **TIRES and TUBES**—Leavens Bros. carry stock of all popular sizes. Goodyear brakes, wheels and brake master cylinders are standard equipment on many popular planes. The **SINGLE DISC BRAKE**, a product of Goodyear research, is probably the greatest single advance in airplane brake design in many years. The wearing parts for brakes, wheels and master cylinders are in stock at Leavens Bros. The slower-moving items can be obtained quickly from the factory.

Goodyear Research is constantly working on better things for aviation. Probably Goodyear's greatest contribution to private flying will be the **CASTERING WHEEL** for cross-wind landings. With the entire mechanism incorporated within the wheel, the castering device can be installed on existing axles. Soon, it is hoped, these wheels will be available for **YOUR** plane, allowing it to use fields not previously suitable. When they are available, Goodyear castering wheels will be sold and serviced by Leavens Bros.!

Aircraft Supply Department

LEAVENS BROS
Air Services Ltd.

Barker Airport

Toronto

The **NEWS**COMMERCIAL
MILITARY CIVILOF CANADIAN
AVIATION

VOLUME 20

TORONTO, CANADA, MARCH, 1947

No. 3

Drop Landing Fees for Lightplanes

\$10 Millions Paid For Canadair

The Government of Canada is reported to be receiving close to \$10 millions from the Electric Boat Co. for the "net asset" investment in the plant of Canadair Ltd. Entirely apart from this transaction, the U. S. firm is reported to be putting up \$2 millions, half of which represents new fixed capital.

In addition, Electric Boat has a 15-year option on the plant and tools, at a price which varies upon the date at which the option is taken up. The price is said to be between \$3.5 and \$4 millions. In the meantime, the company has a firm option on the plant which is being used on a fixed rental basis.

Aircraft Exports Total \$9½ Millions

Canada, not generally thought of as a large exporting company, has succeeded in marking up an export trade

in aircraft and parts amounting to \$9,507,369. The figures are issued by the Bureau of Statistics, Department of Trade and Commerce and cover the calendar year of 1946.

Of the 38 overseas customers for Canadian aircraft, the largest dollar value was shipped to the Netherlands East Indies. They accounted for \$1,805,948 while the United States took delivery of \$1,774,756. These exports include military aircraft types, converted for civil use and include not only complete aircraft but also equipment and spares. Commencing with the beginning of 1947, the Bureau of Statistics will report aircraft exports separately from those of aircraft parts.

● A biplane, pusher amphibian, the Supermarine Sea Otter, using a Bristol Mercury engine is being readied for a demonstration tour of Canadian lakes, say reports from England. The conversion is said to make the Sea Otter into a four-place civil machine.

Recent Changes in Air Regulations Free Lightplane Pilots From Some Worries

SPECIAL LICENSES FOR SOME CASES

One of the more annoying features of landing at a Dept. of Transport airport in Canada has been removed, as far as the pilots of light aircraft are concerned.

Information has been received that the landing fee collected for every visiting aircraft is to be waived in the case of lightplanes weighing up to 5,000 lb. Also cancelled is the charge made for heavy aircraft—if they belong to the governments of foreign states.

In other government circulars, the fliers of Canada are told they can make cross-country flights without the formality of filing a flight plan—if their flights will not take them more than 25 miles from their home field. For longer flights, it is still necessary to file a plan with the air traffic control centre.

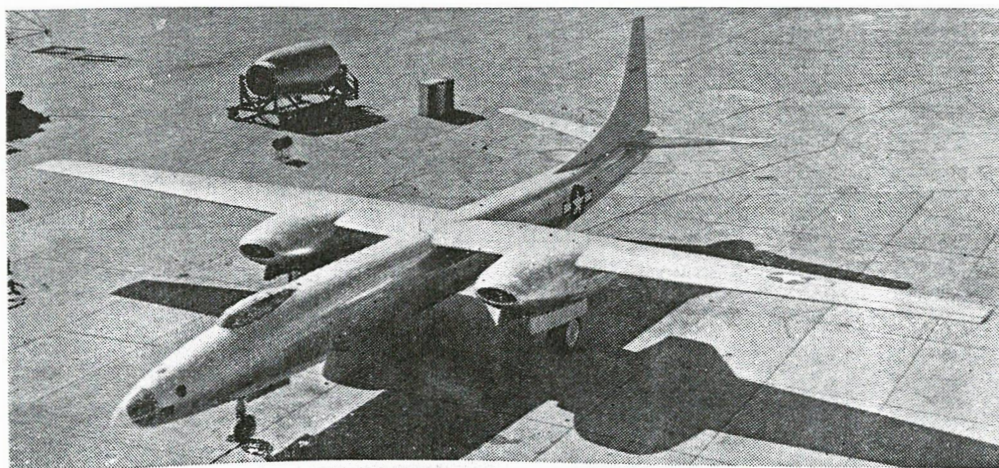
The conditions of issue of

all operating certificates have been amended, now requiring that a reliable timepiece shall be available to the pilot of any aircraft while the machine is in flight.

The requirements for a public transport pilot's certificate have also been amended. Previously applicants had to be 23 years of age, the minimum age has now been reduced to 21 years, and the maximum is 45.

The department has been looking into the medical requirements attendant upon all pilots' licenses. They have been given the power to issue licenses in certain cases to persons who have not normal use of all limbs. The new ruling, which will permit those lacking a leg or the use of a leg, will allow the granting of a limited license to all who can otherwise qualify for the right to fly. Thus, a man with the use of one leg may obtain a license which will permit him to fly such "simplified control" aircraft as the Ercoupe, which is cited as an example.

Four-jet Power Bomber Now Under Test

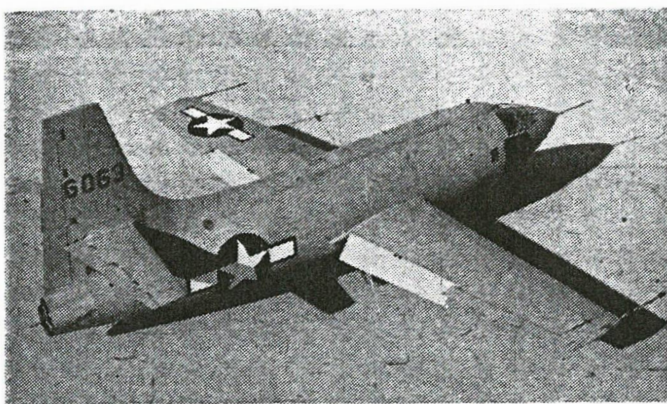


First official view of the XB-46, experimental four-jet bomber being built for the Army Air Forces by Consolidated Vultee Aircraft Corporation. It has been under secret construction in Convair's San Diego plant for the past two years. The jet-propelled medium bomber is now undergoing preliminary ground tests. Powered by four General Electrical turbojet engines located in two lowslung nacelles, the XB-46 has a length of 105 ft. 9 in. and a wingspan of 113 ft.

Sydney Becomes Atlantic Terminus

Canadians living east of Montreal wishing to fly across the Atlantic will benefit from a new International Air Transport Association decision to establish Sydney, N.S., as an additional gateway point for computation of rates for flights between Canada and Europe. Up to now Montreal has been the only Canadian rate gateway.

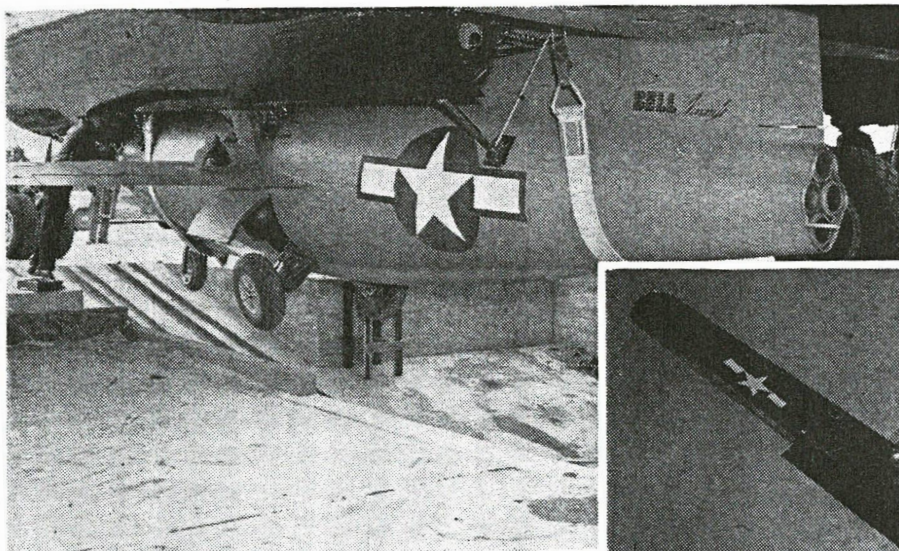
At a recent North Atlantic traffic conference in New York, airline members of the Montreal air body also decided that despite rising costs of operation transatlantic fares would remain at their present level of 9½ cents a mile.



