

Beware of Greeks

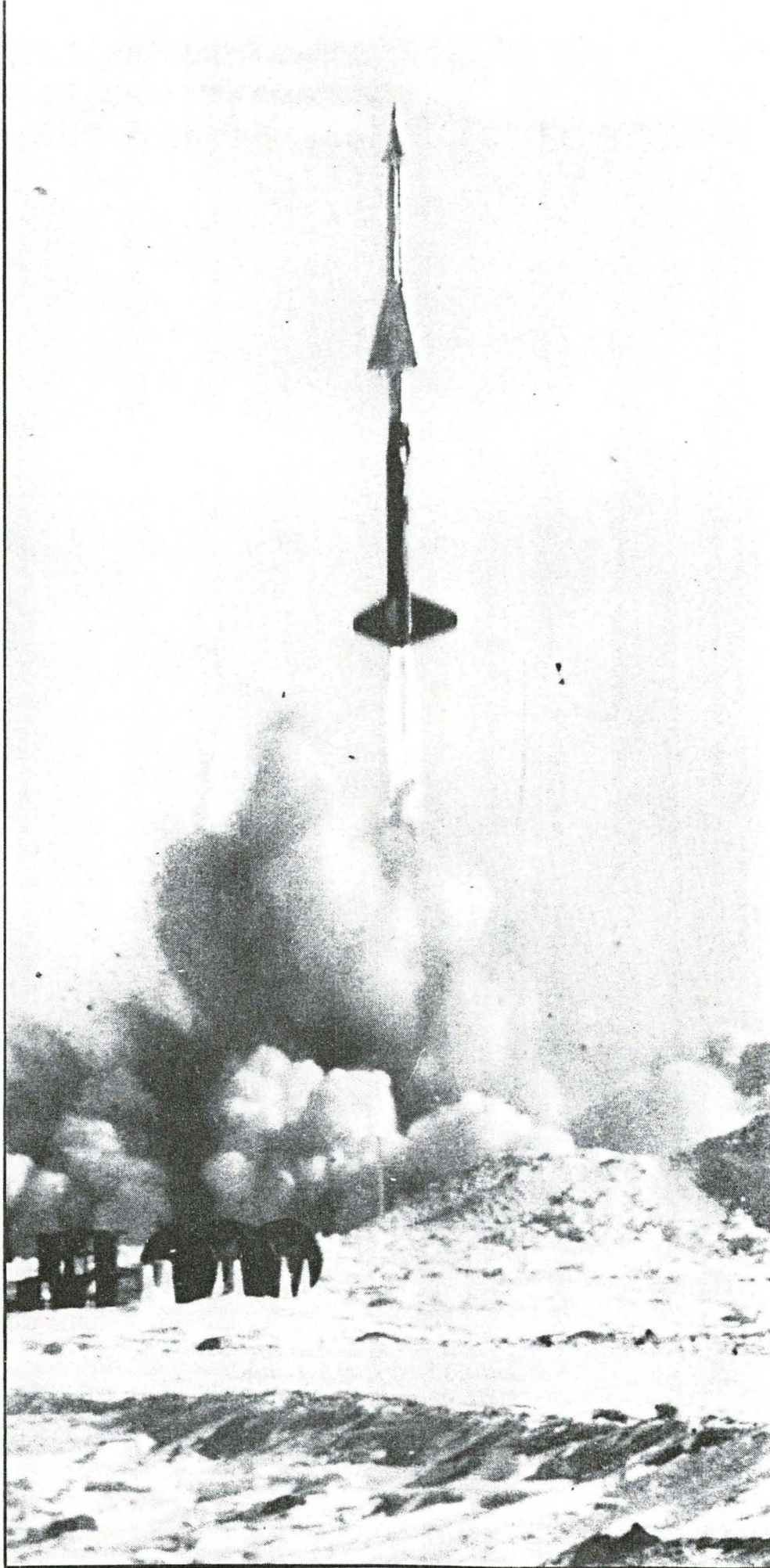
DURING THE past few months, the Canadian Army has been continuing Operation "Frost Jet", the cold-weather testing of the Nike ground-to-air anti-aircraft guided missile, at Fort Churchill, Man. Nike, which was developed in the U.S. for the U.S. Army, is named after the winged goddess of victory in Greek mythology. It has been in operational service with the U.S. service for some time now; there are major installations of the weapon at many centers which have been classified as military target areas.

