

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.

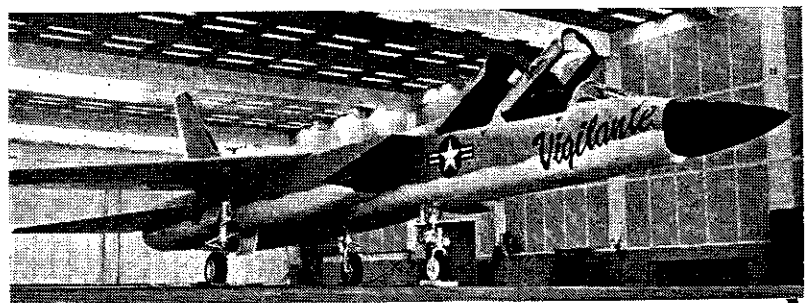
"After very careful consideration last year it was decided that we should continue with the development of this aircraft for another year.

"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."

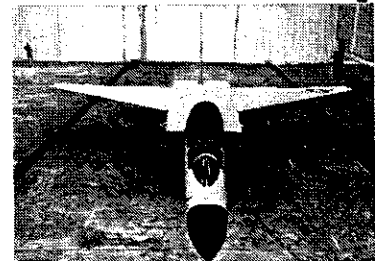
Arrow's Feathers Ruffled

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.





TU-104 AT VANCOUVER: The U.S.'s Boeing 707 and Russia's Tu-104 were seen together recently at the B.C. Centennial Aviation Show at Vancouver. The twin-engine, 76-passenger Russian jet averaged 518 mph from Moscow to Vancouver.

Flight Lieutenant Bill Carss, RCAF Comet pilot who accompanied Tu-104 on its Canadian flight, reports lack of hydraulic boost makes 104 heavier to fly than Comet. Tu-104 had to refuel midway between Ottawa and Vancouver.

way. The pilot, Jan Zurakowski, was not injured.

It would appear that when the aircraft swerved, the undercarriage was subject to severe side loads. Cause of the accident is known to Avro and is regarded as simple to rectify.

Best opinion available is generally to the effect that the accident will not seriously retard the Arrow development program.

Wind Tunnel Go-Ahead

The Defence Research Board and the National Research Council have each earmarked \$750,000 for a construction start this year on the long-delayed supersonic wind tunnel at Uplands. The project was held up last year while the Progressive Conservative government reviewed all spending estimates. DRB and NRC each has \$750,000 in its 1958-59 estimates for this purpose.

Amphibious Floats Popular

Bristol Aircraft (Western) Ltd., reports that a further order for the construction of amphibious floats for the Otter aircraft has been received. The order brings to 23 the number of sets sold since this type of float went into production at the Winnipeg firm's plant.

Otter amphibious floats have been sold to the RCAF (eight sets) and Qantas Empire Airways, as well as others.

CAE Trains Belgians

Twelve Belgian Air Force technicians recently returned to Belgium after being trained by Canadian Aviation Electronics Ltd., Montreal, in the repair and overhaul of the Hughes MG-2

fire control system. This is the electronic brain that controls the armament of the CF-100.

The maintenance and support of the fire control system is part of the Mutual Aid package which sent the CF-100's to Belgium, and a group of CAE personnel have been in that country for some time carrying out maintenance at squadron level.

The Montreal plant of CAE functions as the base overhaul depot for the MG-2 systems in RCAF CF-100 aircraft, and is equipped for this purpose with all necessary test apparatus. While CAE will continue as the base overhaul depot, Belgian technicians will gradually take over the job of squadron maintenance in Belgium.

Orenda - BMW Agreement

Orenda Engines Ltd., has signed a program of technical assistance with Bavarian Motor Works of Munich, Germany. BMW is the company designated by the West German government to repair and overhaul the Orenda turbojets which power Canadian-built Sabre aircraft of the German Air Force.

The technical assistance given the German firm by Orenda will include the training of BMW personnel both in Germany and at the Orenda plant at Malton. Orenda will supply the necessary tooling, and lend assistance in setting up procedures and in the purchase of some capital equipment. Spare engine parts will be supplied from Orenda's Malton plant when BMW's repair and overhaul program gets underway.

At the present time, the German Air Force is flying the Sabre 5, and later in the year will put into service the

first of 225 Sabre 6's purchased from Canadair, most of which have now been delivered.

Bristol Test Facilities

Bristol Aircraft (Western) Ltd., has received RCAF approval of its testing laboratories.