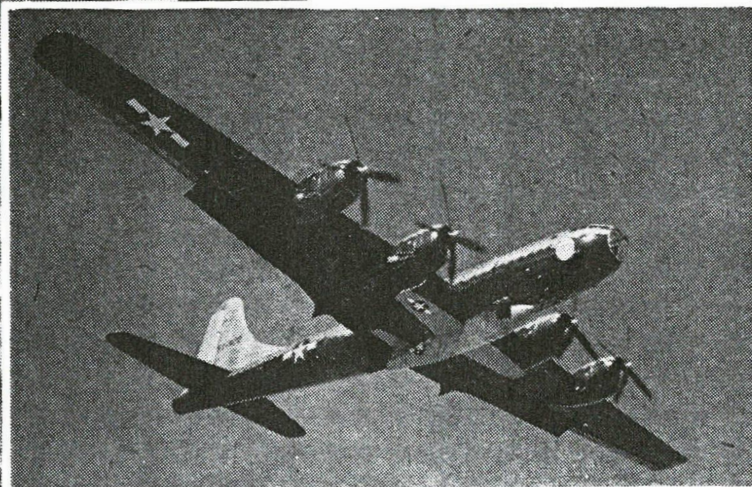
This may be the first aircraft to break through the barrier imposed by sonic vibrations. The Bell XS-1 rocket is designed for just this purpose.

SUPERSONIC QUEST

THESE excellent photographs from the United States Army show the first powered flight of the Bell XS-1 rocket ship which aims at supersonic speeds. Expected to reach a speed of around 1,000 m.p.h., the sturdy little craft is carried aloft by a B-29, with the pilot entering his cramped cockpit at 7,000 ft. and riding there until an altitude of around 30,000 ft. is reached. In its first powered flight the aircraft was held back to a speed of 550 m.p.h. and climbed an additional 10,000 ft. after release. The liquid fuel is fed to the four rocket chambers by the pressure of nitrogen gas—original plans called for a turbine-fuel feed which would have increased the thrust available and the duration of the motor run. During the tests elaborate radar and telemetering devices record the progress of the machine and its instruments. Not intended as a combat machine, the XS-1 is a proving ground for principles which govern future high speed and rocket developments.



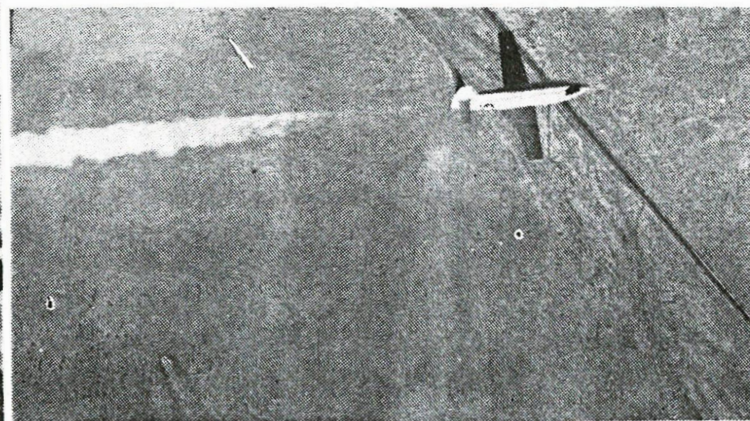
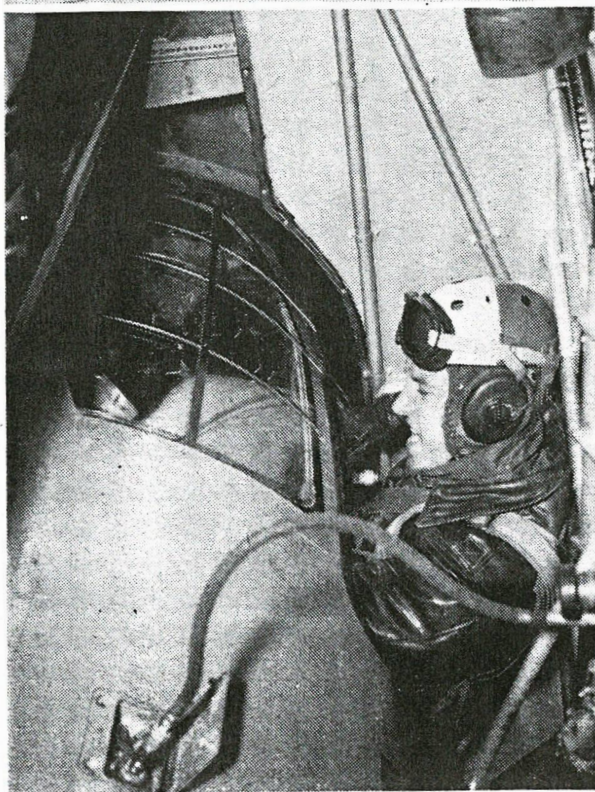
The B 29 Mother Plane is moved over a pit in which rests the little rocket ship, which is hoisted into position so that the rudder and cockpit entrance fit into the bomb bay.



Left: Little room is left for pilot Goodlin to enter.

Below: The XS-1 shortly after release, using its own rocket power.

Above: Here is what the combination looks like in flight.



DeHavilland Aircraft of Canada Ltd., Downsview, Ont., \$89,135 for satellite development contract.

Electronic Materials International Ltd., Ottawa, \$22,575 for engineering investigation of preventive maintenance tests for airfield traffic control system.

Genaire Ltd., Malton, Ont., \$13,133 for toilet servicing units.

Genaire Ltd., St. Catharines, Ont., \$16,507 for aircraft spares.

Gould-National Batteries of Canada Ltd., Toronto, \$24,675 for aircraft batteries.

Walter Kidde & Co. of Canada Ltd., Montreal, \$30,000 for repair, overhaul, recharge and retest of oxygen cylinders during year ending March 31/61.

MEL Sales Ltd., Toronto, \$45,650 for radar test sets.

Orenda Engines Ltd., Toronto, \$5,000,000 for aero engine spares during year ending March 31/61.

Ross-Smith Co. Ltd., Montreal, \$159,872 for aircraft towed target gear.

Sampson Mathews Ltd., Don Mills, Ont., \$11,012 for exterior markings for aircraft.

Servomechanisms (Canada) Ltd., Rexdale, Ont., \$84,535 for development contract.

Shell Oil Co. of Canada Ltd., Toronto, \$200,955 for aviation gasoline.

Aviation Electric Ltd., Montreal, \$21,766 for aircraft spares.

Aviation Electric Ltd., Montreal, \$26,652 for aero engine spares.

Aviation Electric Ltd., Montreal, \$22,844 for oxygen containers.

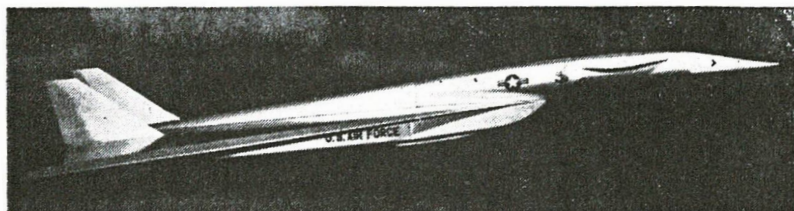
Canadair Ltd., Montreal, \$250,000 for engineering studies, development, manufacture of prototype and production of aircraft modification kits during year ending March 31/61.

Canadair Ltd., Montreal, \$45,000 for engineering assistance on development contract during year ending March 31/61.

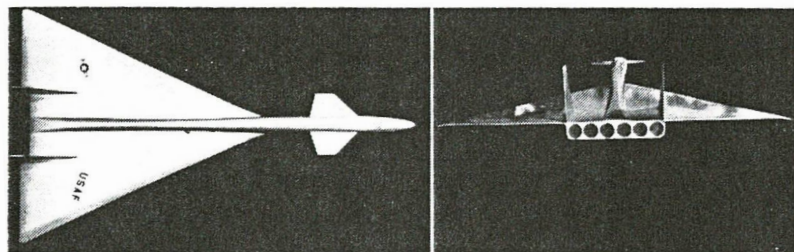
Canadair Ltd., Montreal, \$56,206 for technical publications.

Canadian Aviation Electronics Ltd., Montreal, \$132,400 for repair & overhaul of operational flight and tactics trainers during year ending March 31/61.

Canadian Car Co. Ltd., Fort William, Ont., \$80,875 for airframe spares.