This year's tests, which were scheduled for completion last month, were a continuation of those carried out during the January-March period of 1955. It is possible that further tests may be carried out in the winter of 1956-57.

On Trial: The tests are designed to determine the effects of extreme low temperatures on the complex component parts of the Nike weapon system. Nike employs the command type of guidance, which utilizes two radar tracking devices and a computer. It was found that this electronic equipment reacted well in extreme cold, and the launcher and missile could be put into action quickly.

During the 1955 trials, valuable lessons were learned and according to the Canadian Army, answers were provided to many problems concerning effective operation of Nike under Arctic conditions. The test schedules included taking into and out of action the heavy equipments involved; preparation of the launching site and machinery, and tests to determine the time and degree of accuracy with which critical procedures and adjustments would be carried out on the radar equipment.

Preparations for this work first got underway in 1954, when a 44-man team, which later became known as



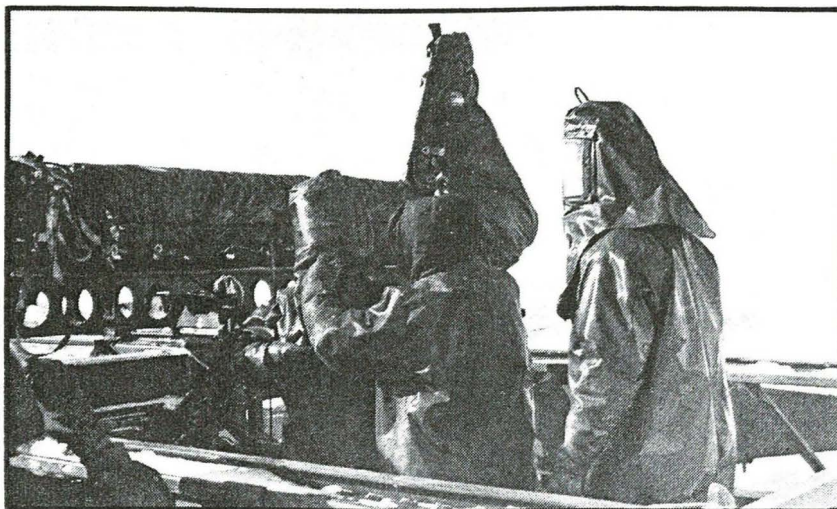
AIRCRAFT APR/56

the Royal Canadian Artillery Guided Missiles Trials Troop, was sent to the U.S. for training in the operation of the Nike system. This team, headed by Colonel H. E. Brown, DSO, OBE, ED, conducted the first tests with the assistance of a five-man group from the Royal Canadian Electrical & Mechanical Engineers. The first firings were carried out early in 1955, following Arctic indoctrination for personnel and the setting up and elementary testing of the equipment, these preparatory tasks being completed in November and December of 1954.

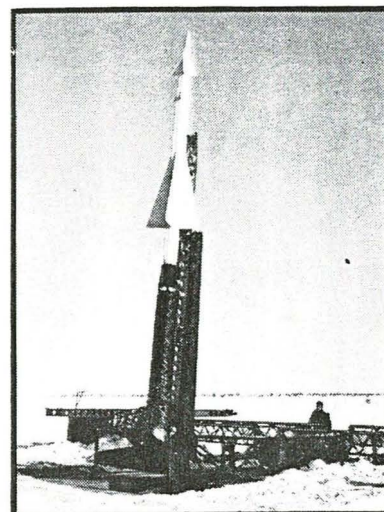
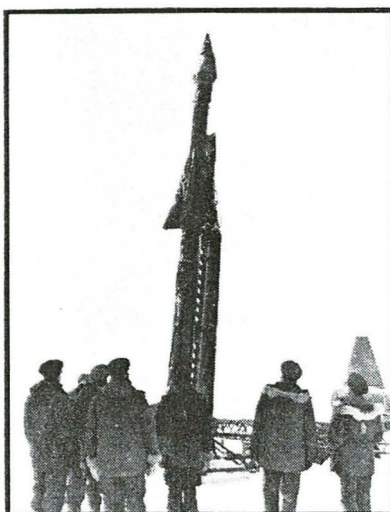
New Edition: The most recent edition of Operation Frost Jet was commanded by Colonel Donald G. Ketcheson, OBE, with the actual firings (of which there were a number of highly successful ones) being carried out by the RCA Guided Missiles Trials Troop, commanded by Major H. H. Winter. Several other Canadian technical personnel participated in the tests along with a limited number of U.S. Army technicians.