Test facilities include: mechanical and metallurgical testing of metals; testing of fusion welders; radiographic inspection of welds, light alloys and other castings; analysis of heat treatment salts, cleaning, plating and anodizing solutions, and chemical film solutions; and testing of anodic, chemical film, and electro-deposited coatings.

Recently expanded and re-equipped, the test and development department is headed by Charles Hovey, former professor of civil engineering at the University of Manitoba.

Iroquois Progress

Orenda Engines' Iroquois engine has successfully concluded a series of runs totalling over 100 hours in the engine propulsion tunnel at the NACA Lewis Flight Propulsion Laboratory in Cleveland. Among the achievements listed by Orenda Engines Ltd. were:

- What are considered to be the highest dry thrust ratings ever recorded by a turbojet in North America.

- Inlet temperatures never before encountered in the tunnel without adversely affecting an engine mechanically.

- Normal relights at designed Mach numbers after induced flame-outs up to 60,000 feet, the altitude capability of the tunnel. An Orenda-patented method of relight is incorporated in the engine.

Iroquois development engines have

completed more than 5000 hours of bench running. In addition, various components such as compressors, combustion and afterburning systems, bearings, gear boxes, have all completed thousands of hours on test rigs. Further high altitude trials will be conducted in Orenda's own high altitude tunnel, scheduled to come into operation this year. It permits investigation of high altitude performance over 100,000 feet at Mach 2.

Flight tests of subsonic performance are currently being carried out in a converted B-47 bomber. Supersonic flight performance will be done in an Avro Arrow; production models of the Arrow will be powered by the Iroquois. Leading particulars, as detailed for the first time by the manufacturer, include the following:

Overall length, including afterburner ---- 19 ft. approx.
 Overall length, without alternator frame ----- 17 ft. approx.
 Intake diameter ----- 42 in. approx.
 Afterburner diameter ----- 47 in. approx.
 Thrust ----- 20,000 lb. class (dry)
 Thrust-weight ratio ----- over 5:1
 Specific Fuel consumption under 1 dry rating; under 2 with afterburner
 Compressor ----- two spool
 Compressor ratio ----- moderate
 Combustion system - annular, high velocity, vaporizing
 Afterburner ----- close-coupled

New Arrival

Dielectric Products Engineering Co. Inc. has entered the aircraft communications antenna field. Engaged in the past in the design and manufacture of broadcast and microwave transmission line, dehydrators and antennas, the highly qualified engineering staff of Dielectric Products will be available to subcontract the design and manufacture of higher gain broad band aircraft radio antennas.

Dayrand Ltd., of Montreal, acts as exclusive Canadian agent for Dielectric Products, whose plant, laboratories and engineering facilities are located in Raymond, Maine. In the Montreal area, Dayrand also represents the Toronto firm C. R. Snelgrove Co. Ltd. For many years Snelgrove has been supplying "failure-free" crystals to the RCAF and commercial airlines.

Curtiss-Wright of Canada

A 1956 first-quarter report shows that Canadian Curtiss-Wright Ltd. has netted \$10,291, from gross sales of \$2,972,000 during the first three months. There is no comparison available with figures from last year as it is less than a year since Curtiss-Wright of Canada

Ltd. merged with Isotope Products Ltd. to form Canadian Curtiss-Wright Ltd. It was not revealed whether or not the Isotope division of the Canadian company is now operating at a profit.

Otters For Indonesia

The Indonesian government recently purchased two Otters from The de Havilland Aircraft of Canada Ltd. The \$210,000 order was made sight unseen as the Indonesians bought the bush-operating Otters strictly by reputation. The two aircraft, one on wheels and the other amphibious, will be used in the

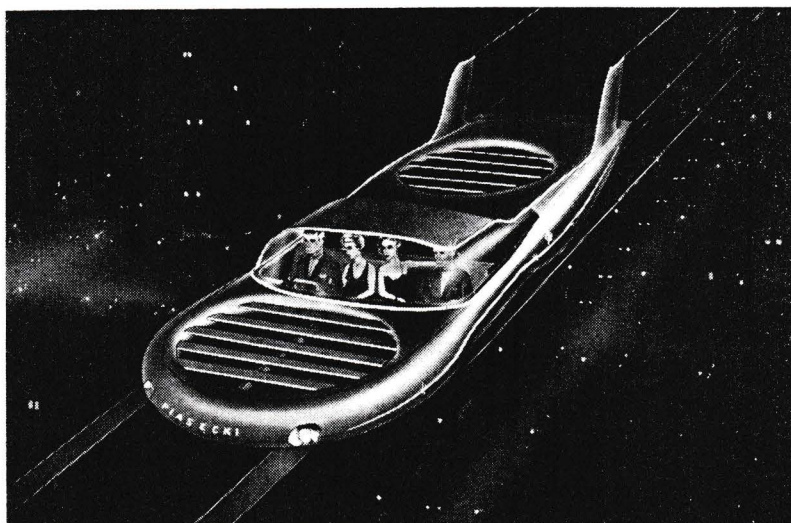
far-eastern country for the transportation of government officials, emergency flights to the interior, and for island-hopping.