B-70 VALKYRIE: Special features of the North American B-70 now under development are shown in these views of a scale model. Above: Side view of the Mach 3 Valkyrie bomber. Below right: The aircraft's six GE J93 jet engines are shown centred under the wing. Other features of the B-70 include canard control surfaces near the crew compartment, and large triangular wing surfaces.



Canadian Flight Equipment Cobourg Ltd., Cobourg, Ont., \$89,715 for aircraft personnel catapaults.

Collins Radio Co. of Canada Ltd., Toronto, \$20,709, for technical publications.

Collins Radio Co. of Canada Ltd., Toronto, \$37,298 for aircraft navigational instruments.

Computing Devices of Canada Ltd., Ottawa, Ont., \$154,113 for air cameras.

DeHavilland Aircraft of Canada Ltd., Downsview, Ont., \$45,150 for engineering

support for aircraft during period ending March 31/61.

Measurement Engineering Ltd., Arnprior, Ont., \$884,146 for control tower consoles.

Shell Oil Co. of Canada Ltd., Toronto, \$16,440 for aircraft engine oil during year ending March 31/61.

Sparton of Canada Ltd., London, Ont., \$518,218 for sonobuoy transmitters.

Sperry Gyroscope Co. of Canada Ltd., Montreal, \$16,014 for aircraft spares.

Imagine a 50-ton Hercules airfreighter lifting off in just 500 feet, from a standing start on an unprepared field. Or picture the big prop-jet stopping after touchdown in 520 feet. This performance of Lockheed's Boundary Layer Control C-130, at mid-point of a 2000-mile round trip mission, is truly remarkable. But its significance goes far beyond the spectacle itself.

The BLC-130 brings true STOL capability to Air Force support missions. Whether it has to rush 92 combat troops to a spreading brush-fire fight, or airlift 18 tons of food to some remote hunger

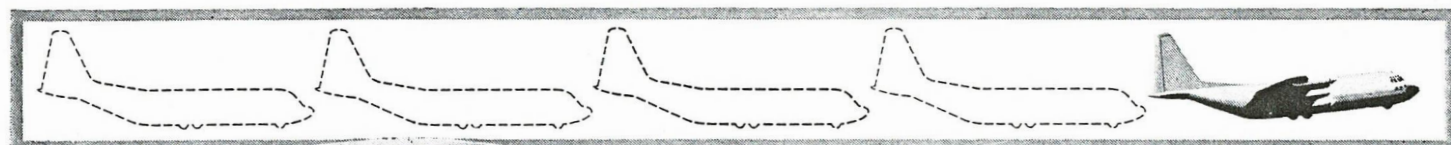
spot, the huge airlifter will be able to deliver its payload closer to the action than ever before possible.

A test bed BLC-130 has completed advanced flight tests, clearly illustrating the feasibility of boundary layer control on big planes.

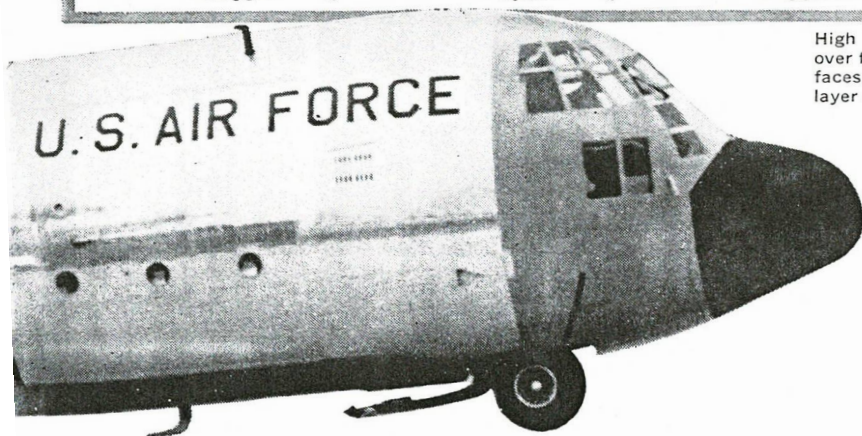
LOCKHEED

GEORGIA DIVISION

MARIETTA, GEORGIA



High speed air—supplied from pylon-mounted turbojet compressors and blown over flaps, ailerons, elevator, and rudder—causes the airstream to hug the surfaces instead of being separated from them. The energization of this boundary layer of air gives the BLC-130 its extraordinarily high lift.



vice president; Lysle Wood, vice president; J. O. Yeasting, vice president; Max Bowen, vice president; H. W. Lord, treasurer; John A. O'Hara, secretary, and John S. Ciechon, asst. secretary.

Kenneth R. Patrick, formerly chairman of the board of Canadian Vertol, is on the board of Boeing of Canada as a director. Max Bowen, in addition to being a vice president, is also general manager, the same position he held with Canadian Vertol. Mr. Berlin was president of Canadian Vertol. Canadian directors, besides Mr. Patrick, are Leonard W. Brockington of Toronto, Hon. J. A. D. McCurdy and Roy G. Peers, both of Montreal.

The Arnprior facility provides overhaul, modification and repair support for Vertol helicopters operated by the RCAF, RCN and Spartan Air Services Ltd. To a lesser extent, it manufactures spare parts and conducts service trials.

Boeing was a familiar name on the aviation scene in Canada prior to World War II, but after the war Canadian operations were terminated. During the war, Boeing Aircraft of Canada Ltd., as it was then known, manufactured B-29 sub-assemblies as well as PBV aircraft at a Government-owned plant in Vancouver (now CPA's maintenance and overhaul base).

More Bomarc Work for CL

Following the news that the Bomarc B ground-to-air missile has been accepted officially by the USAF and ordered into quantity production, Canadair received a follow-up contract for 185 more sets of wings and ailerons. The order has the effect of extending to June 1962 the Bomarc program in Canadair's Missiles & Systems Div., and brings to 300 the total of "B" sets which have been ordered from Canadair by Boeing Airplane Co., the prime contractor.

Canadair completed and shipped, last month, the remainder of 246 sets of the same components for the Bomarc A. All the components are shipped directly to Seattle, Wash., for assembly at Boeing.

CAE Reports

Slightly reduced earnings in the first seven months of 1960, as compared with the same period last year, are

reported by Canadian Aviation Electronics Ltd. in a brief interim report. At the same time, CAE said that the results for the full calendar year should be slightly better than in 1959.

The main effort at CAE's Montreal facility is being directed toward the engineering and development work on the F-104 simulator program. Present employment at CAE in Canada is 1284. As the F-104 simulator program moves into the production phase however, there will be an employment build-up to a point which is expected to provide 600 additional jobs in the Montreal plant.

OHL Declares Dividend

Okanagan Helicopters Ltd. has declared a dividend of five cents on common shares, payable Dec. 15 to holders of record Nov. 18.

The company previously made a payment of 15 cents in April for a total this year of 20 cents compared with a 1959 total of 15 cents.

B.C. Propeller Bought

Vancouver businessman Paul Tak has purchased B.C. Propeller Co. Ltd., an aircraft propeller and engine overhaul, repair, and sales company.

Mr. Tak sold out his majority interest in B.C. Airlines Ltd. about a

year ago. T. C. Walsh, manager of B.C. Propeller, was also formerly associated with B.C. Airlines, the new owner said.

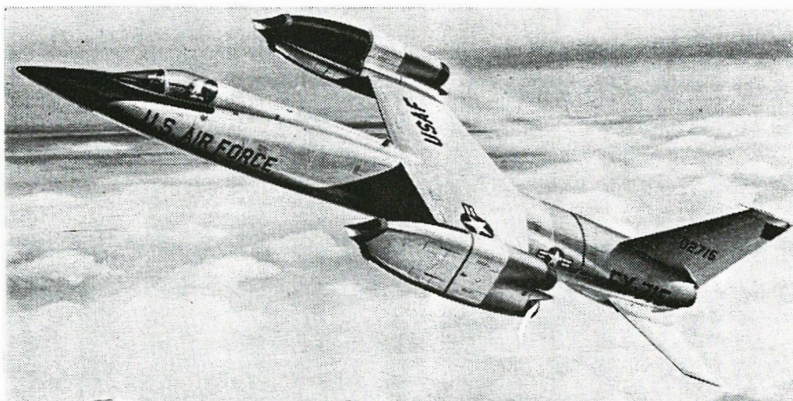
The company was purchased from Kenneth Hillstrom. It will be moved from its present Marpole location to Vancouver International Airport when facilities become available.

Litton in Canada

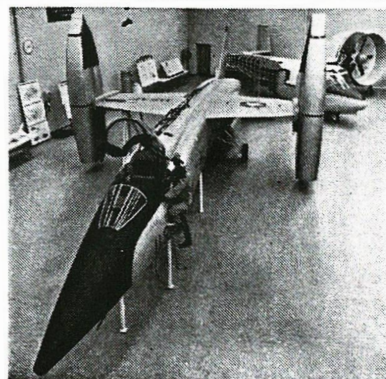
Litton Industries Inc., Beverly Hills, Calif., has formed a Canadian subsidiary named Litton Systems (Canada) Ltd. The new Canadian firm has taken over the operations and facilities of Servomechanisms (Canada) Ltd., which Litton Industries acquired from Servomechanisms Inc. in the spring of 1960.