According to Kenneth Gatland's "Development of the Guided Missile", Nike has a launching weight of approximately 1,000 lbs., a length (less booster) of some 20 feet and a diameter of 12 inches, approximately. It flies supersonically and has a horizontal range of about 17 miles, while maximum effective altitude is in the nature of 60,000 feet. Powered by a bi-propellant (nitric acid/petrol) Aerojet rocket motor, Nike was developed by Bell Telephone in association with Douglas Aircraft, Aerojet, and Western Electric.

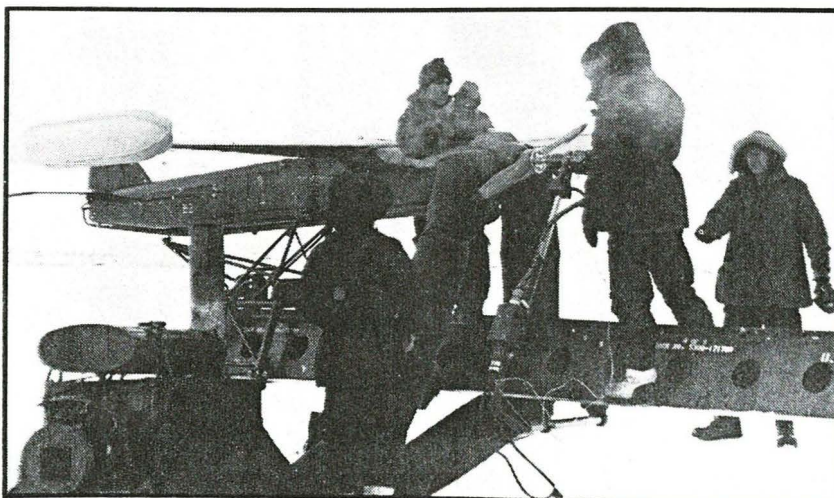
Though the command guidance system used with Nike is considered more vulnerable to electronic interference (i.e., deliberate "jamming") than the so-called "beam-rider" or "self-homing" type of guidance, it enjoys the advantage of being comparatively cheap. Only a small amount of guidance equipment is carried in the missile itself, so that relatively speaking, the cost is small when one is fired (about \$20,000). The ground equipment, on the other hand, is exceedingly complex. Nike is claimed to be 65% effective and a considerable number of successful interceptions have been made, using target drone aircraft which were destroyed while flying at altitudes of 30,000 ft.



Members of the 1st Guided Missile Trials Troop, Royal Canadian Artillery, adjust each other's protective clothing prior to fueling one of the Nike missiles. The fuel used to propel Nike — nitric acid and gasoline — is highly toxic, and must not be inhaled or allowed to come in contact with the skin.



Left, Nike is shown poised on mobile launching ramp awaiting removal of protective covering; right, almost ready to fire . . . the solid-propellant booster (dark section), still covered by the weather resistant material which is removed before firing, drops away after the missile has been successfully launched.



Members of the Royal Canadian Artillery's Guided Missile Trials Troop are shown starting a radio-controlled aerial target before take-off. The targets, radio-controlled from the ground, are launched just before a Nike missile is sent on its way. The Nike then seeks out and destroys the target drone.

MISSILES and ROCKETS

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RL 866-1959

BUSINESS END of a Nike Hercules anti-aircraft missile of the type currently being tested against Firebees at Churchill.