The disassembled Otters are leaving Montreal by ship this month for delivery in Jakarta. Both aircraft already carry the red-and-white markings of Indonesia.

Packard Ferranti Merger?

According to news reports, the well-known Toronto firm, Ferranti Electric Ltd., plans a merger with the Packard Electric Co. Ltd., of St. Catharines. The

PIASECKI'S SKY CAR.....



For many years, inventors have been attempting to incorporate in the same vehicle the abilities to fly like an airplane and to travel the highways like a car.

Known variously as "flying automobiles" and "roadable airplanes", these projects have been noteworthy principally for their lack of success. Usually, if they were made rugged enough to stand the normal wear and tear of road pounding, their gross weight was such as to result in a low-performance flying machine. Conversely, if the standard aircraft engineering practice of "adding more lightness" was followed, the final product was faced with a short, hazardous life in the rough and tumble of normal road traffic.

The latest, and most promising to date, entry in this field is the "Sky Car" (see picture), a military version of which is currently being developed as the Piasecki 59-K by Piasecki Aircraft Corp. for the U.S. Army.

The prototype research aircraft is built to U.S. Army requirements which, according to F. N. Piasecki, president of the Philadelphia, Pa., company, "are close to those of privately owned aircraft.

"We have definite plans to modify the Army design for civilian use as soon as we fill Army requirements."

The Sky Car will have no wings or conventional propellers. It will be powered by two horizontal rotors, one at the front and one at the rear. Both rotors will be fully shielded for safety and will be protected on top by a grille. The driver and three passengers will sit in the centre section between the two shielded rotors.

In operation, the Sky Car will rise from the road and move forward as desired by the driver. It will have two engines and will be able to hover on either one. Wheels will be powered so it can be driven in and out of garages, parking lots and other congested locations.

Says Piasecki: "It will be able to fly down narrow streets, between buildings, and under bridges and wires with complete safety. Though . . . capable of flying over mountains, the Sky Car is designed primarily to operate within sight of ground. This will eliminate the need for complicated air navigational systems, and enable the driver to follow normal highway markings."

According to Piasecki, if mass-produced in the same quantity as automobiles, the Sky Car could cost little more than a high-priced automobile.

Certification procedures have already been begun with the CAA.

new firm will be known as Ferranti Packard Electric Ltd.

Sanderson Plus Acfield

W. J. Sanderson, president of Sanderson Aircraft Ltd., recently announced changes in his aircraft sales and service organization which in future will be operating under the name of "Sanderson Acfield Aircraft Ltd." Vice president & general manager of the firm is Trevor Acfield. No changes of personnel have been made and the firm is still operating out of Malton and Toronto Island Airports.

Two aircraft salesmen have recently been added to the staff, George Daniels and Bov Clark.

Arrow Price-Tagged

For the first time, the Government has made public official figures on total cost of the Arrow development program.

The Department of National Defence on June 3, in a Commons return, answered a number of questions put by George McIlraith, the Liberal member for Ottawa West.

Here are the answers:

"The Government has placed orders for the design, development and tooling for the Arrow airframe, Iroquois engine and the integrated electronic flight and fire control system and the manufacture of 37 pre-production Arrow aircraft.

"The currently estimated production cost of each complete Arrow aircraft within the 37 pre-production order is \$6,100,000. Should the decision be tak-

en to proceed with production, the cost per subsequent aircraft will be reduced considerably.

"The total cost of the Government of the complete Arrow aircraft project including design, development, tooling and pre-production costs of the Arrow airframe, the engine programs and the integrated electronic and fire control system, up to May 1, 1958, is \$233,000,000. This cost figure also covers two completed aircraft, three in final assembly and 32 others, within the present order of 37 aircraft, in various stages of manufacture and material procurement.

"The present plans for the production and development of the Arrow call for the introduction of this aircraft into operational use in 1961."