Litton Industries is responsible for the CF-104's inertial guidance system and the new Canadian subsidiary, which is located in the Toronto suburb of Rexdale, will participate actively in this important program. Litton plans to expand its Canadian operations with particular emphasis on advanced electronic products.

The activities of Litton Systems (Canada) Ltd. are being managed by J. M. Bridgman, who is vice president & general manager. Mr. Bridgman is well known in the Canadian elec-



BELL VTOL FIGHTER-BOMBER: Above, artist's conception of Bell D188A VTOL fighter-bomber in level flight. Powered by four wing-tip engines and two rear-fuselage engines, the D188A will achieve a max. horizontal speed of Mach 2.3. Aircraft has a subsonic range of 1,000 miles, ceiling of 67,500 feet. Right: Full-scale mockup is seen with wing-tip jet engines tilted to vertical position for VTOL take-off or landing. Sea Level rate of climb is estimated by Bell engineers to be over 61,000 fpm. Design study is being sponsored jointly by USAF and USN.



mitting complete pilot training or an evaluation of a pilot's radar competence before he takes costly training on the 104. Also, the CL-41R permits flight testing and calibration of the 104's complete electronics navigation and fire control systems before they are installed in the fighter.

The prototype CL-41R is actually a modified "A" which is one of the two airplanes built by Canadair when the project was still a private venture. This particular airframe has not previously been flown. On completion as a CL-41A, it was put into storage as an economy measure, and all flight tests were conducted with the first airplane, which made its maiden flight in January, 1960.

CL-44 Deliveries Complete

The last of the big Canadair Forty Four freighter airplanes ordered so far by U.S. commercial airlines flew out of Montreal April 5, to begin its career in international air freighting. This completed deliveries of orders placed in 1959 by three U.S. cargo airlines—ten to Flying Tigers, five to Seaboard World, and two to Slick Airways. With 12 to the RCAF (known as Yukons), this makes a total of 29 planes in service.

The commercial swing-tails have brought a total of about \$90 million in export sales to Canada. This has meant three years of steady employment for some 6000 Canadian employees and a like number of workers in sub-contractor and supplier companies across Canada. Each CL-44 is built up from 75,000 different parts.

Although commercial deliveries on firm orders are now complete, a further ten swing-tail Forty Fours are in production at Montreal, of which five are being built by the company at its own expense in anticipation of further sales to international airlines. The second five are being financed out of Government funds.

Commenting on the last delivery,

Canadair Pres. & Gen. Mgr. J. Geoffrey Notman said: "Development of the commercial CL-44 swing-tail from the earlier RCAF military transport is a private enterprise in the best traditions of the aircraft industry. It required a Canadair company investment of over \$13 million to take the project from a clean sheet of paper on a drafting board, through all phases of design, development, testing and certification up to the full maturity of regular airline service."

Tracker Repair

Fairey Aviation Co. of Canada Ltd. has been selected for the repair and overhaul work on the RCN's CS2F Tracker, the Government announced March 29.

Enamel & Heating Products Ltd. was chosen for the production of the necessary parts and components. Enheat will keep production tooling in a stand-by condition to be withdrawn for the production of spares as required. The tooling originally cost about \$9 million, and shipping it to the Maritimes will cost more than \$140,000.

C-46 Spares from Fairey

The Patricia Bay division of Fairey Aviation Co. of Canada Ltd. has recently started production of spares for Curtiss C-46 aircraft, using tools and jigs purchased from North American Aviation Inc. With the tools and jigs came the right to sell the C-46 parts on the international market.

Customer Resistance

The Canadian Government apparently is having a harder time trying to sell Britain on defence production-sharing than it did the U.S.

Canada now has two big defence plums which it can drop in the lap of Britain: three conventional submarines at a minimum of \$10 million each and a repair and overhaul contract for the CF-104 worth about \$3 million a year. If Canada places these two contracts in Britain, it wants the U.K. to purchase defence

equipment of approximately equal value in Canada.

But Britain holds some aces, too. For one thing, it hasn't yet signed a contract to purchase Canadian uranium in 1963-66. And so far it has balked at granting Canadian Pacific Airlines a licence to land at London.

Defence Minister Harkness announced April 11 that Canada will buy from Britain three Oberon class submarines "subject to satisfactory completion of negotiations with the British government."

These negotiations concern British purchases of Canadian defence equipment, particularly in the aircraft field. Two planes under discussion in this regard are the Caribou and CL-44.

British defence officials have had a long look at both these planes. The British Army is reported to want the Caribou but the RAF is objecting. The RAF apparently also objects to any acquisition of the CL-44.

DDP Reports

For the aircraft industry, one of the most hopeful notes in the DDP's 1961 annual report is that \$13,844,000 worth of contracts were let last year in Canada for R & D projects of interest to the U.S. armed forces.

Two examples of these contracts: a study for USAF on how to escape from earth orbital vehicle and a feasibility study into the launching of test rockets from aircraft to altitudes of 100,000 feet at velocities up to Mach 10. Both these contracts went to Canadair.

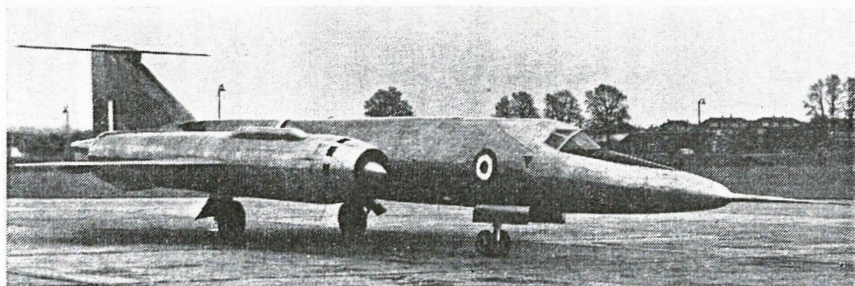
DDP placed \$528 million worth of defence contracts in 1961, 34.3% below the \$804 million value in 1960. The aircraft program accounted for the major part of the decrease—to \$113 million from \$363 million in 1960. The 1960 figure was particularly high, however, because of CF-104 production contracts.

U.S. prime defence contracts placed in Canada in 1961 totalled \$97.5 million compared with \$75.6 million in 1960. At the same time, value of prime Canadian contracts placed with U.S. companies fell to \$16.7 million from \$70.4 million. All U.S. defence contracts placed in Canada, including sub-contracts, were worth \$142.6 million against \$112.7 million in 1960 and \$96.3 million in 1959. The report gives no comparable figure for all Canadian contracts let in the U.S.

Contracts placed with foreign prime contractors represented 4.9% of the total value issued during the year, a significant decrease from the 10.6% in 1960.

Aircraft and aircraft equipment requirements resulted in expenditures to contractors of \$222.5 million in 1961, a decrease of \$44.3 million.

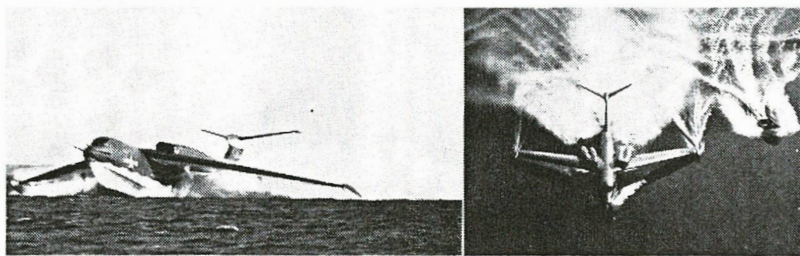
The DDP report says: "The phas-



BRISTOL TYPE 188 FLEW for the first time on April 14. The all stainless steel aircraft took off from British Aircraft Corp.'s field at Filton, England, with Godfrey Auty at the controls. Type 188 is designed for investigating flight problems, particularly kinetic heating problems, at high supersonic speeds. Power is by two DH DGJ.10 Gyron Juniors.



P6M MARTIN SEAMASTER: With an operational cruise altitude of 40,000 feet, the US Navy's SeaMaster is capable of high speeds at low levels to perform its mine-laying or photo-reconnaissance work. The P6M is shown below during taxi trials on Chesapeake Bay. Note canted engine nacelles to prevent afterbody heating.



quirements, was held recently in Washington, D.C.

