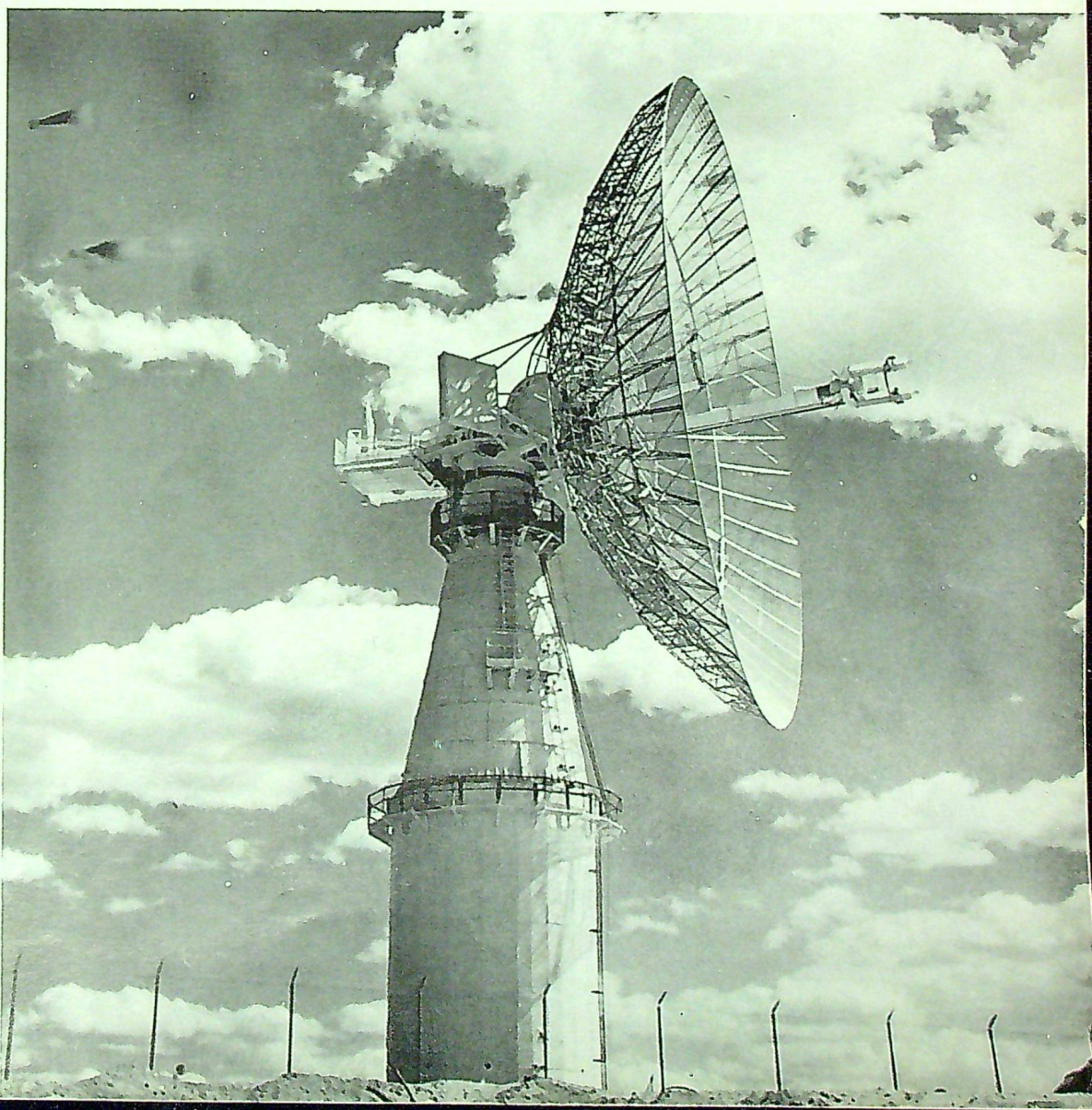
THE Roundel



SEPTEMBER 1959

THE Roundel

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CONTENTS

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THIS MONTH'S COVER

Our cover picture depicts P.A.R.L. (Prince Albert Radar Laboratory) which Prime Minister John Diefenbaker opened in June. This radar facility, which is sponsored jointly by Canada's Defence Research Board and the U.S.A.F., will be employed to investigate factors that influence radar detection of aircraft and missiles entering the region of the northern lights.

Authorized as Second Class Mail, Post Office Department, Ottawa.

On the Break

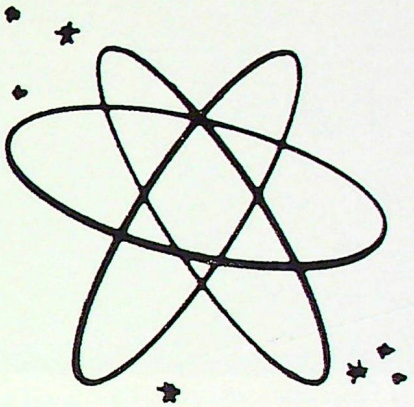
THE futuristic little symbol in the column alongside is simply an attempt to convey to our readers something of the frame of mind that we have been in lately as we went about making up this issue of THE ROUNDEL. First of all, we received an article from the Defence Research Board describing Canadian scientists' contribution to the exploration of the heavens around us, then we saw another celestial offering entitled "Landing on the Moon", we got airborne with the "X-15" and, finally, we went into orbit with "Man in Space". We have always tried to keep our readers informed on current happenings in the field of aviation but, in this out-of-the-world issue, we endeavour to give a brief insight into the shape of things to come.

* *

WITH the recent visit of Her Majesty Queen Elizabeth and Prince Philip to Canada still fresh in our minds we feel that it is an opportune time to introduce into THE ROUNDEL a series of articles that has been in the making for some time. The series "Air Forces of the Commonwealth" starts in this issue with an account of the Royal Air Force. It was a revelation, at least for us, to learn that the R.A.F. operated at so many different and such widely separated points on the globe. With a strength of close to 200,000 personnel and with hundreds of the finest aircraft in existence, the R.A.F. is indeed a Force to be reckoned with. The story of the R.A.F. will be followed by similar articles concerning the air forces of our other partners in this free association of sovereign states which we call the Commonwealth of Nations.

* *

IN keeping with the spirit of the 50th Anniversary of Powered Flight in Canada we have been printing articles concerning Canada's aviation history. In this issue we conclude the most comprehensive description ever printed of the birth of Canadian aviation. Wing Commander F. H. Hitchins' "Too Expensive a Luxury" is both an entertaining and informative account of that pioneering period.



COMOX: Garden Spot of the Service" is the first of a series featuring representative stations throughout the R.C.A.F. Starting from the west (we couldn't get any farther west than Comox) we will work our way east across the Rockies, through the prairies and down to the Atlantic seaboard. For some, these articles may serve as a guide to stations where they have not, as yet, been posted. For others, we hope the articles will recall fond memories. To start the series off, Flt. Lt. T. Collins, SOPR No. 5 Air Division, journeyed to Comox where he was immediately captivated by the scenic beauty provided by a bounteous nature. Not all stations, of course, have been blessed with a blue Pacific on the front doorstep and snow-capped mountains in the backyard but each station has much to recommend it and, as the series will show, a wide variety of interesting jobs are being carried out from coast to coast by our colleagues in air force uniform.

The Editor

The Radio Physics Wing of the Defence Research Telecommunications Establishment at Shirleys Bay near Ottawa is the centre for an extensive fundamental research programme in the field of radio physics and allied areas.

CANADA'S CONTRIBUTION TO SPACE SCIENCE

by

GORDON D. WATSON, Director Of Weapons Research,

Defence Research Board

BECAUSE of her scientific interests and by virtue of her geographic position, Canada has become involved in the new worldwide field of science concerned with the "Space Age".

Relatively recent launchings of Russian and U.S. earth satellites, lunar rockets and solar orbital space probes have stimulated both serious and fanciful discussions within the Canadian scientific community, among members of professional and amateur societies and within the daily and technical press.

Both for military and purely scientific reasons, Canadian scientists have been contributing usefully to some "Space Age" developments in a variety of related fields where special qualifications and facilities exist from previous work.

Canada possesses the world's second largest land mass, and the North Magnetic Pole and much of its associated auroral belt lie within and above Canadian territory. These facts, of special Canadian interest, have stimulated energetic programmes which investigate natural phenomena that have important implications relative to communications, the flight of aircraft and the development of navigation aids. The same phenomena are important considerations in space exploration.

Both the Defence Research Board, which conducts scientific investigations on behalf of the Armed Forces, and the National Research Council, with its programme of research primarily for industrial purposes, maintain active programmes in these and related areas. Both organizations, therefore, are contributing in several fields of importance to future Space exploration.

DRB scientists, with their special interests in defence problems, are

particularly space-conscious because, during most of their flight paths, ballistic missiles will travel through space prior to re-entering earth's atmosphere.

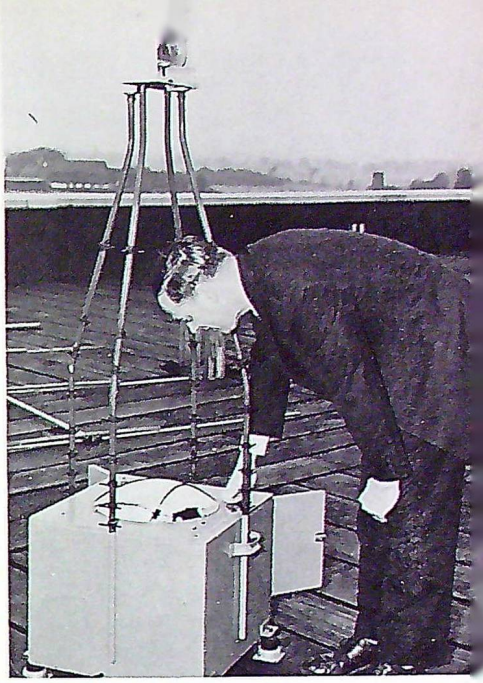
Because ICBM research is an increasingly important activity of Canada's defence scientists, the DRB is especially concerned with these types of scientific investigations. In addition to its defence interest, however, the information resulting from the projects undertaken is contributing to space science generally. Four Board establishments are currently engaged in research either directly or indirectly related to missile defence.

The programme at the Canadian Armament Research and Development Establishment (CARDE), at Valcartier, Que., includes measurements of high-altitude atmospheric absorption and background at infra-red wave-lengths. The data are obtained by employing instrumental aircraft and balloons and rockets. The scientists also employ, at appropriate times, infra-red instrumentation at various locations across Canada to observe rockets and satellites, with particular interest in the latter during their re-entry phase.

CARDE personnel conduct theoretical and experimental studies of hypersonic phenomena including experiments with simulated re-entry bodies in evacuated aeroballistic ranges. In addition, they are studying the feasibility of obtaining useful data from infra-red-measuring satellites, are developing rocket propulsion techniques and are establishing telemetering and radar tracking facilities to support aeroballistics range experiments. The CARDE programme includes the development of special instrumentation for high-altitude rocket test vehicles.

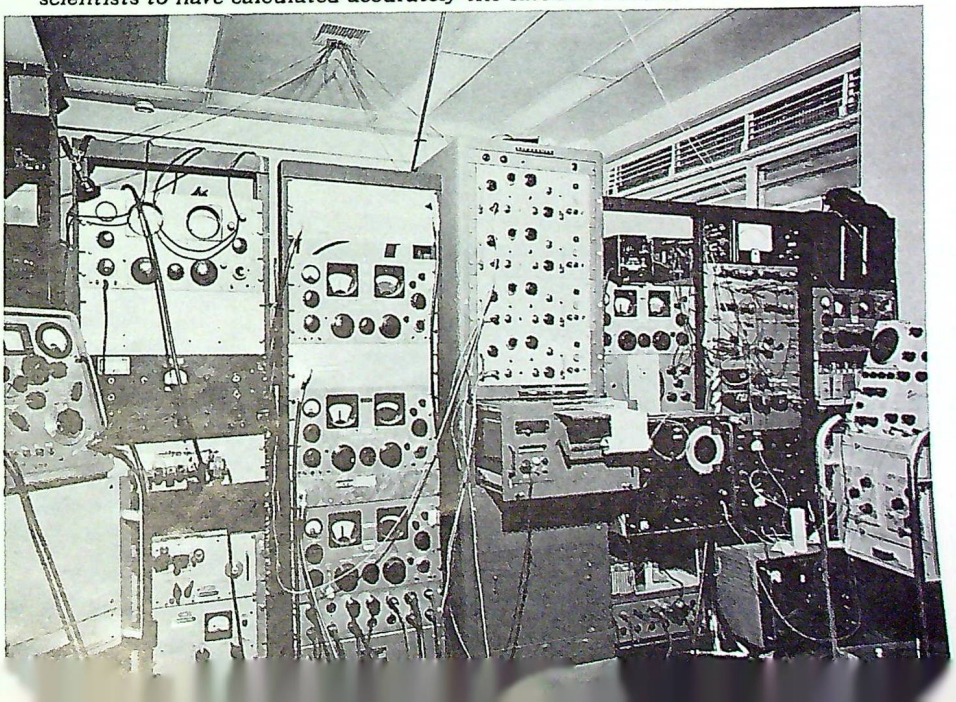
At Shirleys Bay near Ottawa, the Defence Research Telecommunications Establishment (DRTE) has spent 12 years of specialized research on the ionosphere and the aurora borealis, meteors, solar and cosmic radiation and the geomagnetic field. The Prince Albert Radar Laboratory, a DRTE subunit established recently as Canada's largest radar facility, can study the aurora borealis in detail and is capable of tracking high altitude rockets launched from Fort Churchill and satellites in orbits that reach to about 50 degrees North Latitude.

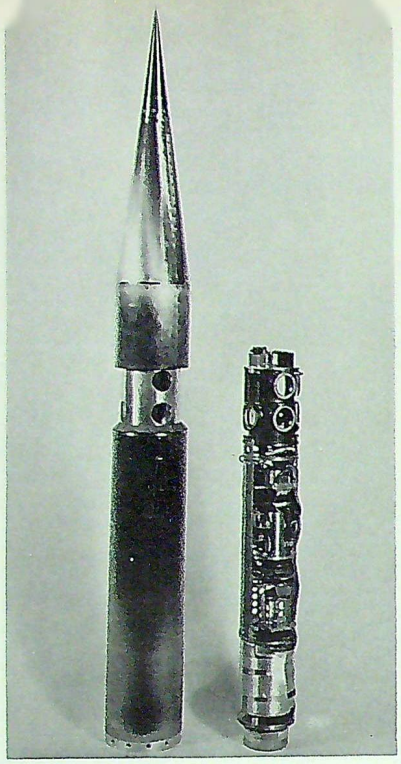
The Prince Albert unit has been instrumented primarily to obtain extensive data on auroral reflections at high levels and at ranges comparable with those required for the detection of ballistic missiles and satellites. In addition, DRTE has attained specialized experience in the development of circuits, components and techniques such as transistorized cir-



Dr. J. H. Meek, a Defence Research Board scientist, examines an all-sky camera before setting its time clock for automatic pictorial records of the aurora borealis.