Deep Freeze Missile Testing

By Peter Brannan

The Nike-Hercules firing program at Fort Churchill, Man., announced in the January issue of *Canadian Aviation*, is under way. The anti-aircraft missiles are being fired by the U. S. Army's 1st Arctic Test Detachment against RCAF Ryan Firebee jet target drones.

The RCAF uses the U. S. Navy KDA-4 version of the remote-controlled drone, and was the first unit of a "foreign" government to receive them. Deliveries of the Firebees to RCAF

weapons firing range at Cold Lake, Alta., began in summer, 1958.

Designated "Operation Snowjet Hercules," the Nike-Hercules tests are an important phase in hemispheric defense. They are being conducted as a co-operative venture of the RCAF, the Canadian Army, and the U. S. Army, and are providing both the Firebees and the Nike-Hercules with their most northerly workout to date.

Winter temperatures at Fort Churchill frequently descend as low as 55 below zero, and wind velocities reach 70 knots. The base, on the northwest shore of the Hudson Bay, is 540 miles south of the Arctic Circle, in the midst of a vast and desolate lake-

studded region. Principal mode of ground transportation for the operation will be Snowmobiles. Parachute recoveries of the Firebees are being made over land, where they can be picked up by helicopter.

Three Ryan field representatives are sharing the rigors of the sub-Arctic winter at Fort Churchill with the military personnel testing the Nike-Hercules against the 600 mph Firebees.

Firebees scored a first in October, when they were used by the USAF in Project William Tell, at Tyndall AFB. It was the first time jet-powered, free flying targets had been employed at a weapons meet.

THE AIRBORNE SERVICES

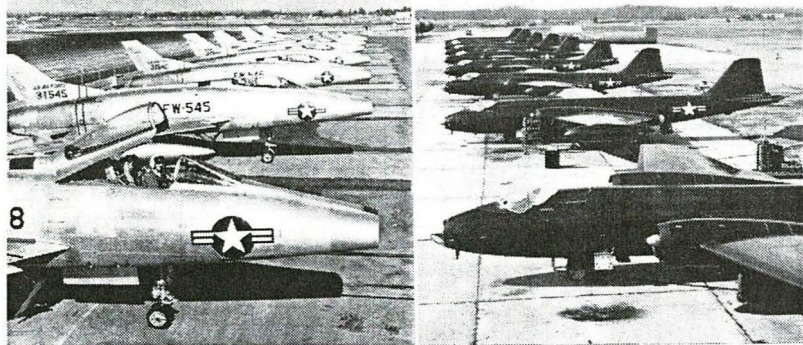
Radar Defences

A review of the state of North American radar defences was released jointly by the Defence Departments of Canada and the U.S. late in September, and at that time it was officially announced that planning was underway to establish a distant early warning line across the far north of the continent. Text of this important joint statement follows.

On April 8, 1954, the Governments of Canada and the U.S. issued a joint announcement which, after referring to the construction of the Pinetree radar chain, announced plans for the establishment of a further radar system "generally to the north of the settled territory in Canada." The

ern part of North America, and have directed that detailed planning for such a line should be initiated at once. The basis of participation by the two countries in the construction and operation of the line, and the division of costs, will be determined after the detailed plans have been considered and agreed.

In developing the complete system for warning of the approach of hostile aircraft and for the control of interceptor forces, the two Governments have followed a policy of building outward from the likely target areas. Thus, the first step, which has now been largely completed, was the construction of the main control and warning radar installations in the



AMERICAN AIR POWER: Quantity deliveries of two new types of aircraft are now being made to the USAF. At left is a line-up of North American F-100 Super Sabres, now in squadron service with Tactical Air Command units. At right are Martin B-57A Canberra intruders, U.S.-built version of the English Electric medium bomber. Powerplants for this aircraft are also of British design, being Armstrong Siddeley Sapphires built in the U.S. under license as the Wright J-65.

Canadian Government subsequently decided that it would be appropriate as part of its contribution to the common defence requirements of the two countries, for Canada to undertake responsibility for financing, constructing and operating this new system, which is generally referred to as the "Mid-Canada Line."