It was pointed out at the meeting that operation of aircraft built in one country by operators of the other would be greatly facilitated if the regulations, particularly those of an operational nature, were unified. In addition, manufacturers hoping to sell in both the U.K. and the U.S. would avoid the need for additional costly flight testing if the performance codes were sufficiently similar to enable each country to validate the other's certificates without requiring special conditions.

It is anticipated that, following early domestic consultations within the U.K. and U.S., a program for mutual collaboration will evolve. It is expected that this program will include a further meeting similar to the one just held.

CL-28 Flight Trainer

Canadian Aviation Electronics Ltd. has received a contract for the design, development and manufacture of an operational flight trainer for the CL-28 Argus maritime reconnaissance patrol craft. The trainer will familiarize Argus crews while on the ground with the operation and characteristics of the engines and aircraft in flight.

At the same time, CAE will also make a design study for a Tactical Procedure Trainer for the training of

crews in the use of the CL-28's complicated radar and weapons system.

The RCAF are also using electronic flight training methods for transport crews; CAE have just started production of 12 general purpose aircraft trainers following a recent order by the Air Force.

Klixon Distributor

Leavens Bros. Ltd., Toronto, has been named as an authorized distributor of Klixon Circuit Breakers, it has been announced by the Spencer Thermostat Div. of Metals & Controls Corp., Attleboro, Mass. Leavens Bros.' territory includes all of Canada east of Saskatchewan.

For testing and experimental work, manufacturers and government agencies will continue to be served by the Spencer field engineer located in Toronto: L. B. Jones, 77 Humbercrest Blvd. Distributors however, will handle routine requirements for all circuit breaker customers.

Piper Service

As the first step in a plan to set up a nation-wide service organization for Piper aircraft, Trans Aircraft Ltd., at Hamilton's Mount Hope Airport, has been approved as a "factory-certified" service centre. The approval came following an inspection of the firm's facilities, operated by a companion com-

pany, Hamilton Aircraft Services.

"We are the first in Canada to receive the certification," said Glenn White, president & general manager of Trans Aircraft. "Within the next few months, five or six of our dealers should receive similar inspection and approval."

Trans Aircraft is Canadian distributor for Piper, and as such is the key outlet in Canada for the American firm.

Contracts Awarded

Contracts awarded business in excess of \$10,000 by the Department of Defence Production during the period Dec. 16, 1957-Jan. 15, 1958, include the following. The list does not include orders placed by the Department outside Canada, or with other agencies, or increases in orders placed earlier—nor do orders classified as secret appear here.

(Names appearing in bold face are current aircraft advertisers.)

Aircraft Appliances & Equipment Ltd., Toronto, \$31,296 for aircraft spares.

Canadair Ltd., Montreal, \$658,145 for air-frame spares.

Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., \$612,636 for helicopters.

Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., \$38,156 for helicopter modification kits.

Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., \$43,177 for aircraft spares.

Crothers Mfg. Ltd., Toronto, \$13,312 for modification of diesel electric generating sets.

Goodyear Tire & Rubber Co. of Canada Ltd., Toronto, \$20,465 for aircraft spares.

Imperial Oil Ltd., Ottawa, \$30,300 for aviation gasoline during year ending March 31/59.

Pioneer Parachute Co. of Canada Ltd., Smiths Falls, Ont., \$34,090 for modification of packboards.

Railway & Power Engineering Corp. Ltd., Montreal, \$21,653 for aircraft spares.

Aircraft Welding & Sheet Metals Co. Ltd., Ville St. Michel, Que., \$16,025 for modification of aero engine containers.

Aircraft Welding & Sheet Metals Co. Ltd., Ville St. Michel, Que., \$22,875 for aero engine containers.

Avro Aircraft Ltd., Toronto, \$169.49 for technical publications.

Avro Aircraft Ltd., Toronto, \$25,198 for technical services.

Canadair Ltd., Montreal, \$102,400 for aircraft spares.

Canadian Aviation Electronics Ltd., \$2,048.435 for flight and instrument twin reciprocating engine trainers.

Computing Devices of Canada Ltd., Ottawa, \$247,183 for technical publications.

Imperial Oil Ltd., Ottawa, \$330,950 for aviation gasoline during the period ending March 31/59.

Orenda Engines Ltd., Toronto, \$23,125 for technical services.

Shell Oil Co. of Canada Ltd., Toronto, \$42,213 for aviation gasoline during the period ending March 31/58.

Shell Oil Co. of Canada Ltd., Toronto, \$21,758 for aviation gasoline during the year ended March 31/59.

Sperry Gyroscope Co. of Canada Ltd., Montreal, \$24,455 for modification of gyro compass system.

THE AIRBORNE SERVICES

Operation Starflight

Delivery of 25 T-33 trainers to Greece and Turkey was made last month, as pilots of the RCAF ferried the aircraft from Trenton, Ontario to Europe. Under the command of Squadron Leader D. R. Cuthbertson, AFC, ex-commander of the Overseas Ferry Unit, the jet trainers made an uneventful crossing by way of Goose Bay, Labrador; Sondrestrom, Greenland; Keflavik, Iceland; and Langar, England. Their initial delivery point was No. 1 Fighter Wing, Marville, France.

Of the total, 17 aircraft went to Turkey and 8 to Greece. The Mark 3 T-Birds are a Canadian gift to the eastern NATO representatives under the Mutual Aid program. It is interesting to note that since its inception in 1951, Canada has donated an estimated \$365 million in materiel gifts, including nearly 750 aircraft and an equal number of spare engines to NATO countries. NATO aircrew training alone is estimated to have cost Canada more than \$400 million. Total Canadian contributions to other NATO countries under Mutual Aid, in the form of military equipment and services, comes to more than \$1 billion.

CL-28's Delivered

Last month, in a ceremony held at RCAF Station Greenwood, N.S., the first five CL-28 Argus anti-submarine aircraft were turned over to Maritime Air Command. These aircraft have been assigned to Greenwood's 405 Squadron, and are replacing the squadron's Neptunes.

Conversion training for the RCAF aircrews is being handled at Greenwood. Canadair test pilot Scotty McLean and chief flight engineer W. L. Harris, have been assigned to the Greenwood station to train the first six pilots and first four flight engineers of Maritime Command to be converted to the CL-28's.

Steinhardt Trophy

The Laurence A. Steinhardt Memorial Trophy for the most efficient all-weather interceptor squadron in Canada has been won this year by No. 413 "Tusker" Squadron of Bagotville, Que. This is the second year in the

three-year existence of the trophy that it has been won by a Bagotville squadron. The competition is open to the nine all-weather squadrons based in Canada.

The trophy was donated by Mrs. A. A. Sherlock, the wife of an RCAF officer, in memory of her father, the late Honorable Laurence A. Steinhardt, U.S. Ambassador to Canada who was killed in an aircraft accident in 1950.

Auxiliary Change - Over

The conversion of 406 Auxiliary Squadron in Saskatoon from Mitchell bombers to Expeditor light transports, will be completed by late June. The squadron is being changed to a transport unit, training to airlift men and equipment in an emergency. The change-over is part of Defence Department plans to change the RCAF auxiliary squadrons into transport units.

Auxiliary squadrons at Winnipeg, Calgary and Hamilton were supplied with twin-engine Expeditor aircraft late last year. Edmonton, the other B-25 Mitchell reserve squadron, is being changed to the transport role at the same time as Saskatoon. The Mitchell squadrons will lose between 70 and 80 of their Regular Force personnel with the switch. Reason for this is the simpler maintenance of Expeditors compared to B-25's.

The six remaining auxiliary squad-

rons in Canada, two each in Vancouver, Toronto and Montreal, which are still operating in a fighter role with Sabre 5 aircraft, are expected to re-equip with Expeditor aircraft later in the year. No concrete date has been set for the transformation.

RCAF 1958 Allotment

The government's 1958-59 fiscal year defence budget totals \$1,686,000,000. Of this, the RCAF has been allotted \$870 million. This is more than half the total defence budget and more than the Navy, Army, Defence Research Board and Mutual Aid expenditures combined.

The appropriation for the RCAF is \$25 million higher than last year. The RCN is cut \$27 million, down to \$282 million, while the Canadian Army is slated for a \$41 million reduction to \$437 million.

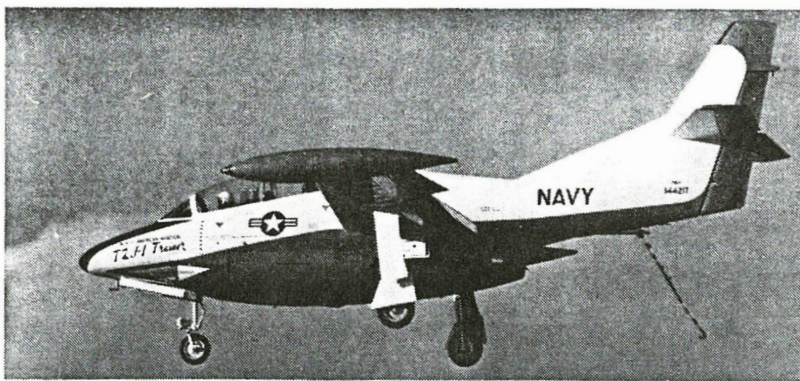
Arctic Re-supply Complete

A giant airlift of more than 1.25 million pounds of freight, in the spring re-supply of Canadian Government outposts deep in the Arctic, was completed on schedule by the RCAF's Air Transport Command. The operation was carried out jointly by 435 (T) Squadron, based at Namao, near Edmonton, and 436 (T) Squadron located at Downsview Airport in Toronto.