Scientists at the D.R.B. Radio Physics Laboratory used this electronic receiving and recording instrumentation to track and deduce the orbit of the U.S.S.R.'s first "Sputnik". The Canadians are believed to have been the first Western scientists to have calculated accurately the satellite's orbit.





Nose cones designed at the Canadian Armament Research and Development Establishment, Valcartier, Que., were launched on U.S. rockets from Fort Churchill. Left: a nose cover in the forward position; right: the multi-lens optical systems and other instrumentation which fitted inside the nose cones.

cuitry and low-power miniaturized assemblies.

A team of scientists and engineers is developing instrumentation which will examine the top layers of the ionosphere from a U.S. satellite to be launched within the next year or so. In addition, it is developing instruments for Aerobee rockets to be fired late this year for high-altitude ionization measurements.

The Defence Research Medical Laboratories (DRML), at Downsview, Ont., are engaged in basic studies on the reaction of human beings to high-altitude, high-speed flight and to the phenomena that will be encountered in a space environment. This research involves investigations relative to isolation, high acceleration, weightlessness and decompression. Scientists at the same establishment are conducting food research and the development of space suits, both matters of importance for future space travellers.

Yet another DRB unit, the Operational Research Group (ORG), whose activities are centred in Ottawa, is exploring various techniques aimed at detecting ballistic missiles.

The Institute of Upper Atmospheric Research and the Institute of Aerophysics at the University of Saskatchewan and the University of Toronto, respectively, both assisted financially by the Board, have been conducting high-altitude ionospheric research and fundamental investigation concerning hypersonic velocity phenomena, shock tubes and plasma generators.

The National Research Council also has a long history of scientific investigations relative to aeronautics, propulsion and high altitude physics, including studies of meteors and meteorites, cosmic rays and the aurora, all of which bear both on defence and space science. The Bureau of Mines contributes the results of particularly valuable basic investigations concerning materials, fuels and metallurgy.

In considering Canada's "Space Age" participation, it is important to distinguish between space science and space technology. The former embraces many scientific fields in which research can be undertaken at a relatively low cost and Canada's present effort lies within these areas. Space technology, however, involves the design and construction of large rocket vehicles and is extremely expensive.

Undoubtedly, such costly activities will remain the responsibility of major industrial nations until new developments produce relatively inexpensive rocket vehicles of commercial or military value. International cooperation, such as that which exists today between Canada and the United States, suggests that launching vehicles can best be made available to smaller countries for research purposes by the major nations.

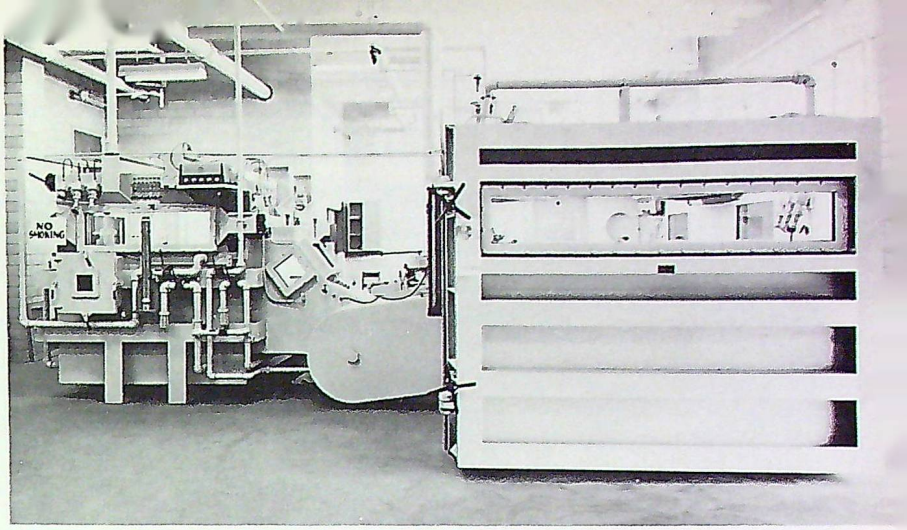
A 1958 scientific discovery of special importance to Canada indicates that the earth is surrounded by a radiation belt of high intensity over the equator. The heavy shielding required to protect the occupants would be a penalty on manned space vehicles launched other than near the regions of the magnetic poles. These regions are believed to be nearly free of the radiations.

Because of international interest in obtaining detailed scientific data about the nature of these radiation levels, the existing Fort Churchill rocket launching site promises to be of increasing value. The site is, in fact, in one of the few conceivable land areas accessible to the western world for the purposes of investigating the absence of this radiation near a magnetic pole.

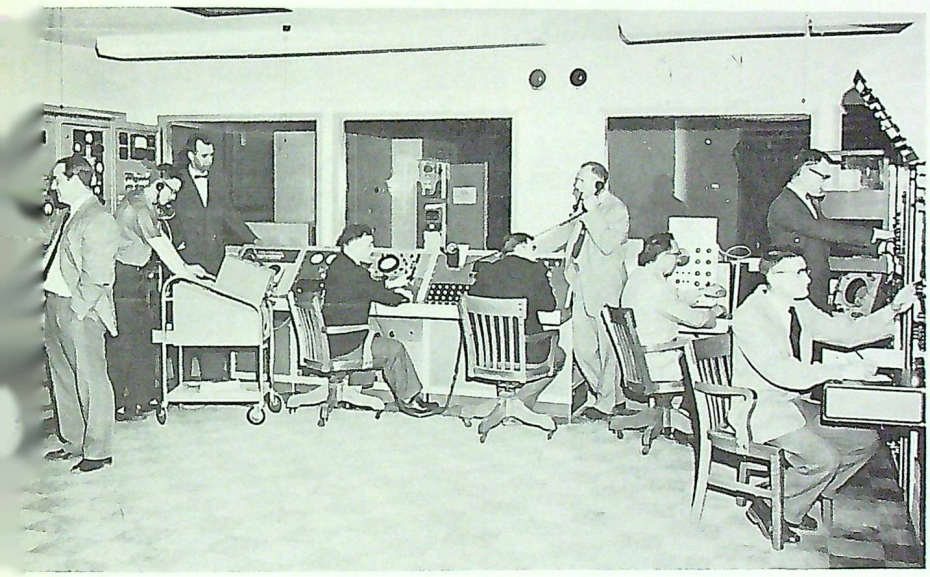
The construction and operation of rocket sounding facilities at Fort Churchill were undertaken primarily for International Geophysical Year studies by the United States with assistance from the Defence Research Board, the Canadian Army and the Department of Transport. The ranges were established during 1955–56 and include an Aerobee tower, a Nike-Cajun launcher and building with associated facilities including a five-station data measuring system, a tracking camera network, radars, a complete range-communications system and other related equipment.

Two of the U.S. high-altitude rockets fired at Fort Churchill last year were instrumented by scientists from the Board's Valcartier establishment. Both launchings proved entirely successful and valuable information was obtained relative to the ionosphere.

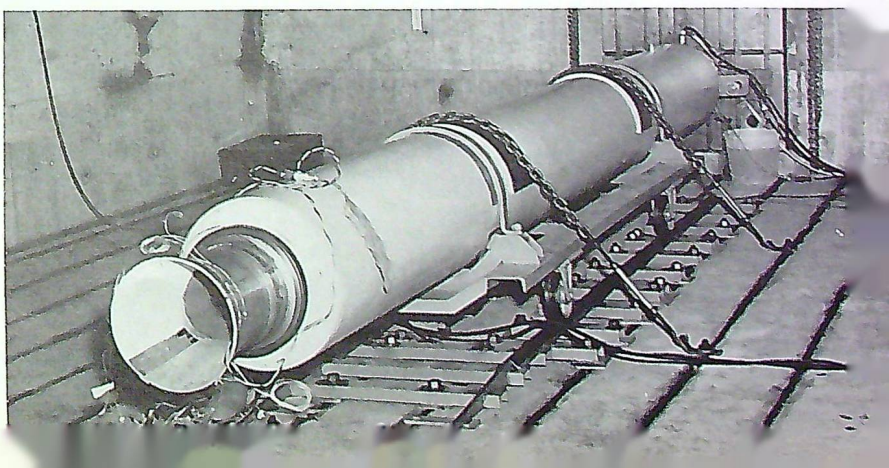
All these and other allied fundamental research activities suggest that not only has the "Space Age" come to Canada— but that Canadian scientists, engineers and technicians have moved forward eagerly and enthusiastically to contribute their skills and experience to solving some of the problems of space science.



Defence Research Medical Laboratories Decompression Chambers.



Dr. D. R. Hansen, third from the left, Officer-in-Charge of the Prince Albert Radar Laboratory, directs operations in the control room of the new research facility near Prince Albert, Sask.



Canada advanced another step in the field of rocketry with the ground-launching of this 17-inch diameter rocket motor at the Canadian Armament Research and Development Establishment. The rocket attained a thrust of 20,000 pounds—the equivalent of more than 100,000 horse power.

Landing on the Moon

By SIR HAROLD SPENCER JONES

(Courtesy The Listener)

THE successful launching by the Soviet Union and the United States of instrumented scientific earth satellites, as a part of the programme of the great enterprise of the International Geophysical Year, has opened a whole new era of space research.

Man has hitherto been earth-bound. All the knowledge that he has been able to obtain about our cosmic environment has been gained from observations made from the surface of the Earth, through the blanket of the Earth's thick atmosphere. He has endeavoured to overcome the handicap that this imposes by sending balloons, equipped with instruments of various sorts, up to heights of about thirty miles; by firing rockets, with instruments in their nose cones, to heights of from 100 to 250 miles, and finally by the launching of artificial earth satellites, carrying instruments of ingenious design, which can radio coded signals back to Earth, conveying much information.

Considerable additions to the knowledge of our environment have already been obtained from the signals transmitted by the artificial satellites. One of the most important has been the discovery that around the Earth there is a belt of intense radiation, extending outwards from a height of about 600 miles above the Earth, which may prove to be a serious hazard, hitherto unsuspected, to space explorers, when it proves possible for man to leave the Earth and to travel outwards into space.

Spectacular developments in the exploration of space may be expected within the next decade or two. The Americans have already made four attempts to send a vehicle to the vicinity of the Moon. The Russians have succeeded in launching a vehicle that has passed within a few thousand miles of the Moon and which has now entered an orbit round the Sun, becoming the first artificial planet, or perhaps I should say the first artificial asteroid, for the thousands of small known bodies in the solar system, whose orbits lie mostly between the Earth and Mars, are called asteroids. This lunik, as the Russians have termed it, is likely to continue circling round the Sun for many thousands of years, returning to the vicinity of the Earth's orbit at intervals of about fifteen months. Whether it will ever be observed again is doubtful. It would be possible to observe it if the Earth were sufficiently near when the lunik returns to the vicinity of the Earth's orbit. But as the Earth moves round its orbit with a speed of about 67,000 miles an hour, very accurate timing would be necessary, and the chances are heavily against the lunik ever being seen again.

The Russians have stated that the lunik was aimed so as not to hit the Moon. But if the direction in which it was launched had differed by less than one degree from its actual path it could easily have hit the Moon. Scientists have been somewhat concerned that man, in his ventures into space with unmanned vehicles, might accidentally hit the Moon before he himself can reach it. The Moon is a virgin world that has so far not been contaminated by man in any way, and from that aspect it will prove to be of the greatest interest when man is able to reach it and explore it.

Let me give one or two examples. One of the greatest mysteries is how life came into existence on the Earth. It is believed by biologists that large molecules of complicated structure were formed first and that from these macromolecules, as they may be termed, spores, bacteria, or other microorganisms developed. How such complex molecules could be built up and replicated is unknown. Have such 'pre-life' processes occurred on the Moon? It would be exciting to discover whether they are present in the dust that covers the Moon's surface. The collision of an unmanned space vehicle with the Moon could conceivably introduce foreign macromolecules from the Earth, which, under the conditions on the Moon, might act as templates and so provide foci for 'pre-life' growth. Even the introduction of dead-bacteria could be harmful.

The impact of a rocket on the Moon could probably not be observed from the Earth unless it carried an atomic device that would cause an explosion. If this were to happen, radioactive material would be scattered over much of the Moon's surface, and this would be prejudicial to various investigations that might give us useful information about the past history of the Moon.

It is known that in America and Russia men are being trained for space travel. The Russians have already sent a dog up in one of their sputniks and the Americans have launched a rocket containing a monkey; information has been obtained about the response of these animals to the high accelerations to which they were subjected in the early stages of the flight and to the condition of weightlessness during free-flight. By means of coded signals, the effects on respiration and heart beat have been ascertained. These investigations are necessary preliminaries to manned flight. The next step, I imagine, will be the launching of a manned rocket, with arrangements for recovery of the chamber containing the man, on its return to Earth.

The American moon-probe experiments have been designed so that, if the vehicle reaches the vicinity of the Moon, it can enter into an orbit round the Moon. To do this, its speed must be greatly retarded by rocket thrust, which can be effected by radio control from the Earth. After the vehicle has passed round the Moon it would be accelerated again for return to the Earth. Much useful scientific information would in this way be obtained without having recourse to a manned vehicle. It could be ascertained whether the Moon has a magnetic field; the side turned away from the Earth, which man has never seen, could be photographed; the intensity and nature of cosmic rays in the vicinity of the Moon could be investigated.

I do not suppose that any country will attempt to land a manned vehicle on the Moon without provision being made for it to be launched from the Moon for a return journey to the Earth. To do this involves problems of considerable complexity. The landing of a manned vehicle on the Moon is already, I suppose, within the technological resources that have already been developed. But what useful purpose would it serve unless the occupants had a reasonable expectation of returning safely home?

The Moon will prove to be a hostile world. It is completely dry, very mountainous, extremely barren, and covered with dust which may be several feet thick. It has little, if any, atmosphere. Observations have proved that any atmosphere it may possess cannot exceed one million millionth of the Earth's atmosphere. Even so, what little there may be would be found to be extremely unpleasant, probably consisting mostly of the gas sulphur dioxide. The lunar explorers would have to be provided with completely airtight suits. The slightest leak would soon prove fatal. They would need to be equipped with an oxygen supply and a means of absorbing the carbon dioxide and moisture that they exhaled. The temperature changes on the Moon are extreme and rapid. During the day the lunar explorers would have to shelter in the shade, for in the Sun the temperature might well exceed the temperature of boiling water. Sunset would be followed by a very rapid drop in temperature, which in a few hours might be more than 300 degrees Fahrenheit.