During the time that plans for the Mid-Canada Line have been under development, studies have also been going on to determine the feasibility of providing even earlier warning of the approach of hostile aircraft.

As a result of these studies, the Canadian and U.S. Governments have agreed in principle that there is a need for the establishment of a distant early warning line across the far north-

continental U.S. and the populated part of Canada.

The second step, which is now underway, is the provision of the Mid-Canada Line. A third measure, the need for which has now been agreed upon between the two Governments, will be the provision of a distant early warning line across the most northerly practicable part of North America. Portions of the complete warning and control system in Canada will be extended to the seaward on both flanks of the continent by the U.S.

Nike Tests in Canada

Plans to carry out cold-weather tests of "Nike" in Canada, were announced in mid-October by the Department of National Defence. Nike is the supersonic anti-aircraft guided missile de-

veloped by the U.S. Army.

"Operation Frost Jet," as the tests have been designated, will take place at an artillery range in the vicinity of Fort Churchill, Manitoba, during January and February of 1955. Numerous test firings will be carried out to determine the effects of extreme low temperature on the complex component parts of the Nike weapon system.

Selected Canadian Army personnel who trained at the U.S. Army Guided Missile Centre at Fort Bliss, Texas, during this past summer, will man the Nike weapon. A limited number of U.S. Army technicians will participate in the operation.

In his book, "Development of the Guided Missile," Kenneth W. Gatland describes Nike as being the first post-war surface-to air missile to enter full production. Developed for the U.S. Army by Bell Telephone in association with Douglas and other companies, "the missile embodies triangular wings and steerable nose vanes and is launched with the aid of a powerful booster. An Aerojet sustainer motor is employed, using nitric acid and gasoline.

"Tested at White Sands in the spring of 1953, Nike successfully scored a direct hit on a QB-17 target drone flown under remote control at 30,000 feet." Photographs of this test were widely published a few months ago.

The action of the Nike missile is described by Mr. Gatland as follows: "Tracked by radar, the bomber approached the launching site trailing smoke from a flare on its starboard wing, which had been fitted to assist ground observation and photography, and when it came within range, an operator moved a switch which fired the Nike from an elevated ramp. Another radar set locked on to the missile as it accelerated away.

"The two plots from the bomber and missile were then continuously integrated by an electronic computer, which caused steering signals to be sent to the missile, changing course until the radar traces signified that the Nike was nearing its objective. Final guidance is obtained by the technique known as 'semi-active homing,' the missile responding to target reflection from the ground radar. This . . . permits the missile to fix its

position in space and by means of appropriate controls to guide itself automatically to the source of reflected energy."

Range of the 1,000 lb., 20 ft.-long missile is said to be approximately 18 miles and maximum altitude about 50,000-60,000 feet.

Visitors from Abroad

During October, Canadian defence installations and industrial plants were hosts to three high-ranking British visitors. First to arrive for a ten-day tour, were two senior RAF officers, Air Chief Marshal Sir John Baker, KCB, CBE, MC, DFC, and Air Marshal T. G. Pike, CB, CBE, DFC. Air Chief Marshal Baker is Controller of Aircraft in the British Ministry of Supply while Air Marshal Pike is Deputy Chief of the Air Staff.

The third visitor was Rt. Hon. Lord de L'Isle and Dudley, VC, Secretary of State for Air for the United Kingdom. Lord de L'Isle and Dudley will also visit Canadian aircraft firms and RCAF stations.

Postings & Careers

•Air Commodore Douglas A. R. Bradshaw, DFC, CD, formerly chief of training at AFHQ, has assumed the post of commandant of the Royal Military College, Kingston, Ont., succeeding Brigadier D. R. Agnew, CBE, CD, who has retired from the service after 38 years in the Canadian Army.

•Group Captain V. H. Patriarche, OBE, AFC, CD, has been named chief of training at AFHQ. G/C Patriarche, who is now promoted to air commodore rank, has been serving as group commander of the RCAF Auxiliary Group HQ at Toronto.