C-119 Packets operating out of Resolute Bay, made 106 sortie-flights into isolated joint Canadian-U.S. weather stations, DoT radio stations, and RCMP outposts scattered through-



ZERO-LAUNCH FIGHTER: Shown is an artist's conception of the Northrop N-156F supersonic fighter being launched from small, hidden forest clearing. The lightweight fighter is being developed for use by NATO nations. Zero-launch capability is based on use of launchers presently available. The missile-carrying N-156F is capable of Mach 2; can be operated from short airstrips and grass fields.



NORTH AMERICAN T2J DEMONSTRATED: First demonstration flight of North American's T2J all-purpose jet trainer took place recently, only five weeks after the rolling out of the aircraft. The T2J is destined for the U.S. Naval Air Training Command at Pensacola, Fla. Top speed is 429 knots, landing speed only 67 knots. Aircraft is powered by Westinghouse J-34 giving 3400 lb. thrust.

out the Arctic. Resolute Bay is an Air Transport Command base located on Cornwallis Island some 1600 miles due north of Winnipeg.

To take advantage of the continuous daylight in the Arctic this time of year, round-the-clock operations were maintained. Two crews were assigned to each aircraft. Maintenance crews and other squadron ground crew personnel were flown into the Arctic base.

Neptunes for Comox

The first Neptune aircraft, replacing the Lancasters 10MR's still on operational duty with 407 Maritime Squadron at Comox, B.C., have arrived at the Vancouver Island base. They are aircraft belonging to 405 (M) Squadron at Greenwood, N.S., which is being re-equipped with Argus long-range anti-submarine aircraft.

Additional aircraft will be arriving at Comox as they are made available from Greenwood. No. 407 (M) Squadron forms part of Maritime Command with headquarters in Halifax. Its prime role is that of maritime reconnaissance; however it is also used on occasion as a long range search and rescue unit. Ice patrol in the Arctic forms another duty of the squadron.

RCAF-USAF Exercise

USAF B-57 bombers and T-33 training aircraft, are presently operating out of North Bay and Lakehead airports in a joint RCAF-USAF exercise to test the North American air defence system. The exercise, which will last more than 40 days, is designed to test the joint operating procedures of the Canadian and U.S. air defence forces. Other exercises of similar nature

have been carried out in both Canada and the United States in the last few years but on a smaller scale.

For purposes of the operation, 12 T-33 jet trainers have been positioned at Lakehead airport with about 30 USAF personnel, and 12 T-33's are at North Bay. Five B-57 bombers, (the Martin version of the British Canberra), are also at North Bay. All of these are unarmed training aircraft of the USAF's Air Defence Command. About 50 USAF aircrew and ground servicing personnel are located at North Bay.

R-Theta for NATO?

Last month announcement was made that the Belgian government had ordered the Canadian-built R-Theta navigation computer system for its CF-100 interceptors. This order, the exact amount has not been disclosed, is expected to be approximately \$1 million. Canadian Applied Research technical representatives will supervise the installation of the navigation equipment in Belgium.

J. M. Bridgman, CARL vice-president and general manager revealed that other NATO air forces may soon adopt the R-Theta. Said Mr. Bridgman: "At the moment it is being evaluated by the French Air Ministry and the Royal Swedish Air Board. These are two European air forces which have expressed interest."

OTU in Germany

The training of German pilots by RCAF personnel on Sabre aircraft, is continuing at Oldenburg, Germany. Handling the OTU training is a 31-man RCAF advisory group. In addition

to these, RCAF technicians are giving German groundcrews on-the-job training in servicing the Sabres which are part of the original 75 donated to Germany by Canada under Mutual Aid agreements.

Patterned after the RCAF's Sabre OTU at Chatham, N.B., the course for the German pilots includes practice intercepts, battle formation flying, gunnery, tactics, instrument flying and flight simulator training. At the present time, the German pilots take their simulator training at the RCAF's No. 5 Field Technical Training Unit located at 3 Fighter Wing, Zweibrücken, Germany. The Oldenburg establishment will receive their own simulator later in the year.

Military Hospital Planned

Foundation and excavation work tenders have been called for a 350-bed hospital in the Ottawa area for the armed forces, DVA and the RCMP. The RCAF has been charged with the design and construction of the \$8.5 million hospital, and it is expected that tenders covering the main structure and services will be called later this year.

The new hospital, to be called the National Defence Medical Centre, will have accommodation for 350 beds and provision for dental services, medical and diagnostic services, outpatient treatment and casual care for members of the RCN, Canadian Army, RCAF, RCMP and for veterans eligible for treatment under DVA regulations.

Costello to Retire

Air Commodore Martin Costello, AOC of Maritime Air Command, will retire from the service in July, and will be succeeded by Air Commodore William Clements, chief of personnel at AFHQ.

A/C Costello's retirement follows 30 years of distinguished service with the RCAF, which has been climaxed by his leadership of Maritime Air Command. His period of service with Maritime Command, which is becoming increasingly important in the face of the growing submarine threat, saw the build-up of the Maritime force and greatly improved operational capability.

His successor, A/C Clements, is a veteran of 25 years service with the RCAF, and possesses a similarly outstanding record. This record includes pre-war experience with coastal recon-

Canadair Contracts

First official figures on costs of the Canadair CL-28, CL-44 (CC-106) and Eland Convair 440 (CL-66) were given by Defence Production Minister Raymond O'Hurley in the House of Commons on July 28. Mr. O'Hurley gave an account of all unclassified contracts awarded to Canadair between August 10, 1953, and June 30, 1958. In this period, Canadair was awarded 182 contracts worth \$10,000 or more with a total value of \$340,060,869.48 and 466 contracts under \$10,000 with a total value of \$611,368.51.

Among the details of contracts are: Engineering and development of CP-107 (CL-28), \$20,969,100; tooling for CL-28, \$25,265,000; production of CL-28, \$113,500,000.

Engineering and development for production of CL-44, \$8,500,000; tooling for CL-44, \$10,100,000; production of CL-44, \$24,000,000. Production of CL-66, \$10,000,000. The company at present has orders for 33 CL-28's, eight CL-44's and 13 CL-66's.

Other noteworthy contracts awarded to Canadair included: \$8,000,000 for pre-production planning and engineering for the Sparrow II air-to-air guided missile; \$2,250,000 for Sparrow tooling; \$52,781 for tooling for Sparrow simulated aerodynamic vehicles; \$460,044 for Sparrow simulated aerodynamic vehicles; and \$800,000 for production of Sparrow II Mod. "D" missile.

\$30,000 (Feb. 14, 1957) for a vertical take-off and landing design study; \$10,000 (Feb. 5, 1958) for engineering assistance for ballistic missile defence studies; and \$50,000—(May 29, 1958) for engineering and analytical assistance for guided missile research and systems study programs.

Lear Autopilot for Caribou

The U.S. Army Signal Corps has awarded Lear Inc., production contracts to supply modified Lear F-5 automatic flight control systems for the de Havilland DHC-4 Caribou and the Beechcraft L-23 Twin-Bonanza. Contracts totalled \$716,000 with follow-on orders expected.

The Lear automatic flight control system won the Army award on the

basis of its proven performance, reliability, weight and availability. It is one of the adaptations of the basic Lear F-5 automatic flight control concept designed to meet automatic control requirements for military jet aircraft. Production is scheduled to begin in March, 1959.

RCA Victor at Malton

Negotiations are being concluded by the RCA Victor Co. Ltd., for the construction of a 50,000 sq. ft. area building and hangar on Derry Road, Malton, Ont., just west of the A.V. Roe Company property.

RCA Victor recently announced the organization of a new Defence Electronic Systems Division for the research, development and production of important electronic systems such as the integrated electronic system to be used in the CF-105 Arrow. Formal announcement regarding this new RCA Victor activity will be made at a later date.

Company Expansion

Carriere & MacFeeters Ltd., one of the industry's fastest growing companies, has recently opened a second plant on Northline Road, Toronto. The new facility will add 10,000 square feet of working area, and will be devoted to the manufacture of hermetically-sealed sub-miniature relays and high-temperature solenoids.