Here on the Earth we are sheltered by an extensive atmosphere from all the short-wave radiation from the Sun—from the ultra-violet down to x-rays. These radiations are absorbed in the atmosphere, but for which life on the Earth as we know it would not be possible. But on the Moon there is no atmosphere to speak of and consequently no such protection. Our lunar explorers would therefore have to confine their activities to the intense, bitter cold of the lunar night. Even so, they would run a serious risk of being hit by a micro-meteorite, travelling much faster than a rifle bullet. Many millions of these enter our atmosphere daily and are burnt up; our atmosphere is again our protection from this hazard. The slightest puncture of the explorer's suit by one of these micro-meteorites would be fatal; suits of great thickness, perhaps like the tread of a motor tire, would perhaps provide sufficient protection. The hazard from high-energy cosmic rays, from which again our atmosphere protects us, might also be great.

The Russian lunik took about thirty-six hours to reach the vicinity of the Moon, which is not too long a journey. In order to land on the Moon the vehicle would have to be retarded so as to be captured by the gravitation of the Moon. Then it could gradually glide downwards towards the ground. If suitable controls were provided, a level terrain could be selected for landing and the vehicle oriented so that it landed base downwards. How irregular the ground may be below its deep cover of dust we do not know, but with some luck there would be a chance that a correct landing would be achieved.

The vehicle would have to be provided with completely airtight doors and with an airlock so that the occupants could emerge without all the precious air escaping. All the food, water, and oxygen required for the sojourn on the Moon would have to be carried. In order to return to the Earth, fuel for the launching from the Moon would have to be carried. All these requirements would add greatly to the weight of the vehicle that would have to be launched from the Earth.

The launching of the rocket from the Moon for its homeward journey would be in one respect easier than its launching from the Earth for the outward journey. This is because the Moon's diameter is not much more than one-quarter of the Earth's, and its mass is only one-eightieth. For the outward journey the launching speed must be not less than 25,000 miles an hour, but for the return journey a launching speed of 5,500 miles an hour, would be adequate. But, on the other hand, the launching from the Moon would have to be effected without any of the elaborate ground facilities that are available when it is made from the Earth.

Landing on the Moon and explorations of its surface offer tremendous and exciting possibilities. The hazards would be great and the chance of success perhaps rather small. But there have always been men ready to face a great challenge and to risk much for a great adventure. Nevertheless the wise course, I feel sure, will be to endeavour to learn more about the Moon by orbiting round it without any attempt to land on it; much information should be gained by looking at it from close quarters. Much is likely to happen within the next decade or two, for we are now entering upon the age of exploration of space.

In the Battle for Man's Moon

In view of the great expense and difficulty in firing rockets at the moon attempts should be made when the moon is full. There would be a better chance of hitting this target than hitting the thin crescent.

From a letter to the Glasgow Herald.

SOME time in the near future a pilot will board a cramped 2,400 lb. cone-shaped capsule at the United States Air Force Missile Test Centre at Cape Canaveral and, if all goes well, will be blasted into orbit approximately 120 miles above the earth. Travelling at the rate of 18,000 m.p.h. he will circle the world in 90 minutes. This man will be America's first space traveller.

The U.S. programme to put a man into orbit and bring him back alive is called Project Mercury and is being handled by the National Aeronautics and Space Administration. This project is distinct from the tests scheduled for the X-15. The X-15, which is really a very special aeroplane, will be air launched from a "mother" aircraft and then climb into space briefly then glide quickly back to earth under full control. Project Mercury's space capsule is designed for an around-the-earth orbit then a landing by parachute.

The rocket which will take the astronaut and the capsule into space is the Atlas I.C.B.M. which successfully orbited the earth last year. The Atlas will be used as a first stage booster. It will be topped by some added stages plus emergency rockets for the capsule in case trouble develops during the launch. When the historic flight is ready to start the astronaut, clad in a pressure suit and strapped to his seat, will recline with his back to the floor. The air in the capsule will consist of carefully mixed helium and oxygen plus other breathable gases circulated mechanically in the closed environment. Secured to his seat by a tight cloth across his middle the spaceman will then be hooked up to a network of medical instruments which will relay to ground stations his physiological reactions. When the doctors, engineers and technicians have finished, the ground-crew will make last-minute checks, then the countdown will get underway. Finally the blastoff. The astronaut will be pushed firmly into his padded couch under the force of 7 Gs or more as the rocket accelerates. The next few seconds will be critical and if anything goes wrong, ground control will put into motion a chain of events to rescue the astronaut. A mechanism will fire a small cluster of emergency rockets.

The rockets will separate the capsule from the Atlas missile and lift it to a height of at least 2,500 feet. From that altitude capsule and astronaut will return to earth by parachute. If the blastoff is successful, missile and man will continue to accelerate and when they have reached an orbital velocity of 18,000 m.p.h. the man-carrying nose cone will separate and begin its orbit. The capsule will then be tipped by reactor jets to a horizontal attitude and the spaceman inside will ride facing forward. An automatic attitude sensor will operate jets to keep the capsule from rolling. If the astronaut wants to eat or drink during his orbits around the globe he will have to do so by means of suction tubes or squeeze bottles since he will be in a state of weightlessness. A two-way radio will allow him to communicate with ground stations and a periscope device will give him an indirect view of the world below him. Except for glances at the optical display and conversation with the ground, the astronaut will have little to do during his celestial sojourn. He will wait in darkness and eerie silence in a still and weightless world while the capsule hurtles through space. After two orbits the crucial business of a safe re-entry will begin. At a critical moment, pre-calculated on the ground so that the capsule's landing area will be known, jets will turn the capsule so that its retro-rockets can fire and slow its speed. In its reversed position the astronaut will be riding with his back downward, the best position to absorb the stresses of deceleration. In addition, the extremely blunt base of the capsule will produce the maximum practicable wave drag and provide uniform surface heating. As its speed decreases the capsule will transfer from an orbital path to a re-entry trajectory. It will curve downwards into the atmosphere and will hit the thin upper air travelling at more than a million and a half feet per minute. To prevent man and capsule from being vapourized by the resulting heat of friction a "heat sink" of beryllium on the base of the capsule will act as a shield. Even with this protection observers on the ground may see the capsule glowing like a falling star and leaving a track of flame in its wake. Fortunately, however, this critical period, which is expected to heat the surface of the capsule to 1500 degrees Fahrenheit, will last for only a minute or two. Fortunately for the astronaut the temperature inside the capsule will rise only slightly due to the brief time element of maximum heating and the combination of two metal walls and two layers of dual purpose insulation. He will, however, be subjected to a force of about 10 Gs. If capsule and pilot survive this crisis, a drogue 'chute will stream out at 70,000 feet and at about the speed of sound. Simultaneously, chaff will be released to help radar track the capsule's descent. At 10,000 feet a large landing parachute will be opened to produce a landing speed of 30 feet per second. The retro-rockets and the heat shield will be ejected and a large rubberized "doughnut" will inflate around the capsule's base. This device is designed to cushion the impact if the capsule drops on land or to keep it afloat if it falls into the ocean. While the astronaut waits for his rescuers a tracking beacon, two-way radio, flashing lights, safor bombs (for underwater sounds) and dye markers will function to guide search parties.

THE X-15

The North American X-15, which will take man closer to space than he's ever been before, is a United States research effort conducted by the Air Force, Navy, and National Aeronautics and Space Administration.

Carrying a half ton of instrumentation, the X-15 will probe the vast reaches of the sky for scientific data to bring closer to reality man's desire to fly to the stars. The rocket-powered experimental aircraft will perform research in aerodynamic heating, stability and control at speeds in the vicinity of 3,600 m.p.h. and at altitudes exceeding 100 miles. The X-15 will be launched from the underside of the starboard wing of a B-52 bomber at an altitude of at least 38,000 feet. Once dropped from the mother 'plane the X-15's 50,000 lb. thrust rocket engine will boost it in a steep climb to the outer reaches of the earth's atmosphere. The rocket thrust will last for approximately 90 seconds and will be followed by a research flight lasting almost 30 minutes. Although the X-15 is a craft incorporating proved principles of powered flight, there will be portions of its flights where 50 years of accumulated knowledge in aerodynamics will not apply. Some of these unprecedented challenges are: extended periods of weightlessness and the instrumentation challenge of navigating and manoeuvring at extreme altitudes with limited gravitational or visual reference to earth.

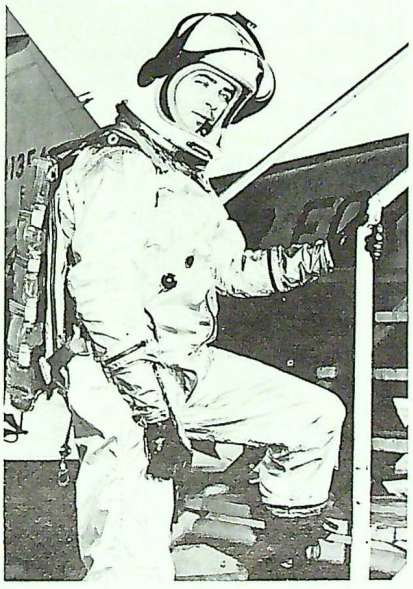
The X-15's flights, which will consist of two categories, maximum altitude and maximum speed will take place over a 485 mile flyway 50 miles wide and known as the X-15 High Range. During the high speed phase of the X-15 programme the aircraft should attain hypersonic speeds (greater than Mach. 5). During the ventures to the edge of outer space special tracking stations will follow the X-15 by radar and collect telementry data. Maximum bulk data that can be collected by these stations runs

The X-15 destination . . . the edge of space.

to 60,000 items a minute and will cover every item from the pilot's heartbeat, to the operation of turbopumps that feed life-giving propellant to the X-15's engine.

The X-15 programme may last as long as five years. The flights of the X-15 will gather much useful data for man's steps into space, Project Mercury's manned space capsule and the Dyna-Soar craft.

FULL PRESSURE SUIT



Captain R. M. White of the U.S.A.F. wears the MC-2 full pressure suit designed to withstand the pressures of high speed flight at extreme altitudes. The full pressure garment differs from partial pressure suits in that pneumatic pressure is exerted over the pilot's entire body. It is designed to give protection against the physiological effects of extreme altitude and against heat from solar radiation. Its high heat resistance will give protection in event of flash fire and against the exceptional thermo stress of high speed escape at great altitudes.

Space Suit in Production

A contract has been let by the U.S.A.F. Air Material Command for production of the most expensive garment in history, a futuristic space suit.

The space suits, which will cost $200,000 each, are designed to permit astronauts to leave their spaceships for reconnaissance missions, in-flight exterior maintenance, or inter-space travel. The suits, which are completely self-contained units, will give their wearers the opportunity of working outside their space ships or satellites for up to six hours at a time.

In order to ensure that the astronauts won't go drifting off into space while walking on the surface of their space craft the suits will have magnets in the boots. The inter-space travel aspect may be accomplished by the use of rockets or other propulsion devices on the suits. This-out-of-this-world space age haberdashery is also designed to provide a barrier against solar radiation.

"TOO EXPENSIVE A LUXURY"

BY WING COMMANDER F. H. HITCHINS
R.C.A.F. Air Historian

SECOND OF TWO PARTS

Between 1909 and 1914 repeated attempts were made to introduce aircraft into the Canadian Army.

When the Aerial Experiment Association was dissolved by time limitation at the end of March 1909, McCurdy and Baldwin formed the Canadian Aerodrome Company at Baddeck to continue their experiments in aviation and embark also on the commercial construction of aircraft. Their factory, in which eight to ten men were employed under Mr. Kenneth Ingraham as foreman, was the first aircraft industry in Canada and the *Baddeck No. 1* was its first product. On their return to Baddeck from Petawawa in August 1909 McCurdy and Baldwin resumed flying with their second machine, the *Baddeck No. 2,* and kept Major Maunsell informed of their progress.* The airfield used for the tests was a meadow about five miles from the workshops where the airmen camped out through the autumn months.

The *Baddeck No. 2* flew for the first time on 25 September and, although the experiments proceeded slowly, partly due to flooding of the meadow by heavy rains, by the end of October about 50 flights had been made, including one of 11 minutes duration while "circomdroning" the field seven times. On 1 November an even better flight was made, covering 15 miles (14 circuits of the field) in 21 minutes. In contrast to their previous policy, the airmen were now carefully keeping all news from the newspapers, so far as possible, until they had thoroughly tested the *Baddeck No. 2* and its capabilities. For the same reason they did not officially inform the Department of Militia and Defence that they were ready to resume demonstration flights.