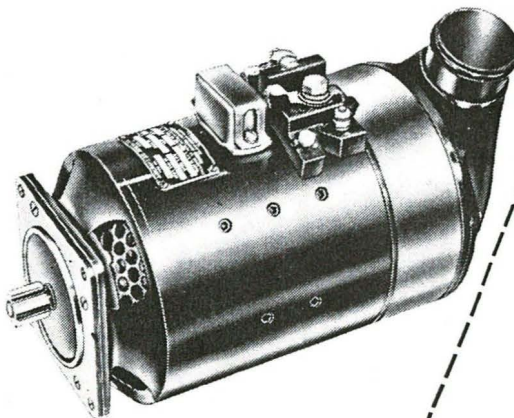
•Group Captain Z. L. Leigh, OBE, ED, formerly chief staff officer at Air Transport Command, has been named group commander of Auxiliary Group HQ at Toronto.

•Group Captain Murray D. Lister, Chief of Plans & Intelligence at AFHQ, has been appointed to the rank of Air Commodore.

•Air Commodore Keith L. B. Hodson, OBE, DFC, CD, was recently appointed Chief Staff Officer at Air Defence Command HQ. He has been succeeded as Chief Staff Officer of the RCAF Air Division in Europe by Air Commodore W. I. Clements, OBE, CD.

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mouth, N.S., in a Piasecki HUP-3 and flew 270 miles through high winds and snow flurries, picking up a doctor at Sydney, and landing on the island in swirling snow.

The lighthouse keeper, Maurice M. Baker, had received a skull fracture and a badly mangled arm in a dynamite explosion. He was flown to hospital at Sydney.

Postings & Careers

- Air Vice Marshal Hugh L. Campbell, former AOC of the RCAF's Air Division in Europe, is now Vice Air Deputy at Supreme Headquarters Allied Powers Europe in Paris. He succeeded Air Marshal F. R. Miller, who retired from the service to become Canada's deputy defense minister. A/V/M Campbell, 47, is a native of Salisbury, N.B. He joined the RCAF in 1931.

- Air Vice Marshal Harold B. Godwin has moved from Air Material Command to succeed A/V/M Campbell at the Air Division. He has been succeeded, in turn, by Air Vice Marshal J. L. Plant, former Air Member for Technical Services. A/V/M Godwin, 48, is a native of Westmount, Que. He

joined the RCAF in 1928.

- Lieutenant-Colonel John E. Leach, 38, of Kingston has been appointed Army Member of the Directing Staff at the RCAF Staff College, Toronto. He replaces Lieutenant-Colonel A. H. Lowe of Montreal, now with the Directorate of Military Operations and Plans. Lt.-Col. Leach is a Korea veteran and was formerly employed by the Defense Research Board as an Arctic Warfare Technical Staff Officer.

- Lieutenant-Commander James B. Fotheringham, 33, of Toronto and Kingston, has begun a six-month course at the RAF Flying College, Manby. He is the first RCN pilot selected for the course, which includes staff duties and flying a variety of aircraft. Lt.-Cmdr. Fotheringham has been officer in charge of naval personnel at Royal Military College, Kingston. He was formerly the commanding officer of the 31st Support Air Group.

Fouga Visit

A French report says a Canadian mission is expected at the Fouga works

at Toulouse to evaluate the Magister elementary jet trainer. The report mentions that the tandem-seating Magister has in the instructor's cockpit a binocular periscope device with which it is possible to control the pupil's aiming during gunnery exercise.

Nike Trials

U.S.-made Nike anti-aircraft missiles have been successfully test-fired in the area of Churchill, Man., the Canadian Army announces. For six months, ending in March, a 44-man team of the Royal Canadian Artillery put to good practice lessons it had learned at Fort Bliss, Tex. The tests demonstrated that the Nike is an efficient cold-weather weapon.

"These delicate instruments reacted well in extreme cold," the Army reported. "Launcher and missile could be put into action quickly. Valuable lessons were learned, and the tests were eminently successful in that they provided the answers to many problems concerning effective operation under Arctic conditions."

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