Meanwhile, the head office is still located at the company's number one plant at 936 Warden Avenue. Major activity here is the repair and overhaul of RCAF and RCN equipment, as well as commercial airline contracts, and work done on business and

private operated aircraft. The company represents Bendix-Scintilla; B.T.H.; Delco-Remy; and Westinghouse. They are Canadian distributors for U.S. Gauge Aircraft Instruments, and Kenyon Instrument Co. Ltd.

RR Canada Contract

A contract has been placed with Rolls-Royce of Canada Ltd., for the overhaul of the Westinghouse J.34 - WE.36 turbine engines which will shortly be installed as auxiliary power units in the RCAF's Neptune maritime reconnaissance aircraft.

Rolls-Royce will utilize existing facilities already engaged in overhauling J.34 engines for the RCN's Banshee aircraft.

Fairey Diversification

Fairey Aviation (Canada) Ltd., of Dartmouth, N.S., are presently conducting a research program into the problem of servicing hearing aids. The company hopes to produce a cheap but easily serviced resistor hearing aid.

Says general manager Charles E. Hilbert: "If our development is successful, the user will be able to have his hearing aid repaired in any electronic shop."

While the main part of Fairey's operation still consists of the repair, overhaul and modification of RCN Banshees and RCAF Neptune aircraft, some diversification has been in progress. Fairey (Canada) has been producing hydraulic booster equipment for Banshee jets for over a year.

Unlike most manufacturing plants in Canada, Fairey continues an apprentice plan. Each year the company enrolls a class of 10 apprentices in a five-year training program. In addition to the plant work, the boys are given one day a week in the vocational



CONVAIR 600: American Airlines has purchased 25 Convair 600's and taken an option on a further 25. Powered by four GE CJ-805-21 jet engines, a development of the J-79, the Convair 600 has a top speed of 635 mph, trans-continental range. The luxurious interior will seat 90 to 120 passengers according to interior configuration. First flight is scheduled for August 1960.

Tynes for the CL-44

The selection of the Rolls-Royce Tyne 2 turboprop engine as a replacement for the Bristol Orion in the Canadair CL-44 long-range transport, has been confirmed by an announcement at May's beginning by RCAF Headquarters.

The replacement of the Orion became necessary following the decision of Bristol Aero Engines Ltd. to cease further development of the engine. This decision was blamed on lack of support of the project by the British Government. Though the Orion held great promise, the order for the CL-44 was the only one that had been signed, and Bristol felt that this was not sufficient justification for further expenditures on essential development work.

The Rolls-Royce Tyne is a new two-shaft, high pressure ratio turboprop engine scheduled for installation in the Vickers Vanguard airliner, numbers of which have been ordered by BEA and TCA. In military installations, the Tyne will produce a total equivalent hp of 5550. The high powers and low fuel consumption permit Tyne-powered aircraft to achieve extremely attractive military and commercial performance, according to Rolls-Royce.

Compared to the Dart, the Tyne has a specific weight that is 40% less and at representative cruise conditions the larger engine will give about three times the cruise power of the Dart, using 40% less fuel per hp developed.

Following the RCAF's statement concerning the selection of the Tyne, Canadair Ltd. announced that:

- The original schedule by which the first CL-44 (RCAF CC-106 is to come off the line late next year will be met despite the change in engines.

- Revision of Canadair's manufacturing and sales agreement with Bristol Aircraft Ltd. and The Bristol Aeroplane Co. Ltd., of Britain, provides that Canadair is to have the right to manufacture the airplane in Canada and to sell the airplane with any powerplant, and for any purpose, anywhere in the world except the U.K., where Canadair will be entitled to sell the airplane for maritime reconnaissance purposes.

- With the Tyne engine, the aircraft will have an all-up weight of

205,000 lbs., a length of 136 ft. 9 in., and a wing span of 142 ft. 3 in. Cruising speed is to be 375 mph.

- In the all-cargo civil version the aircraft is to have a payload capacity of 66,500 lbs., at an operating cost of 5.2 cents a ton-mile. In the all-passenger civil version, it will accommodate 150 in the new "economy" class, at an operating cost of 1.1 cents a seat-mile.

- With typical fuel reserves, maximum range, with a substantial payload, will be 5100 statute miles; with a full complement of passengers, or 25 tons of cargo, the range will be 4200 miles; with a maximum cargo load, the range will be just under 3000 miles.

CDC Sales Agreements

Selection of new agency lines to enable Computing Devices of Canada Ltd., to offer a complete range of equipment for data acquisition, data processing, has resulted in the signing of exclusive sales agreements for Canada with five foreign firms in the past six months.

These new agreements complement existing arrangements with Benson-Lehner Corp., and the Computer and Pacific Divisions of Bendix Aviation Corp. Benson-Lehner make equipment for reducing film or chart records to digital quantities. Bendix Pacific manufacture a digital telemetering system known as Electrospan, and Bendix Computer manufactures the Bendix G-15D digital computer. The new agency agreements are with Ep-

sco Inc., Traid Corp., Flight Research Inc., Reeves Instrument Corp., and O.M.I. Corp., of America.

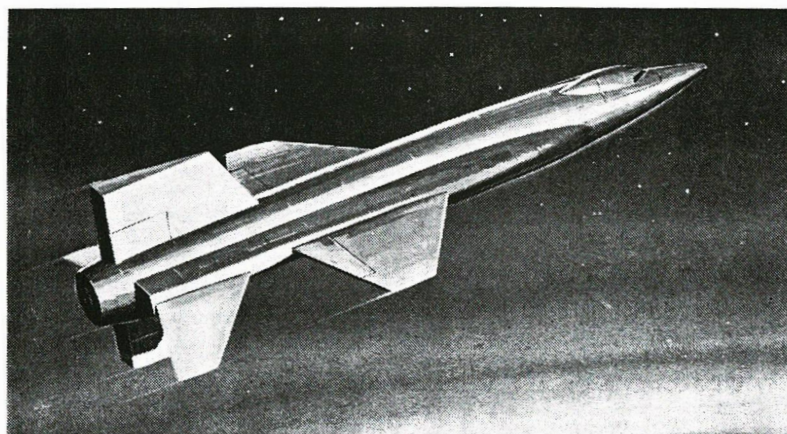
Epsco Inc., manufacture a line of very high speed analog to digital and digital to analog converters, capable of speeds up to 45,000 conversions per second with an accuracy of 0.05%, as well as digital telemetering equipment. Reeves Instrument Corp., are best known for REAC analog computers. CDC operates a 96 amplifier REAC in their Computing Centre in Ottawa, in addition to two digital computers.

Photographic instrumentation manufactured by Flight Research Inc. and Traid Corp. will enable CDC to fill all requirements for special purpose military and industrial cameras. Flight Research specializes in multiple synchronous cameras in 16, 35 and 70 mm, for accurate data acquisition in aircraft and missile testing. Traid Corp. build photographic instrumentation systems, including high speed (up to 200 frames per second) scoring cameras, gun cameras, and interval data recording cameras.

Most recent of new CDC agencies are Ottico Meccanica Italiana, of Rome, Italy, and the O.M.I. Corporation of America, suppliers of what is claimed to be the widest assortment of photogrammetric instruments made by a single manufacturer. High quality photomappers, photostereographs, and stereocomparators are the most important instruments in the line.

Engine Handling

Timmins Aviation has recently acquired sole manufacturing and distributing rights for the Lakeshore En-



EXPERIMENTAL SPACEPLANE: Designed to be the first aircraft to penetrate outer space is the X-15 rocket-powered experimental aircraft now under development at the Los Angeles Division of North American Aviation for the U.S. Air Force, Navy, and NACA. Seen above is an artist's conception of the X-15. Note thick, wedge-shaped vertical surfaces. Pilot on first flights will be Scott Crossfield.

Vanguard Guidance

Guiding the Vanguard rocket to its satellite-launching orbit was a new guidance reference system developed for the project by the aeronautical division of Minneapolis-Honeywell. The guidance brain was about the size of a basketball, and contained three of Honeywell's ultra-accurate HIG gyroscopes and comprehensive electronics.

The system was located in the second stage of the massive Vanguard rocket and guided the vehicle through the first and second stages or powered flight, and the final or third coasting phase of the flight. Just before the third stage and its satellite were nudged ahead into the orbit, the guidance system was called on to provide a final heading control to assure a successful orbiting.

Heart of the gyro reference system are the three Honeywell gyroscopes that were calibrated to a "memorized" heading reference in the three directions of flight; one gyro each for roll, pitch and yaw. Known as HIG (Hermetic Integrating Gyros) they weigh about 4.6 pounds and fit compactly in a cylinder 5.9 inches long and 3.07 inches in diameter. If the rocket rotates incorrectly even an infinitesimal part of a degree, because of shifting of fuel supply, engine irregularity, cross winds, etc., the gyros will sense the error and send an electrical signal through an autopilot amplifier to the error-correcting servo system at the rocket engines.