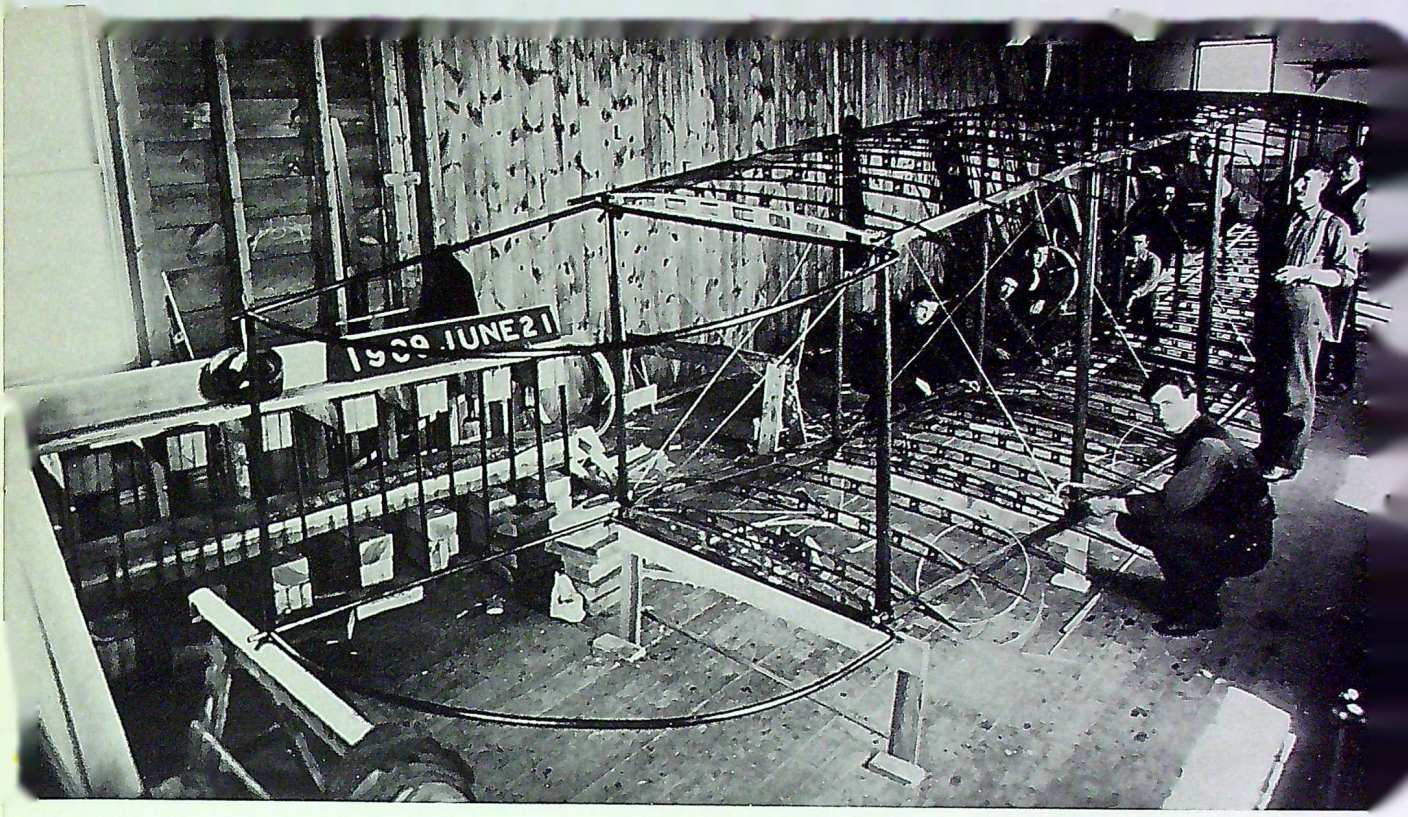
When winter came and Bras d'Or Lake froze over, the airmen transferred their activities to its ice-covered surface. Early in 1910 when they felt that they were ready for official inspection, McCurdy and Baldwin sent a telegram to the Militia Council inviting it to send a representative to witness the flights which they were making. Major Maunsell was at once detailed for the mission. He arrived at Baddeck on the evening of 8 March and remained there four days, watching test flights and studying the work of the Canadian Aerodrome Company. The ice was still intact over a large portion of the bay, providing a sheet about two miles long and half a mile wide over which the *Baddeck No. 2* made its flights. The engine was the same one which had been installed in the *Silver Dart* and the *Baddeck No. 1* at Petawawa, and Maunsell noted that it took about half an hour to get it started on a cold March morning.

On the first morning (9 March) after one test flight of 90 seconds at a height of 40 feet, during which one turn was made, McCurdy restricted himself to straight flights of 1½ miles because of the wind. Several times he flew up and down the course, landing at each end to turn around. Major Maunsell was taken up for two flights, one each way, each "flip" lasting approximately two minutes at a "pace of about 30 miles per hour." The next morning (10 March) McCurdy, flying alone, made a steady flight up the bay at a height of 20 feet, completed four turns and landed "very easily". On gliding over the ice one wheel broke through the thin surface, causing some slight damage which prevented further flying that day as the wind was blowing too hard when the repairs had been completed. McCurdy hoped to make a long flight for Maunsell on the 11th, but after 6½ minutes in the air, during which he completed three circuits of a circular course, he landed to adjust the engine, and once again the rising wind stopped flying until the evening. Then, after flying a mile, McCurdy found that the wind was still too strong when he was making a turn and he had to alight on the ice. In doing so one tire was punctured by the rough surface and the wheel was broken.

NEED FOR TWO ENGINES

Anxious to prove that they could make a long distance flight McCurdy and Baldwin urged the major to stay for another day. On the morning of 12 March the *Baddeck No. 2* made some very good flights of several minutes duration, including a number of turns at 40 to 50 feet height despite a light wind from the southwest; but the engine was not running well and no long distance flight was possible. In his report on the tests Maunsell commented that "it was quite evident that with sufficient power and speed, the

*At the verbal request of the Governor General, the Directorate of Intelligence at Militia Headquarters sent McCurdy and Baldwin periodical precis of information collected about aeronautical developments throughout the world.



Canada's first aircraft factory. The Baddeck No. 1 under construction in the Canadian Aerodrome Company shop at Baddeck, June 1909.

aerodrome would remain in the air indefinitely in calm weather." Dr. Bell, who watched all the experiments "with great interest", advocated the use of two engines as "one of the first great improvements in flying machines." Maunsell agreed that "this engine uncertainty" must be overcome before aviation would be safe. In the flights which he witnessed "It was very noticeable . . . that unless the 40 h.p. engine was under almost full speed, the aerodrome would give one the appearance of dragging down."

While waiting between flights at Baddeck Major Maunsell studied the five aircraft of the Canadian Aerodrome Company. The *Baddeck No. 1* had been entirely repaired and improved. Like the *Baddeck No. 2* it had been fitted with elevators at the tail as well as in the bow control, and the wingtip ailerons had now been moved to a position between the main planes. Springs had been added to the undercarriage to take the landing strain. As there was only one engine available for the *Baddecks*, only the second machine was being flown that spring.

The Company's first commercial order was the *Mike*, a monoplane that was being built for an American customer, Mr. Gardiner Hubbard of Boston. Somewhat similar to the famous Bleriot monoplane in design, the *Mike* was much smaller and lighter than the *Baddecks* and appeared to be very fast, although Maunsell thought it was "probably not so steady" as the big biplanes. Unlike the *Baddecks* it was a tractor with the engine mounted in front of the pilot. The engine on order for it was a 40 h.p. automobile motor, similar to that of the *Baddeck*, manufactured by the Pullman Company.*

In addition to the three conventional aircraft the Canadian Aerodrome Company had two powered kites, the *Cygnet* and the *Oionos*, designed by Dr. Bell. As mentioned previously, some tests had been made with the *Cygnet* early in 1909, but the engine had not been able to attain sufficient speed to lift the kite into the air. Dr. Bell was so convinced, however, that the tetrahedral system was correct that he had a second machine built, incorporating some modifications. The *Oionos* was a triplane constructed from a large number of tetrahedral cells, each cell being a solid triangle with sides about nine inches long. Maunsell watched this aerodrome being tested on the morning of 10 March with a small 12 h.p. motor. The engine drove it over the smooth ice at 17 m.p.h., but was not strong enough to lift the *Oionos* into the air. Pending receipt of a more powerful engine, experiments were being made to test the balance, resistance and stability of the craft.

Commenting on other work being done by the Canadian Aerodrome Company, Maunsell noted that the airmen were considering the

*The *Mike* was successfully tested by Mr. Hubbard on 5 April 1910, in nine flights at 10 or 15 feet height.

effect of a gyroscope in an aircraft. "It is thought that two gyroscopes, one running in one direction and one in the other, would steady the machine in the air." The company was also experimenting with hydroplanes, for installation on an aerodrome, and with airscrew-driven iceboats.

AN OFFER TO THE ARMY

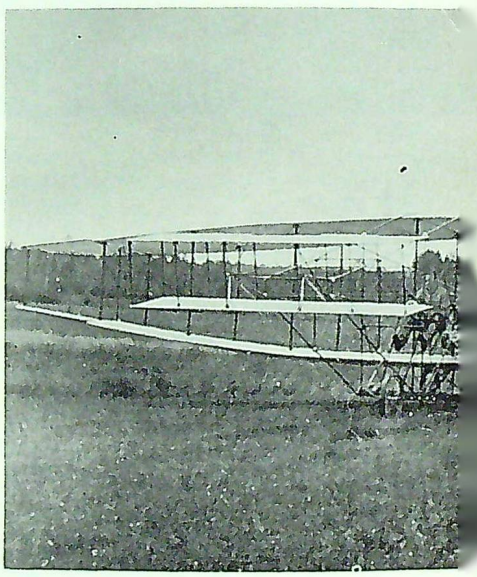
While Maunsell was at Baddeck, Baldwin and McCurdy wrote to the Militia Council, on 10 March 1910, making a formal offer of terms and conditions. They proposed that the Canadian government purchase the two *Baddeck* aerodromes for $10,000, delivered at the factory; after delivery they would, without further expense to the government, instruct one or two officers to fly the aircraft, provided the instruction was given at Baddeck where they had every facility for the work. The purchase price, the two airmen pointed out, would enable them to continue their aerial investigations and develop improvements to their machines.

On his return to Ottawa, Maunsell suggested various alternatives "by which experiments in aviation may be carried out in Canada, under the Department of Militia and Defence":

1. Establish an Aviation Section of the R.C.E. to experiment in constructing and handling aerodromes and balloons. As the section would have to start at the beginning "and work up to the stage reached by Messrs. McCurdy and Baldwin after years of steady work", this alternative would take both time and money.
2. Accept the offer of McCurdy and Baldwin. The two aircraft had actually cost more than $10,000, so the department would get full value for its money and would also get the benefit of the airmen's experience and subsequent improvements.
3. Offer them an annual grant to aid their work, in return for which they would keep one machine of the latest type for the use of the government, train selected officers of the Canadian Militia, and carry on experiments and trials. Major Maunsell thought that this was probably the most advisable method.

These proposals were referred to the Militia Council which considered them on 5 April 1910 and decided to adopt the third alternative, as Maunsell had recommended. The Master-General of the Ordnance was instructed to prepare a report for submission to the Privy Council to secure approval of the policy and inclusion of an item in the Supplementary Estimates for 1910-11. After approval by the Inspector-General, the Chief of the General Staff, the Adjutant-General, and the Quarter-Master General, the report was submitted to the Governor General in Council on 7 April, accompanied by a further supplementary estimate for 1910-11 for the grant of $10,000 to Messrs. McCurdy and Baldwin to enable them "to pursue their studies in aviation." In return for the grant, renewable annually at the discretion of the Government, six conditions were laid down: the two airmen should train officers in the use of their machines; they should place a machine at the disposal of the Department whenever required; they should give the Department the refusal of any invention or machine they might produce; they should be prepared to carry out such experiments and trials at Petawawa or elsewhere as the Department might require; their factory should be open at all times for inspection by officers of the Department; and the grant should not be used for the purchase of material or the construction of machines intended for sale. But the Privy Council would not approve the request for a supplementary estimate and referred the matter back to the Militia Council.

Failing to secure the $10,000 grant, Col. Rutherford, the Master-General of the Ordnance, tried another tactic and suggested that a grant of $5,000 be made from the appropriation for the Engineer Services (Headquarters Reserve). After delivery of the *Mike* monoplane to Mr. Hubbard early in April, Baldwin and McCurdy had closed their factory to await further developments, and Rutherford pointed out that if some grant were not made the services of the airmen would be lost and their experiments would cease. The Militia Council approved this new proposal on 10 May and another submission was made to Privy Council for authority to take the $5,000 from the Engineer appropriation, subject to the same conditions as before. Privy Council, however, refused to approve even the smaller sum and the submission was once again referred back to the Minister of Militia and Defence on 9 June. Maunsell then sent a telegram to McCurdy and Baldwin "very sorry Department is unable to make you grant towards aviation this year." In a letter confirming the sad news, Col. Fiset, the Deputy Minister, told the airmen that if they still wished to continue their experiments and give the Government the benefit of their experience later on, the question might be brought up again in the next financial year. In the meantime if the Department could be of "any assistance . . . in a

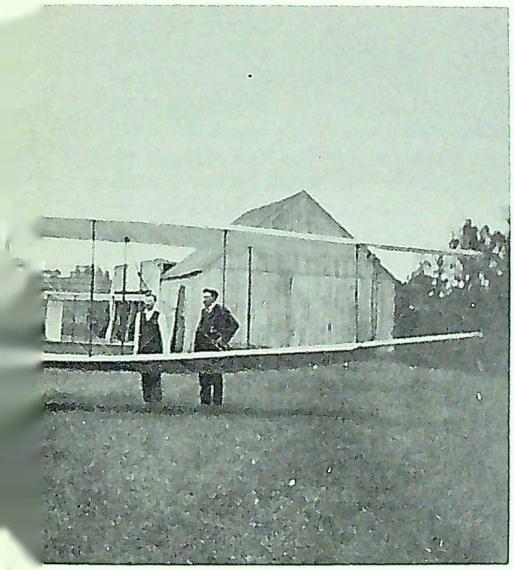


The Baddeck No. 2 by the aerodrome at Big Baddeck,

general way" in experiments at Army camp grounds he would be glad to hear from them.

MESSAGES FROM THE AIR

Denied any tangible assistance from the Canadian government, McCurdy returned to the United States where in the summer of 1910 he carried out some experiments at Sheepshead Bay, N.Y., in the use of wireless in aircraft. A sending apparatus weighing about 20 lbs. was attached to his machine, with a telegrapher's key mounted on the steering wheel. Flying at a height of 500 to 700 feet in a radius of one mile around the receiving set, McCurdy tapped out signals which were easily picked up by the ground station. "This



shed on the Bentick Farm N.S.

marks a new stage for the aeroplane in connection with war purposes", McCurdy wrote to Maunsell, and he invited the Canadian government to send a representative to Hammondsport to observe further trials with wireless.

Before receiving this letter from McCurdy, Major Maunsell, the persistent champion of military aviation in Canada, had already re-opened the matter of government support by proposing, on 29 August 1910, that an amount of $10,000 be included in the estimates for 1911–12 for a grant to McCurdy and Baldwin on the lines proposed earlier that year. But this time the Militia Council, after two rebuffs, apparently did not wish to expose itself a third time and the recommendation was not approved.

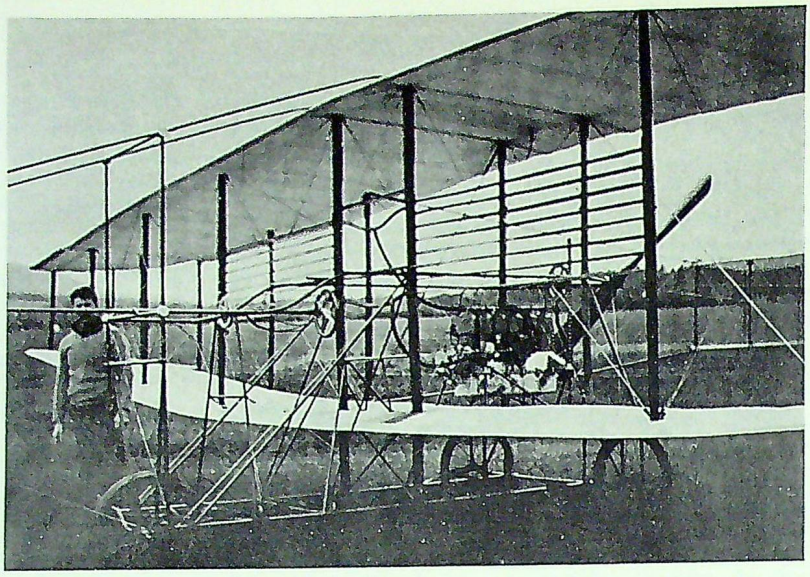
A year later, Maunsell, now a lieutenant-colonel, tried once more to introduce aviation into the Canadian forces. He drafted a letter for the Deputy Minister to send to the Governor General, requesting that the British War Office be asked for "information and advice relative to the best method of commencing the study of Aviation in the Canadian Militia, on a small scale"; what were the best aeroplanes for instructional purposes and for military purposes, and what personnel would be required to handle, say, two machines. In a covering memorandum, dated 28 November 1911, Maunsel pointed out that in accordance with the policy decided upon by the Militia Council on 4 May 1909, that everything possible should be done to facilitate the study of aviation, funds had been included in the Engineer Stores vote which could be made available for that purpose. To enable the Department "to make a start in the organization of the aviation section, which has become so important in Military operations", War Office advice should be sought.