Defence Department officials say the

amount being spent on the Arrow program in the 1958-59 fiscal year is \$175,000,000. The total amount which will have been spent by next March 31 will be some \$387,000,000.

Expenditures for the Arrow alone in this fiscal year will account for more than 10 per cent of the entire defence budget of \$1,686,000,000.

• Other expenditures for aircraft in the 1958-59 fiscal year include \$46,500,000 for the Argus, \$28,800,000 for the new RCAF transport, the CL-44, \$24,400,000 for the Mk.5 CF-100, and \$3,500,000 for the Canadair 540. Officials say CF-100 production will be cut back sharply next year.

Sarah Distributorship

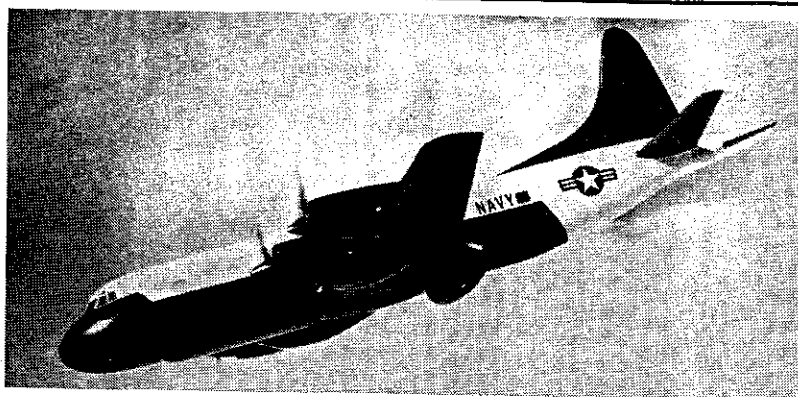
Field Aviation Company Ltd., Oshawa, Ont., taken over the exclusive Canadian distributorship for the Sarah (Search and Rescue and Homing) equipment from Canadian Aviation Electronics Ltd., Montreal.

Couch Ordnance Reps

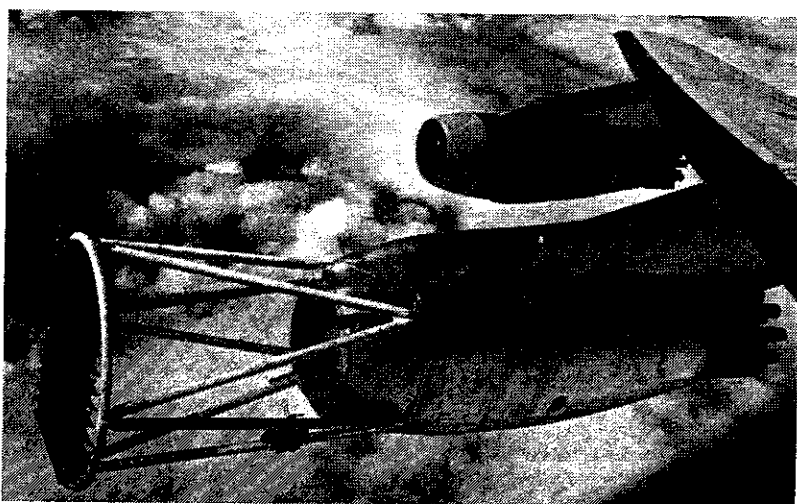
Leonard Electric Ltd. has been appointed representative for Couch Ordnance Inc., Quincy, Mass. Couch Ordnance are manufacturers of a diverse line of electronic devices and components, including rotary relays capable of withstanding shock loads of 75G and vibration of 20G.

Philips Agencies

Philips Electronics Industries Ltd., Toronto, has been named exclusive Canadian agent for two well known American firms. The first of these, Analogue Controls Inc., manufacturers high precision potentiometers, both single and multiturn types. All models are designed to meet aircraft and mis-



ELECTRA SUB-HUNTER: The U.S. Navy has chosen the anti-submarine version of the Lockheed Electra turboprop for its next generation of sub-hunters. The 450 mph patrol aircraft will be powered by four Allison T-56A engines developing a total of 16,200 hp at take-off. Bulge beneath fuselage houses radar installation; tail cone carries MAD gear.



ENGINE ICER: Built by Boeing to test the 707's engine deicing and anti-icing equipment, this device is fitted with parallel bars containing spray nozzles and extends five ft. out in front of engine intake. At high altitude temperatures, ice formed quickly and was as quickly melted by hot air bled from engines and channeled around inside the cowlings. Two movie cameras and one TV camera monitored the tests.