USAF Officers Train on Bomarc

A group of USAF officers has recently completed the first round of technical instruction in preparation for the activation of Bomarc interceptor bases. The officers, especially selected by the USAF's Air Defense Command for the five-month maintenance engineering seminar, have received their instruction at a special Boeing training school in Seattle.

From the classroom these officers are being given actual on-the-job assignments in Boeing's pilotless aircraft division for several months. Following this, their training will carry them to the Bomarc test firing unit at Cape Canaveral, Florida, and then to the Santa Rosa Island Bomarc opera-

tional testing base now nearing completion adjacent to Eglin AFB, Fla. This last-mentioned base, off the Florida gulf coast, is known as an "employment and suitability testing base." It will be used for operational testing of the Bomarc weapon system and for training purposes.

Thor IRBM Ground Testing

Beckman Instruments Inc. have completed an electronic data processing system which will automate static testing of the USAF's Thor IRBM. The \$100,000 electronic unit was ordered by the missile division of Douglas Aircraft Corp. and has been installed at Edwards Rocket Base, near Boron, Calif.

The data system will speed missile ground tests by automatically recording temperatures, strains and vibrations from up to 350 sources at the rate of 5 samples per second. It will also alert test engineers the instant any monitored variable exceeds pre-set limits. In addition to saving time, the system will conserve technical manpower and test costs by reducing materially the man-hours and equipment which would be required to record test information by conventional methods.

New Bomarc Test Program

Boeing Airplane Co. is nearing the successful completion of the extensive flight test program for its now-in-production Bomarc interceptor missile and will soon start tests on an improved model Bomarc. The model currently

being tested is a supersonic missile of approximately 200-mile range which is designed to seek out and destroy enemy bombers and air-breathing missiles before they can near vital U.S. targets.

A more advanced version of Bomarc, also being developed for the USAF, will have a range of more than 400 miles and incorporate significant technical advances. Both missiles will be able to carry atomic warheads.

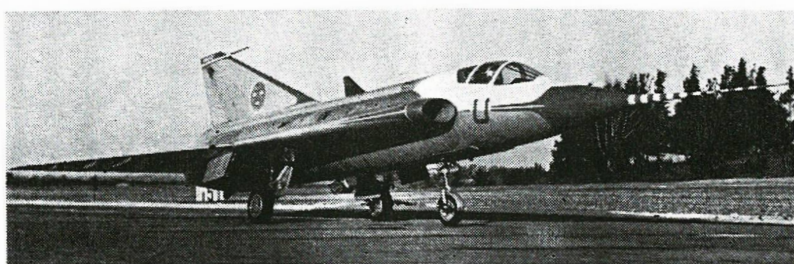
In the majority of Bomarc tests the missiles have been fired without warheads.

Beverly Airlifts Bloodhound

An operational Bristol Bloodhound guided missile, of the type shortly to be handed over to the RAF, was recently loaded complete with trolley and ancillary equipment into a Beverly aircraft and flown from Filton to Cranwell. The missile was required at Cranwell for a secret exhibition. Although Bloodhound is easily transported by road, the opportunity was taken by the RAF to test the air mobility of the missile under simulated operational conditions.

This was the first time that a Bloodhound had been carried by air in the U.K., although Bristol Freighters have been used on several occasions in Australia to carry the missiles from Salisbury to the Woomera range.

Loading of the missile took exactly 10 minutes. A significant point is that on arrival at its destination, the missile is ready for operational use. Being mounted on its trolley, it can be transferred in a matter of minutes to its launcher ready for firing.



FIRST PRODUCTION DRACKEN: The first production model Saab-35A Draken supersonic delta has made its first flight. This model of the Swedish-designed and built single-seat fighter differs from prototype models in that it is powered by a Rolls-Royce Avon with afterburner. Attack version of the Draken can carry air-to-ground rockets of a new type. Shown at right are six 13.5 cm rockets slung on one side; total load is twelve.



Press On the Arrow

Defence Minister G. R. Pearkes has made it pretty plain that the Government will order the Avro Arrow into full production.

He said before the Commons estimates committee in June:

"We have reason to believe that the Russians have somewhere in the neighborhood of 1500 to 1700 bombers of various types, some of which are capable of attacking targets anywhere on the American continent and of returning to Russian soil. Others would not have the capability of making the return trip. That is, a large fleet of hostile bombers constitutes a very serious threat against this continent.

"In addition to the bombers we have reason to believe that the Russians have developed some form of intercontinental ballistic missiles of a prototype nature. We have no reason to believe that those missiles are in operational use at the present time, but they have undoubtedly got some prototypes of this intercontinental ballistic missile.

"The best advice that I have received both from our own chiefs of staff and from the senior British and NATO authorities and from U.S. officers is that we may expect for many years yet an attack by manned bombers and by air-breathing missiles or unmanned bombers. And gradually that threat would be supplemented more and more by the introduction of the intercontinental ballistic missile.

"But it is the opinion which has been confirmed by many sources that it would be many years, if ever, before Russia would rely solely on the intercontinental ballistic missile. One of the main reasons is that while the ICBM may become very effective against an area target fired on a predecided course at a preselected target, there is little opportunity of changing the direction of that missile once it has been launched. Therefore there is rigidity about such an attack which eliminates a possibility of flexibility; and as long as an enemy may require to select some small pinpoint target such as an airfield, or may for some reason or another have to vary its method of attack, then the manned bomber will be in use for a long time to come.

"Now the manned bomber of to-

morrow will fly faster and much higher than the manned bomber of today. There is no doubt about that. And although the CF-100 a few years ago was considered to be the outstanding all-weather interceptor in the world, today its period of future usefulness will be restricted and eventually it will have to give way to a more modern type of interceptor.

"That situation was foreseen several years ago and steps were taken then to design in Canada an interceptor which would fly higher and faster than the CF-100. That type of aircraft, now known as the CF-105, or the Avro Arrow, is a Canadian-built and Canadian-designed aircraft, a prototype of which has flown successfully in recent months at great speeds of up to a thousand miles per hour and has been able to break through the sound barrier and fly at great heights. The aircraft has not been fully armed, nor has it been fully tested.

"In these [defence] estimates which you will consider there is a sum of money provided to enable further development, for one year, of this Avro Arrow. There has been an order given for some 37 of these pre-production aircraft to be built. It was considered from the beginning that you cannot make a thorough test of a new type of aircraft without at least a production of 37.

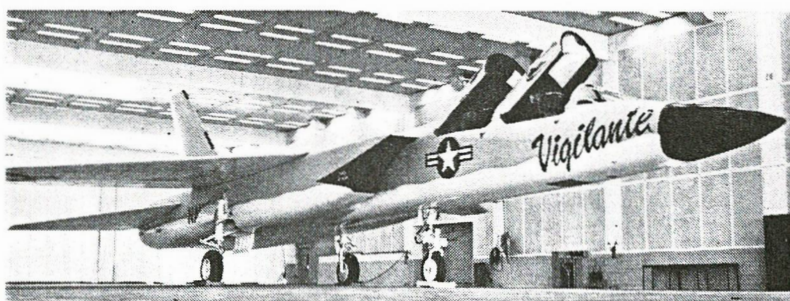
"After very careful consideration last year it was decided that we should continue with the development of this aircraft for another year.

"Sometime this fall the government will have to decide whether they are going to continue with the development and production of the Avro Arrow. If we do not accept this type of aircraft for any reason — because of the failure of this aircraft which we hope will not be the case — then we will be faced with the problem of having to purchase elsewhere an aircraft which can do this advanced work. It must be an advanced type of aircraft able to intercept the bomber, manned or unmanned, of the immediate future. That is a major decision which this government will have to make this year. As far as these estimates are concerned, provision has been made for \$175,000,000 for the further development of this aircraft."

Arrow's Feathers Ruffled

The first Arrow 1 is currently undergoing a detailed inspection following a landing accident resulting from an undercarriage malfunction. June 12. The exact extent of the damage sustained will probably not be determined until the aircraft has been completely stripped down. It is not possible at this time to say when it will be returned to flight status.

Following the accident, which occurred at Malton, Avro Aircraft Ltd. issued a statement to the effect that the Arrow had made a normal touchdown on landing from a routine test flight, but a malfunction of the undercarriage had caused the aircraft to swerve off the runway, severing the undercarriage leg and eventually coming to rest on its belly on the ground alongside the run-



VIGILANTE ROLL-OUT: North American's A3J Vigilante is shown at its recent christening. The all-weather attack aircraft is destined for carrier-borne naval duties. It is powered by two GE J79-2 turbojets, each rated at 15,000 lb. thrust. Vigilante has a crew of two, is equipped for different roles including nuclear weapons.