That advice, however, was not immediately forthcoming and two months later, late in January 1912, Maunsell asked that a cable be sent pressing for an urgent reply. He pointed out that the training season was drawing near and if orders were to be placed for aeroplanes for use that summer early action would have to be taken. This cable elicited a reply from the War Office which gave some general information and emphasized that "the employment of aeroplanes requires skilled military pilots and, what is equally important, efficient staffs on the ground. This latter point is generally missed." For two service machines the personnel required would be two pilots, two mechanics, two trained riggers, one sailmaker and one carpenter. The War Office letter also enclosed a copy of "Specifications for a Military Aeroplane".

Armed with this information Lt. Col. Maunsell proposed in February 1912 that the Department should again approach Mr. McCurdy and ask him to give a few officer volunteers from the R.C.E. and other corps a few weeks training at Petawawa in August of that year. McCurdy would be allowed to choose an aeroplane which would most nearly meet the War Office's specifications, and the Department would purchase it. Maunsell did not think it was particularly important what type of aeroplane was chosen initially "as all the present designs will be obsolete within a few years"; the important thing was to make a start in training a few officers who would be able not only to handle aircraft, but also to build them on the designs that develop from time to time. One or two officers and two or three men would be sufficient in the first stages, and the initial outlay would be the cost of one, or preferably two machines at about $5,000 each, and the employment of Mr. McCurdy permanently, or for one month's training.

THE MINISTER SAYS NO

Major-General C. J. Mackenzie, the new Chief of the General Staff, thought that the suggestion was a practical one as a beginning. ". . . A military organization which does not keep pace with the latest scientific developments must be hopelessly left behind by organizations which are alive to that necessity." The proposal was then referred to the Deputy Minister with the comment that money was available in the 1912–13 Engineer Stores vote for the purchase of a machine and possibly the cost of instruction also, although the latter item could be charged to the training vote. This time Maunsell's plan was vetoed by Col. Sam Hughes who had become Minister of Militia and Defence in October 1911



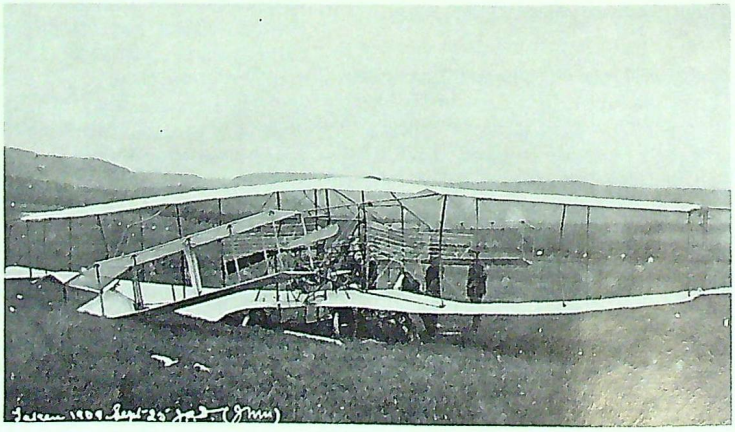
The Baddeck No. 2 showing the controls and the new design radiator.

when the Conservative government of Sir Robert Borden replaced the Liberal regime of Sir Wilfrid Laurier. The Deputy Minister reported that the new Minister "does not approve of this recommendation and does not want any steps taken this year—neither towards training nor purchase of aeroplanes."

This ministerial decision of 14 March 1912 held through the next two and a half years. From time to time offers were received from pilots or manufacturers of aircraft, but they were all declined; no funds were available for the purchase of aeroplanes or the employment of airmen. After the Great War began Mr. McCurdy approached the Minister of Militia and Defence, in December 1914, with a proposal from the Curtiss Aeroplane Company of Hammondsport, N.Y., to establish an aircraft in Canada and to train pilots for an aeroplane corps to work in conjunction with the second Canadian contingent. No bonus or assistance was sought from the government to establish the factory, other than an assurance that an order would be placed with it for the manufacture and equipment of an aeroplane squadron of eight machines at a cost of $7,500 each. The training course for pilots would be of four weeks duration and would include instruction in map reading as well as in flying. But General Hughes stood by his 1912 decision; he did not wish aviation taken up at that time. He had already tried one brief experiment in forming an aviation corps for the first contingent, and the result of that experiment did not encourage him to try again. Not until 1918 was any further action taken to form Canadian air units.

NEXT MONTH: THE CANADIAN AVIATION CORPS

Slightly bent. The Baddeck No. 2 after a bad landing.



For the illustrations which accompany this article we are indebted to Mr. Melville Bell Grosvenor. The photograph of the Canadian Aerodrome factory was taken by John McNeil and is copyright the Bell Family. The photographs of the Baddeck No. 2 were taken by J. A. D. McCurdy and are courtesy and copyright National Geographic Society.

THE ROYAL AIR FORCE

(First in a series on Air Forces of the Commonwealth)

PER ARDUA AD ASTRA

At an airfield in England the raucous blare of a klaxon sounds and a red Very light soars into the air, sending crews racing to their aircraft. One by one jet engines howl into life and an invisible scythe flattens the grass as *Handley Page Victors* turn off taxi strips and speed down the runway, following one another into the air at 30 second intervals. This scene, vaguely reminiscent of the Battle of Britain, is typical of the type of operations which the R.A.F. are engaged in today as they carry out their responsibility of maintaining a constant vigilance.

The first official order covering the use of aeroplanes in the British forces dates back to 28 February 1911 when an Air Battalion of the Royal Engineers was formed. In the same year the Admiralty ordered the building of a wooden rigid airship. These steps into military aviation were greatly strengthened when, on 13 April 1912, King George V signed a Royal Warrant which brought into being the Royal Flying Corps, with naval and military wings. The naval wing was shortly—and unofficially—transformed into the Royal Naval Air Service. On the outbreak of war in 1914 there were 276 officers and 1,797 other ranks in the British Air Services. At the time of the Armistice the R.A.F. (which was the amalgamation of the R.F.C. and the R.N.A.S.) had 27,333 officers and more than a half a million other ranks.

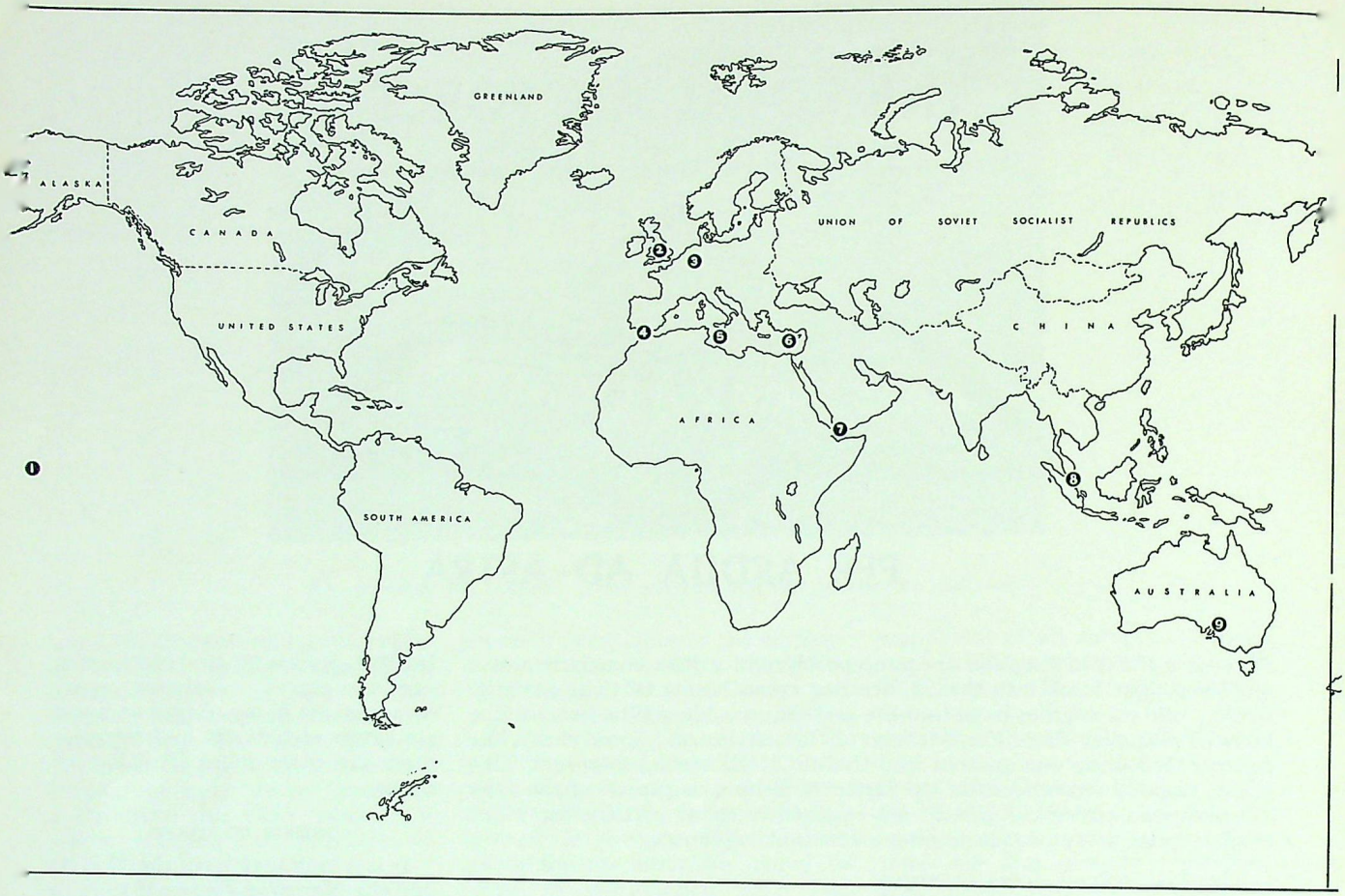
This year as the R.A.F. celebrates its 41st birthday, it is one of the world's leading air forces with a strength of more than 184,000 personnel and with men and equipment in almost every corner of the globe. Based at home are seven commands and overseas there are three more (R.A.F.) air forces.

Marshal of the R.A.F. Sir Dermot A. Boyle, G.C.B., K.C.V.O., K.B.E., A.F.C. Chief of the Air Staff

BOMBER COMMAND

It is a long way from the D.H.4s and the *Handley Pages* of 1918 to the sleek swept-wing *Victors, Vulcans* and *Valiants* of 1959 and in those four decades the role of the R.A.F. has also changed and is now mainly one of deterrence. And, the United Kingdom's main contribution to deterrence against a Third World War is an expanding V-bomber force and growing stocks of advanced nuclear weapons.

The *Vickers-Valiant* is a highly versatile aircraft. It has, in addition to its normal role as a bomber, been used for testing thermo-nuclear devices on Christmas Island and also for the development of in-flight refuelling equipment which will extend the radius of action and operational flexibility of the V-force. The delta wing *Avro Vulcan,* which came into service in May 1956, cruises close to the speed of sound. On one occasion two *Vulcans* flew from Ottawa to London, a distance of 3,345 miles, in five hours 20 minutes at an average speed of 627 m.p.h. On



ROYAL AIR FORCE DEPLOYMENT BY ROLES AND AIRCRAFT TYPES

1 CHRISTMAS ISLAND

Atomic Trials Detachments

2 UNITED KINGDOM

BOMBER COMMAND

Medium Bomber	Valiant
	Vulcan
	Victor
Light Bomber	Canberra
Photographic Reconnaissance	Valiant
	Canberra
Ballistic Missiles	Thor

FIGHTER COMMAND

Day Fighter	Hunter
All-Weather Fighter	Javelin
Surface to Air Guided Weapon	Bloodhound

COASTAL COMMAND

Maritime Reconnaissance	
Troop Transport	Shackleton
Colonial Policing	
Air/sea Rescue	Whirlwind
	Sycamore
Meteorological Reconnaissance	Hastings

TRANSPORT COMMAND

Long Range Transport	Britannia
	Comet
	Hastings
Heavy Freighter	Beverley
Short Range Transport	Pioneer
	Twin Pioneer

3 HEADQUARTERS R.A.F. GERMANY Munchen-Gladbach

Day Fighter	Hunter
All-Weather Fighter	Javelin
Photographic Recce.	Canberra
Fighter Recce.	Swift
Light Bomber	Canberra

4 A.H.Q. GIBRALTAR

Maritime Reconnaissance	Shackleton

5 A.H.Q. MALTA

Maritime Reconnaissance	Shackleton
Photographic Recce.	Canberra

6 H.Q. Middle East Air Force (CYPRUS)

Day Fighter	Hunter
Light Bomber	Canberra
Photographic Recce.	Canberra
Heavy Freighter	Hastings
Air/Sea Rescue	Sycamore

7 H.Q. British Forces Arabian Peninsula (ADEN)

Day Fighter/Ground Attack	Venom
	Hunter
Fighter Reconnaissance	Meteor
Colonial Policing	Shackleton
Maritime Recce.	
Heavy Freighter	Beverley
Short Range Transport	Pembroke
	Pioneer
	Twin Pioneer
Air/Sea Rescue	Sycamore

8 H.Q. Far East Air Force (SINGAPORE)

Day Fighter/Ground Attack	Venom
Fighter Reconnaissance	Venom
Light Bomber	Canberra
Photographic Reconnaissance	Meteor
	Pembroke
Maritime Reconnaissance	Shackleton
Heavy Freighter	Beverley
Short Range Transport	Sycamore
	Whirlwind
	Pioneer
	Twin Pioneer

9 WOOMERA DETACHMENTS

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another occasion this R.A.F. aircraft made an Atlantic crossing from the coast of Labrador to the coast of Northern Ireland in three hours 27 minutes.

The *Handley Page Victor,* which has been in service with Bomber Command since April 1958, is the heaviest of the V-bombers. The fuel load alone exceeds the fully bombed-up weight of the heaviest of the Second World War bombers, and its four jet engines give the *Victor Mk. 1* more than ten times the power of a last war bomber. The *Victor* is capable of operating at altitudes some ten miles high and, during its trials, has flown faster than sound. Both the Mk. 2 versions of the *Vulcan* and *Victor,* which are under development, will have a still better ceiling, longer range and will also be equipped to carry the stand-off bomb, the first air-to-ground missile to be developed in the United Kingdom. Instead of having to penetrate enemy defences, the V-bomber pilot will release the bomb to fly under the control of an automatic navigator to the target and deliver its warhead in a steep dive. Experimental launchings of the full scale stand-off bomb are due to begin in Australia this year. In the field of radar reconnaissance one *Victor* aircraft is able to photograph the entire Mediterranean and give a count of the number of ships in the area. Four *Victors* in one sortie could provide a radar map of a region the size of the United States.

The strategy of the R.A.F. is planned in close co-operation with Britain's allies. Bomber Command's operations are co-ordinated with those of the United States Strategic Air Command and its light bomber force of Canberras, also equipped with nuclear weapons, is assigned to N.A.T.O. as a tactical force for the defence of Europe. Bomber Command's other deterrent factor is the ballistic missile. The first strategic missile squadrons have been equipped with the U.S. Thor surface-to-surface intermediate range ballistic missiles, and are carrying out operational training on these weapons. Britain's own I.R.B.M. Blue Streak

The V-Force

. . . Victor

is also under development.

A concentration on deterrent strategy does not rule out the possibility of local limited wars, and with this in mind orders have this year been placed for the T.S.R.2, a tactical strike reconnaissance aircraft, as successor to the *Canberra*. Its objectives will be to keep the skies in the region free of enemy aircraft by destroying them on the ground at their bases. Equipped with electronic equipment for accurate navigation, bomb aiming and reconnaissance by day and night in all weather, the T.S.R.2 will operate with a useful bomb load at great height and high supersonic speed over a radius of at least a thousand miles as well as having an effective low level capability. It will also have short takeoff and landing characteristics and be able to operate from unprepared surfaces.

FIGHTER COMMAND

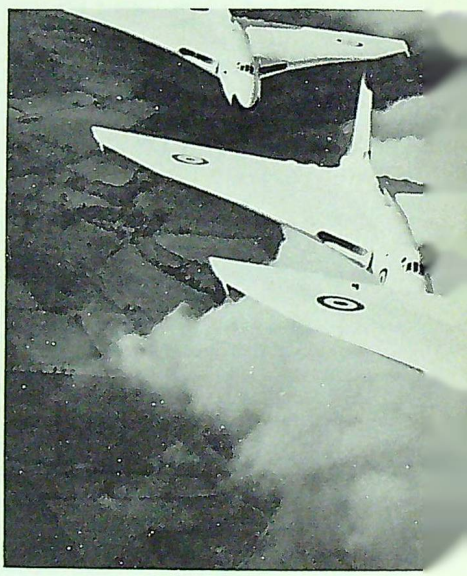
Ability to penetrate enemy defences and deliver the required weight of attack is not in itself sufficient. It is equally essential that the deterrent should be adequately protected from surprise attack on the ground. The responsibility for alerting the bases and defending the V-force is now the primary task of Fighter Command.

Fighter Command carries out this responsibility by means of several types of manned interceptors plus an inventory of missiles. The day fighter role is in the hands of the *Hawker Hunter*, while the allweather fighter role is handled by the *Gloster Javelin* and will soon be joined in that task by the *English Electric Lightning*. Squadrons of *Javelins* with re-heat engines, which give better operational ceiling and rate of climb are being introduced during the next few months. They will carry four De Havilland Firestreak missiles under the wings. The Firestreak is Britain's first operational air-to-air guided missile. When it is fired, an internal rocket boosts the missile to supersonic speed. A detector in Firestreak picks up the infra-red energy radiated from the target aircraft and uses the information to control the missile's flight. The Firestreak will also be an integral part of the *Lightning*'s weapons system. Unlike an aeroplane carrying guns and missiles, the supersonic *Lightning* has been designed as a complete weapons system. The radar fire control, flying aids, and the guided weapons have been developed side by side with the aircraft and tailored to fit its performance. Surface-to-air missiles are also part of Fighter Command's defence equipment. The first unit of Bristol Bloodhounds has been equipped; more stations are being formed and more advanced types of missiles are under development.

TRANSPORT COMMAND

Just as the value of a fire brigade depends upon the rapidity with which it can reach the fire, so speed is all-important in dealing with emergencies. Getting the R.A.F.'s "fire brigade" overseas in time to tackle an incident before it develops into a graver crisis is the main operational task of Transport Command.

To ensure that Transport Command can carry out this task with the maximum of despatch, new equipment is constantly being introduced. Now coming into service is the *Bristol Britannia*, which will replace the piston engine



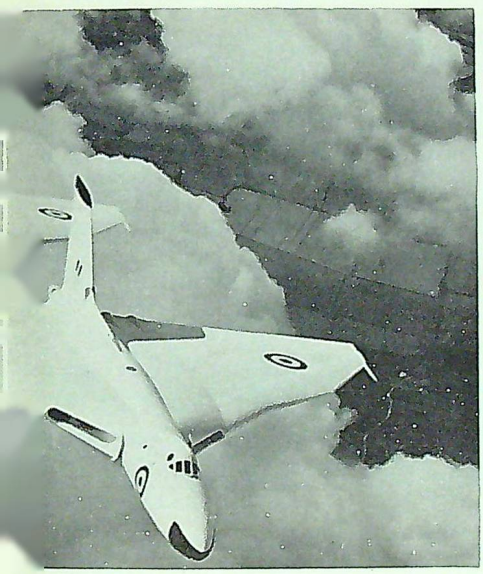
. . . Vulcan

Handley Page Hastings and supplement the *De Havilland Comets* on the long range transport of men and equipment. The *Britannia* has a maximum range of over 5,000 miles and the freight version can carry 15½ tons. Ninety-four fully armed troops or 70 paratroopers can be carried by the R.A.F. medium range heavy freighter, the *Blackburn Beverley*, which has a maximum take-off weight of 135,000 lbs. For the short range tactical airlift of troops

the *Bristol* 192 helicopter has been ordered. This helicopter can carry three tons of freight over a range of 50 miles. Orders have also been placed for a special strategic freighter, the *Britannic 3,* to move overseas in an emergency large and costly items of the latest equipment which it is too expensive or otherwise impracticable to stockpile overseas. A new medium range jet freighter, the A.W. 660 military version of the *Armstrong Whitworth Argosy*, has also been ordered. Suitable for carrying freight and personnel, including paratroops, the A.W. 660 has four Rolls Royce Dart engines and cruises in the region of 300 m.p.h.

COASTAL COMMAND

Coastal Command's long range



reconnaissance force is another Royal Air Force N.A.T.O. commitment. Squadrons in Coastal Command, equipped with *Avro Shackletons,* have made operational flights lasting more than 24 hours and covering over 4,000 miles. The *Shackleton,* powered by four Rolls Royce Griffon engines, was designed for long range anti-submarine and reconnaissance patrols in temperate and tropical climates. In addition to its coastal command work this aircraft is also equipped for air-sea rescue duties. These aircraft carry out numerous exercises in conjunction with the Royal Navy and, in co-operation with other air forces and navies, exercises in places as far apart as Nova Scotia and Ceylon. In emergency they possess a useful troop carrying capability and they have been successfully used for low level long range reconnaissance in the featureless territory of the Arabian Peninsula.

FLYING TRAINING COMMAND

Flying Training Command is responsible for the task of training future pilots, navigators and air electronics officers from the time of their entry into the service, through initial officer training on to basic and advanced aircrew training up to "wings" standard. This command also operates the R.A.F. College, the R.A.F. Flying College, the Central Navigation and Control School and the Central Flying School. An all-through jet training has been introduced but this method of instruction will be limited until the command starts receiving production jet *Provosts* in appreciable numbers.

After completing the course at Initial Training Schools student-navigators take a 49 week course at an Air Navigation School which includes approximately 200 flying hours. Air Electronics Officers go from I.T.S. to the Air Electronics School for a one-year training course before going on to an Operational Conversion Unit. A 20-week advanced signallers course is also given for N.C.O.s to provide experienced air signallers with advanced trade training and possible selection for a commission as A.E.O.s.

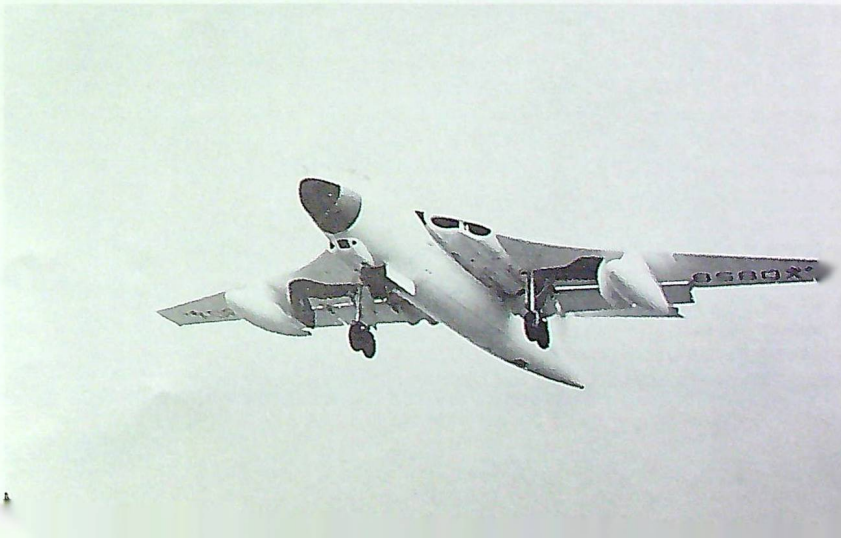
TECHNICAL TRAINING COMMAND

This command, which is one of the largest in the R.A.F., is responsible for the training of all service personnel with the exception of aircrew and cadets at R.A.F. College. The Command is comprised of three Groups and the R.A.F. Technical College. Each of the Groups is responsible for training in several fields. Recruit and administrative trade training, for instance, is the main task of No. 22 Group while technical training is the responsibility of No. 24 Group. The Technical College is established on lines similar to Cranwell for the training of technical cadets, and also undertakes the training of specialist officers in the fields of guided weapons, aircraft, radar and electronics.

MAINTENANCE COMMAND

Keeping the operational commands of the R.A.F. in a high state of technical and logistic efficiency is the responsibility of Maintenance Command. This Command is responsible for receiving, storing and issuing every item of equipment, from the aircraft and other industries, that the service uses. It also

. . . *Valiant*



controls the modification and preparation for issue of complete aircraft and other equipment and provides major technical assistance to other formations of the service which cannot deal with the work themselves. Maintenance Command includes large workshop and repair facilities and undertakes a very wide range of tasks from the repair of electronic equipment to the salvage of crashed aircraft.

MIDDLE EAST AIR FORCE

A large R.A.F. component which serves far removed from the U.K. is the Middle East Air Force. The role of this force includes the maintenance of internal security in British colonies and protected territories, the safeguarding of air and sea communications passing through the area, and the support of defence treaties to which the U.K. is committed.

In the Arabian Peninsula theatre the R.A.F. keeps adequate forces for immediate requirements and these can be reinforced from the U.K. in times of emergency. In Aden, a command which includes both Air Force and Army units and is headed by an R.A.F. commander, a fire brigade force has been assembled with a variety of aircraft for colonial policing operations. Backing up a tactical force of *Venoms* and *Meteors* are *Shackletons, Valettas* and *Pembrokes,* hard-working piston aircraft employed on numerous support roles.

FAR EAST AIR FORCE

Like other overseas components of the R.A.F. the Far East Air Force has been contracting for the last few years and its aircraft strength has been progressively reduced although without reducing its operational effectiveness. The F.E.A.F. still has bases, however, in such places as Hong Kong, North Borneo, Malaya, Singapore, and the Maldive Islands and has staging rights in the Philippines, Viet-Nam and Ceylon.

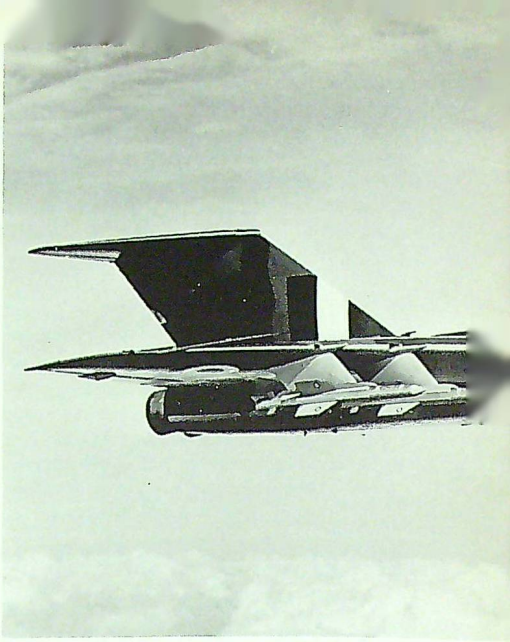
One of the principal tasks of the Far East Air Force is protecting the vital route from Australia to Europe. Other tasks for the F.E.A.F. are the safeguarding of British interests in the area, the contribution of operational units to S.E.A.T.O. and the Commonwealth Strategic Reserve. This component of the R.A.F. is a prime example of Commonwealth co-operation since it includes units from the R.A.F., R.A.A.F., R.N.Z.A.F. and the Malayan Air Force within its organization. The F.E.A.F. is organized on a tactical basis. It relies primarily on strategic mobility not only for local reinforcements to stations within the Command, but also for strengthening its resources from the U.K. in the event of such action as a limited war. With the arrival of a V-bomber force which would be provided in an emergency, the F.E.A.F. would have strategic nuclear capability.

The F.E.A.F. employs a wide variety of aircraft and was the last R.A.F. organization to use the venerable old *Sunderland* flying boat. For the past 10 years the Far East Air Force, including its commonwealth contingents, has been engaged in driving terrorists deeper into the Malayan jungle but this commitment is diminishing and air supply of troops in the jungle is now the principal role required of the Force.

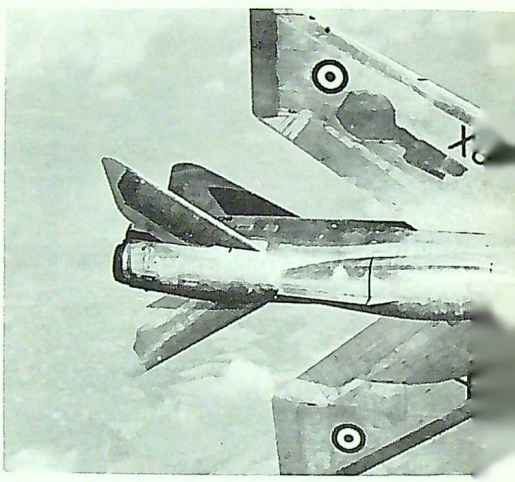
SECOND TACTICAL AIR FORCE

The Second Tactical Air Force, which is the British component of N.A.T.O.'s Second Allied Tactical Air Force, serves alongside Belgian, Dutch and German components. Until 1957 the Second Tactical Air Force was responsible for the entire defence of Northern Germany but this responsibility is being reduced as units of the Luftwaffe are sharing this commitment. The subsequent reduction in air strength involves almost the entire day fighter-ground attack element of the R.A.F. in Germany.

Second, T.A.F., however, retains the defence of specific installations and its all-weather fighter element of four squadrons which is being reinforced by the replacement of *Meteors* by *Javelins*. The strike and reconnaissance elements of the Second T.A.F. have also been untouched by the cuts. For these roles

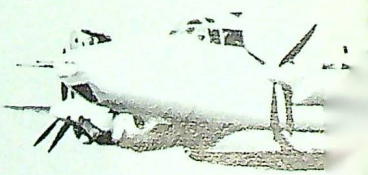


The Javelin handles the



Lightning with Firestreak missiles

The workhorse of Coastal Command,



all-weather fighter role.

the Avro Shackleton.

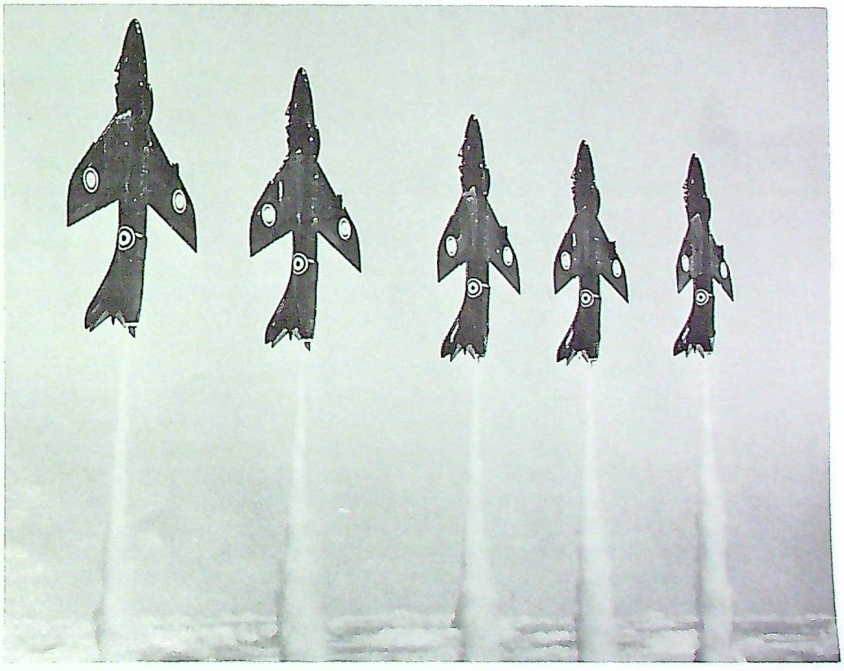
the Second T.A.F. is equipped with *Supermarine Swifts* and *English Electric Canberra* aircraft. The *Canberras* have had nuclear capabilities added to their conventional armament and, in keeping with their wider responsibilities, have been redesignated as Light Bomber Intruder aircraft. The Second T.A.F. streamlined for survival in the nuclear age, remains a powerful striking force in Northern Germany.

THE PRESENT AND THE FUTURE

In presenting the 1959 Air Estimates to the House of Commons, the Rt. Hon. George Ward, United Kingdom Secretary of State for Air, summed up the present state of the Royal Air Force and gave a glimpse into the future. He said, "In Bomber Command we have an effective deterrent ready for action. In Fighter Command we have day and all-weather squadrons capable of defending the deterrent bases against attack by manned aircraft which is still the main threat. In Transport Command we have nearly doubled our lift since 1951. In Coastal Command we have a versatile anti-submarine force equipped with aircraft as good as any in service in N.A.T.O. maritime forces today. Overseas the Royal Air Force is operating from dozens of bases with 15 types of aircraft, ranging from the Pioneer to the V-bomber.

"By 1963 we shall achieve an all-regular uniformed force of 135,000. A smaller all-regular air force must have the best possible equipment, and squadrons trained for instant action. The Royal Air Force carries out a great variety of tasks all over the world. It is clear that these tasks will continue and that aircraft will be the best means of fulfilling the vast majority of them. The recent decisions to order three new types of aircraft for the R.A.F. should be convincing proof of this. But, let us not forget that the efficiency of all these forces depends basically on the qualities of the officers and men to fly and support them. They have always served the R.A.F. wonderfully in the past. I have every confidence that they will maintain their great tradition."

The Hawker Hunter, day fighter.



The pilgrimage of United Kingdom relatives to Ottawa for the unveiling by the Queen of the Ottawa Memorial on July 1st was in two groups. The photo on the left shows Air Cdre. J. G. Stephenson greeting those who arrived in the city by train on June 26th. The air party (right) arrived on June 29th. The welcoming party included Sir Saville Garner, High Commissioner for the United Kingdom in Canada; A/V/M J. G. Kerr, Air Member for Personnel, and Mrs. Kerr; and A/V/M T. A. Lawrence, President of 410 Ottawa Wing. The centre photo was taken during one of the sight-seeing tours arranged for the visitors.

R.C.A.F. ASSOCIATION

BONDS between the Royal Air Forces Association and the R.C.A.F. Association were further strengthened this summer with the unveiling by Her Majesty Queen Elizabeth of the Ottawa Memorial. Through the co-operative efforts of the two Associations more than 50 United Kingdom relatives of airmen commemorated attended the unveiling ceremony and the service of dedication.

The memorial was erected by the Imperial War Graves Commission and bears the inscription:

> "In honoured memory of the men and women of the Air Forces of the British Commonwealth and Empire who gave their lives in Canada, in the United States of America and in neighbouring lands and seas and who have no known grave."

The pilgrimage was organized by the R.A.F. Association which arranged transportation of the 53 persons in two groups, one by sea and the other by air. Accommodation arrangements in Ottawa were made by the National Office of the R.C.A.F. Association and No. 410 Ottawa Wing. In addition, the "Bon Voyage" Committee on the three Montreal Wings met the boat on which the sea party arrived and the aircraft which carried the second group across the Atlantic. The assistance given the pilgrims and the hospitality they received in Montreal made their entry into Canada a pleasant event. They spoke frequently of their surprise and delight in being given this friendly reception.

The first group of 27 arrived in Ottawa on 26 June. During their twelve day stay they were shown many of the points of interest in Ottawa and vicinity and entertained at a number of social events. The air party spent only three days in the Capital but the nature of the hospitality shown them as guests of members of No. 410 Wing was such that they returned home with a wonderful impression of their hosts and of Canada. Twenty-two members of this group were guests at the homes of Wing members who arranged a wide variety of activity for them and in addition a scenic bus tour and a picnic was provided by the Wing members and their ladies.

The United Kingdom relatives and Canadian relatives in Ottawa for the unveiling were guests of the Chief of the Air Staff, Air Marshal Hugh Campbell, the members of the Air Council and the officers of Air Force Headquarters at a reception at R.C.A.F. Station Rockcliffe on the evening of 29 June. The following day the U.K. pilgrims visited the House of Commons and with Association President Air Marshal W. A. Curtis and Secretary Mr. Jack Gray, were guests of the Honourable Roland Michener, Speaker of the House of Commons, and Mrs. Michener for tea in the Speaker's Chambers. The High Commissioner for the United Kingdom in Canada, Sir Saville Garner,

was host to the sea party on 3 July at Earnscliffe, the High Commissioner's residence.

The leader of the pilgrimage was Air Chief Marshal Sir John Baker with Mr. George Roper, Senior Welfare Officer, R.A.F. Association, in charge of administration.

At the unveiling ceremony the R.C.A.F. Association was officially represented by Air Marshal Curtis who placed a wreath at the memorial. National Executive Council members in attendance were immediate Past President Air Vice-Marshal F. G. Wait; Legal Representative Mr. G. A. Ault, Q.C.; Vice-Chairman Group Captain S. Sznuk; Saskatchewan Group President Miss Marion Graham, and W.D. Representative (Central) Miss Ethel Henderson. The Association standard, displayed throughout the ceremony, was carried by Flt. Lt. (ret.) M. E. Ferguson, a former Executive Assistant at the Association's National office. His successor, Flt. Lt. R. Rowlands, was the commentator during the ceremony.

The R.C.A.F. Association extends thanks to the R.C.A.F. officers and airmen whose assistance in the reception of the pilgrimage was greatly appreciated and to all others who helped provide the opportunity for next-of-kin to pay tribute in person to their loved ones.

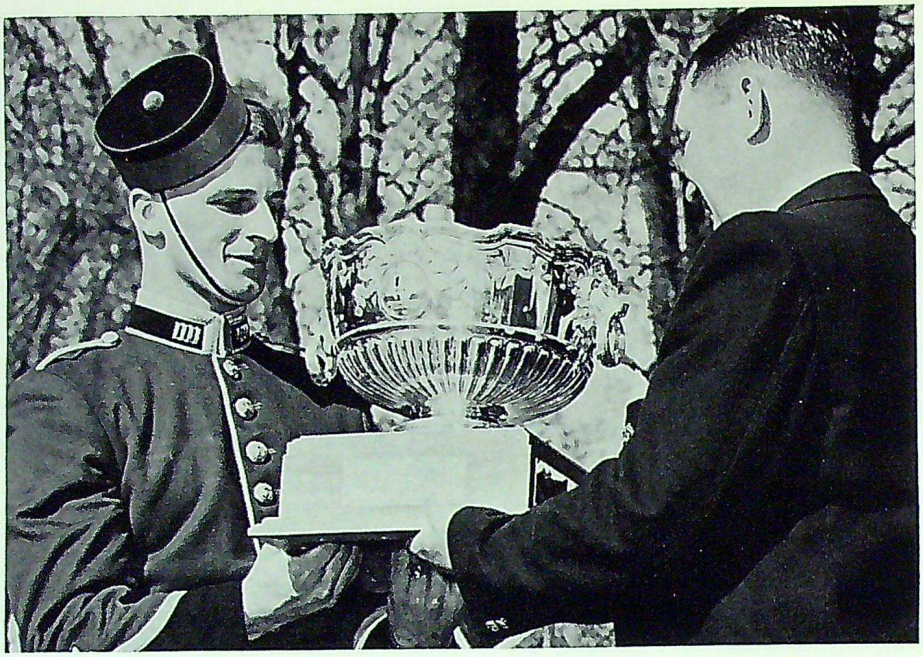
This section of THE ROUNDEL is prepared by R.C.A.F. Association Headquarters, 424 Metcalfe St., Ottawa, Ont.

In publishing the names of the National Executive Council in the last issue of THE ROUNDEL the name of the immediate past president Air Vice-Marshal F. G. Wait was inadvertently omitted. We apologize for this error.

The Queen in Ottawa

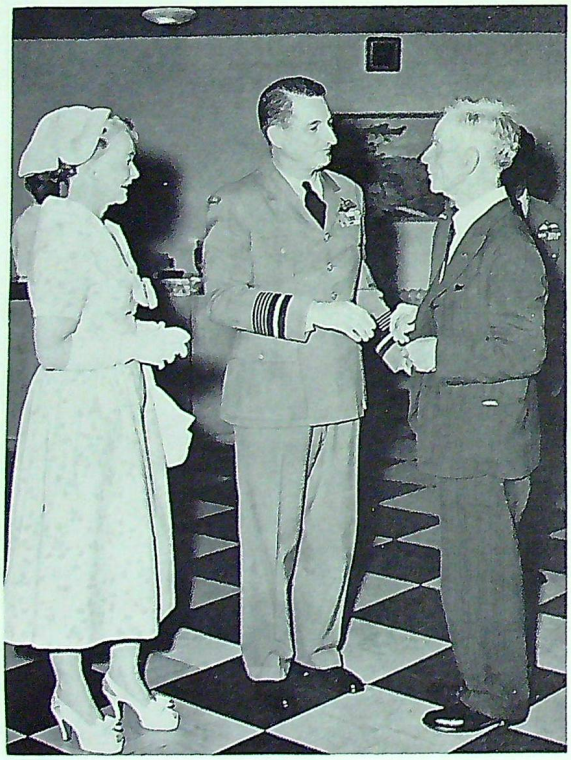
On Dominion Day 1959 Her Majesty the Queen and His Royal Highness the Duke of Edinburgh took part in an impressive ceremony in Ottawa. Before a crowd of several thousand, including a number of persons who had flown to Canada from the U.K. for the occasion, Her Majesty unveiled the Commonwealth Air Force Memorial commemorating by name 798 men and women who died in Canada, the United States and neighbouring lands and water during the Second World War and who have no known graves.

Her Majesty The Queen and Mr. C. B. Fuller, Secretary General of the Canadian Agency of the Imperial War Graves Commission, at the Commonwealth Air Force Memorial.



Mr. A. Cooper presents the R.C.A.F. Association Harold Feldman Memorial Trophy to Cadet Sqdn. Ldr. J. D. L'Homme. The trophy is presented by No. 306 (Maple Leaf) Wing, to the outstanding squadron in sports at College Militaire Royal de St. Jean.

Air Marshal Hugh Campbell and Mrs. Campbell receive Mr. F. Gamble, Bedworth, Warwickshire, England, at the reception at Rockcliffe.



The R.A.F. Association official who conducted the sea party to Ottawa, Mr. James Preston and Mrs. Preston, are shown on their arrival at Union Station with the R.C.A.F.'s Chief of Personnel Services Air Cdre. J. G. Stephenson, and R.C.A.F. Association Secretary J. C. Gray

COMOX - Garden Spot of the Service

BY FLIGHT LIEUTENANT T. H. COLLINS,

Staff Officer Public Relations, 5 Air Div. HQ.

Totem at right hooks at nearby Courtenay.

MARRY up a maritime squadron with a fighter unit, locate them in a beautiful valley between the mountains and the sea, and the resultant family is characterized by an esprit-de-corps unexcelled in the R.C.A.F. today.

This situation exists at Comox, on Vancouver Island, B.C., site of the most westerly R.C.A.F. flying station in Canada. Here *Neptunes* of 407 (Maritime Patrol) Squadron operate from the same runways as CF-100s of 409 (All Weather Fighter) Squadron. With the close liaison between the maritime squadron and the R.C.N. at Esquimalt, it's a common occurrence to have a navy aircraft clearing with the tower or asking for ground controlled approach assistance.

Comox was officially constituted an R.C.A.F. aerodrome on 1 May 1943. Development of the airfield was still in progress but the building of runways, barracks, offices, and other station accommodation had reached a point where the R.C.A.F. was able to make some use of the field. To provide servicing facilities for visiting aircraft, receive equipment, and establish fire prevention and security measures, a small detachment was posted there during the summer.

In September 1943 a flying control unit from No. 32 Operational Training Unit (R.A.F.) at Patricia Bay was set up at Comox to provide contact with aircraft during their training flights. There were frequent visits from these aircraft as well as other Canadian and American machines flying up and down the coast. In addition to this local and coastwise traffic, there were visits from aircraft providing air co-operation for an Army Com-

bined Operations School in the vicinity.

Meanwhile, construction continued. As buildings were completed more R.C.A.F. personnel moved in, the strength of the station rising from two officers and 21 airmen (not including attached personnel) at the end of November 1943, to four officers and 63 airmen at the end of April 1944.

On 15 May 1944 an advance party from No. 32 O.T.U. moved from Patricia Bay to Comox, followed by the main party 11 days later. The O.T.U. had originally been formed in England, coming out to Canada in the summer of 1941. For over two years it had been operating at Patricia Bay, training transport crews on *Expeditors* and *Dakotas*. The increase of flying activities at Patricia Bay had resulted in so much congestion, however, that it was decided to move the O.T.U. to Comox as a relief measure.

After the O.T.U. was settled at Comox it was converted, on 1 June 1944, from an R.A.F. to an R.C.A.F. unit under the designation No. 6 O.T.U. Group Captain P. H. Maxwell, A.F.C. (R.A.F.), who had been commanding officer of No. 32, remained in command of No. 6 until 27 April 1945 when he was succeeded by Group Capt. D. C. S. MacDonald, D.F.C. (R.C.A.F.).

The arrival of the O.T.U. increased the station population to 1,250 staff and 200 trainees. Courses for transport crews (pilot, co-pilot, navigator, and wireless operator—air gunner) continued at Comox until 15 January 1946 when No. 6 O.T.U. was moved across Canada to R.C.A.F. Station Greenwood, N.S. At the time of the move the strength of the unit was about 1,020 staff and 175 trainees. Comox was then placed on a care and maintenance basis.

REACTIVATION

More than six years passed before R.C.A.F. Station Comox was reactivated, effective 1 June 1952. New construction and rehabilitation of existing buildings got underway and for months many sections operated in temporary, makeshift accommodation.

Squadron Leader E. R. Wilson assumed temporary command of the station on 9 June 1952 pending the arrival of Wing Commander C. W. McNeill. Intake of personnel and material was heavy during that summer. The biggest problem at first was the procurement of publications, stores and equipment of all kinds. The supply section was certainly one of the busiest on the station and everyone worked overtime to put his own shop in order as quickly as possible.

On 1 July 1952 No. 407 Squadron was formed at Comox under the temporary command of Sqn. Ldr. J. F. Drake. On 15 September 1952 Group Capt. G. S. Austin took over command of the station and Wing Cdr. McNeill became Officer Commanding 407 Squadron. Rehabilitation and construction continued under the direction of 2 C.M.U. Detachment. New building projects included a PMQ area, two hangars, a control tower and extension of runways to accommodate jet aircraft.

On 1 November 1954, No. 409 Squadron and No. 51 A.C. & W. Squadron were activated under the command of Sqn. Ldr. F. E. Haley and Flt. Lt. S. W. Nichols, respectively. Thus Comox assumed its dual role of air defence plus maritime patrol. Five months previously Group Capt. Austin had been succeeded as station commander by Group Capt. R. C. Weston. Group Capt. Weston handed over to Group Capt. R. F. Miller, A.F.C., in February 1958.

MARITIME OPS

While 407 Maritime Squadron is only a lodger unit on an Air Defence Command station, it has the distinction of being the first unit to fly operationally from R.C.A.F. Station Comox in the post-war years. Its *Lancasters* first wheeled onto the runway in July 1952. Recently 407 Squadron has increased its operational efficiency with the arrival of *Neptune* reconnaissance aircraft to replace the Second World War *Lancasters*.

Working with its own squadron maintenance, 407 boasts of its high serviceability record. This was proven on the transfer of Group Capt. Weston last year.

The C.O.'s departure date arrived and he boarded the waiting *Expeditor* for his trip to Vancouver, about 100 miles away. Under grey drizzly skies, the aircraft was ordered to hold by the tower until the *Lancasters* had taken off. It was 407's final tribute to him. The C.O.'s aircraft held at the intersection while every *Lanc* operated by the maritime squadron wheeled onto the runway in a Second World War bomber take-off pattern. Half way to Vancouver the *Expeditor* was "intercepted" between cloud layers by a formation of 409's CF-100s. The jet jockeys were certainly not going to let their friendly rivals in the

McKenzie Lake on Forbidden Plateau is one of many beauty spots on Vancouver Island within easy access of R.C.A.F. Station Comox.

(B.C. Govt. Photo)

Lancs outdo them in the farewell department.

In its operational role of an anti-submarine patrol squadron the maritime unit works closely with the R.C.N. Exercises are continually being carried out either in the Straits of Juan de Fuca or in the open Pacific Ocean. Good-natured rivalry exists between the two forces, both during exercises and in personal contact.

While the Royal Canadian Navy in Victoria is well aware of the separate identity of the maritime squadron, members of the United States Navy in San Diego are sometimes doubtful.

Following a combined R.C.A.F.-U.S. Navy exercise held recently off the coast of California, a social gathering was held for the visiting maritime squadron. Outside the entrance to the building was a sign welcoming the Canadian "Navy" to the affair. The matter was soon straightened out by 407 aircrews who hastily constructed an appropriate R.C.A.F. sign.

After the Canadians had returned to Comox, 407's C.O. received from the C.O. of Navy Fleet Air Wing in San Diego a message that is one of the squadron's most prized possessions. It ably expresses the operational efficiency of the maritime squadrons.

"Your Maritime Patrol Demons* set a new record for resourcefulness on station, task time, number of contact kills. Wing Commander "Buzz" Foster and squadron were used where utmost skill and training were necessary.

"Their superb finished performance was responsible for a major number of detection opportunities. No aborts, no lates and after four days continuous operation, all aircraft were up.

"We want your gang on our side in any melee. Well done indeed."

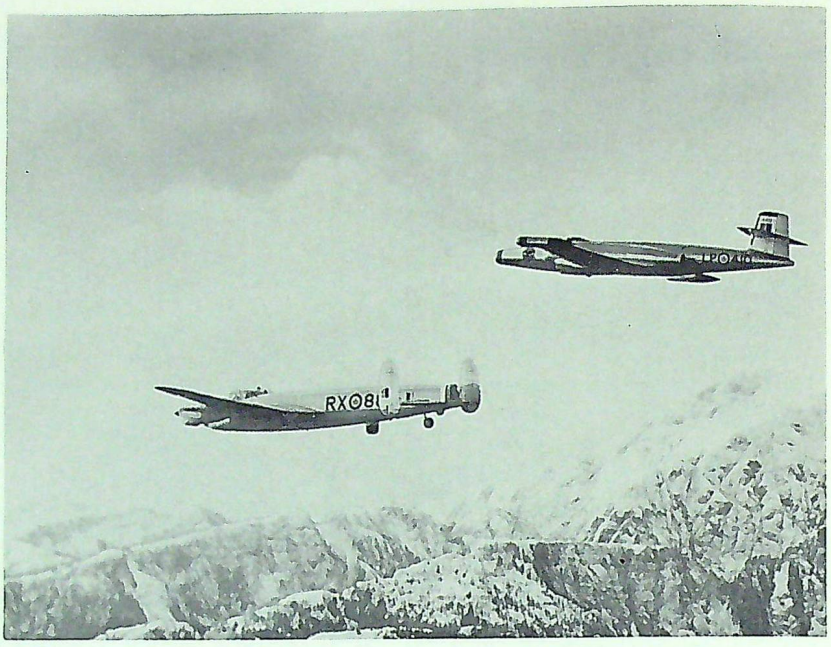
*407's nickname. During the Second World War it was also a maritime squadron in Coastal Command.

ALL-WEATHER FIGHTERS

Flying CF-100s from Comox is No. 409 (AWF) Squadron, which during the Second World War adopted the nighthawk as its symbol. The wartime night fighter unit's motto, "Media Nox Meridies Noster" (Midnight Is Our Noon), is still appropriate today as 409 aircrews are on 24-hour standby and can be airborne in a matter of minutes.

This state of alertness is rigidly

Tower controller Flying Officer H. Gold.



After an interception exercise, Lancaster and CF-100 both head for the same home base—Comox.

maintained. Standby crews sleep and eat in the readiness hangar while waiting for a scramble to intercept an unidentified blip on the radar scopes of American or Canadian-manned warning and control squadrons in the west coast area. Comox is located directly under the main airway from the U.S.A. to its 49th state, Alaska, and to the Orient which means plenty of business for the jet crews.

These present-day nighthawks have an impressive record to live up to. Their wartime predecessors, flying *Defiant, Beaufighter* and *Mosquito* aircraft, racked up this score during four years of operation: 67 enemy aircraft destroyed, seven probables, 24 damaged, plus 12 flying bombs and several locomotives and ground vehicles destroyed. No. 409 was disbanded following the close of hostilities and was reactivated at Comox in November 1954. Its first T-33 *Silver Star* arrived in December, followed two months later by the first CF-100 *Canuck*.

SEARCH AND RESCUE

The two squadrons at Comox work closely with the search and rescue organization in rugged British Columbia. Comox-based facilities are often called upon by the Vancouver Rescue Co-ordination Centre to search for a missing aircraft, assist boats in distress or help in finding lost hunters.

It was a CF-100 from 409 Squadron that started the aerial hunt for the missing civilian airliner with 52 persons aboard that disappeared on a flight from Vancouver to eastern Canada one stormy night three years ago. The jet covered the route taken by the airliner in an unsuccessful attempt to spot possible fires from the air. The aircraft was found months later but all aboard had perished.

Comox had a land search team available for emergencies that might occur in the dense bush country covering the terrain west of the station. Besides being available for rescue operations this group also specializes in training aircrews in survival techniques peculiar to the west coast.

Lancasters and *Neptunes* from 407 Squadron have flown hundreds of hours during sea and land searches for missing aircraft or boats. Their long range makes them especially adaptable to this type of work.

During the past few years overseas air traffic to the Far East has increased tremendously. A large volume of this traffic passes through an area west of British Columbia extending more than 600 miles to sea. It is not unusual for an airliner in difficulty to radio for an escort, and this request is funnelled through the Vancouver R.C.C. If considered necessary, a CF-100 or *Neptune* will be vectored on the airliner by radar and the aircraft escorted to safety.

MARINE GUARD

Direct telephone communication between the Vancouver R.C.C. and Comox is maintained through the control tower. Not all emergencies call for aircraft assistance and often the distress involves a sinking boat. This usually occurs during a storm and at night, but regardless of the circumstances, crews at the marine section are on call 24 hours a day to put to sea in

their 40-foot, twin diesel rescue launch.

Such work calls for airmen who have a thorough knowledge of the coast and are experienced seamen. Although the rescue launches are sturdy craft, searching in a howling gale and heavy seas can tax an airman's endurance to the limit.

Prime responsibility of the marine section, which has its headquarters and docking facilities at the village of Comox, is to patrol the bombing range and protect shipping from entering the area when the squadrons are either practicing with bombs or rockets.

FLYING CONTROL

To handle the traffic operating out of Station Comox, a modern control tower was constructed recently on the east side of the airfield overlooking the Strait of Georgia. Monitoring 14 frequencies, the tower operates 24 hours a day. Besides the two squadrons, the Comox Flying Club, Pacific Western Airlines and other visiting R.C.A.F. aircraft operate from the field.

Traffic handled by the tower normally averages about 2,300 landings and take-offs a month. Another flying control facility is a GCA (Ground Controlled Approach) system—its prime role being the recovering of fighter aircraft that operate in all weather. This radar unit handles between 300 and 400 runs a month.

No. 121 Communications and Rescue Flight, based at R.C.A.F. Station Sea Island, operates a sked run from Vancouver to Comox to R.C.A.F. Station Holberg on the northern tip of Vancouver Island. Carrying freight and personnel, No. 121 aircraft make the round trip three times a week.

Comox personnel enjoy one of the finest climates available to Canadians. It is possible to play on one of the two nearby golf courses all year and salt water sports fishing—no licence required —is available any time.

Surrounded on three sides by the Strait of Georgia, the angler is next door to one of the best salmon fishing areas in the world. And for light spinning tackle, trout are available in streams only a few miles from the station. This is a favorite pastime with some members on the base and, indeed, can sometimes be profitable in an unusual manner.

One sergeant photographer decided to try his luck near the bridge that crosses the Oyster River on the highway a few miles north of the air base. After numerous unsuccessful casts, and already short three lures, he snagged bottom. Annoyed at the earlier loss of his lures, he was determined not to lose another, so he rolled up his trousers and waded to the end of his line. It was hooked to an old gunny sack which he carefully loosened from the bottom and carried ashore from the ice-cold water.

It was probably the finest catch the sergeant had ever made. Attached to the gunny sack were 13 lures—all in good condition—lost by other unsuspecting fishermen.

COMMUNITY LIFE

Visitors to the station usually take it for granted that the largest nearby town is Comox. This is a false impression, as Comox is a relatively small community of about 1,700 persons while Courtenay, located seven miles from Station Comox, is a thriving town with a population of about 4,000. The Comox Valley, which includes the area around Courtenay and Comox, has a total population of more than 15,000 persons. Agriculture, logging and coal mining are the basic industries with the tourist trade fast becoming a main source of revenue.

Their proximity to the sea has a habit of stirring the dormant, nautical blood in a great number of air force personnel transferred to Comox. A well organized hobby shop is a bee-hive of operation on the station and it caters exclusively to amateur boat builders. The latest victim to bow gracefully to the call of the sea was the commanding officer, Group Capt. Miller, who this summer launched his own cruiser capable of sleeping four passengers.

Group Captain R. F. Miller, A.F.C., Station C.O.

Wing Cdr. W. D. Foster, D.F.C., C.O. No. 407 Sqn.

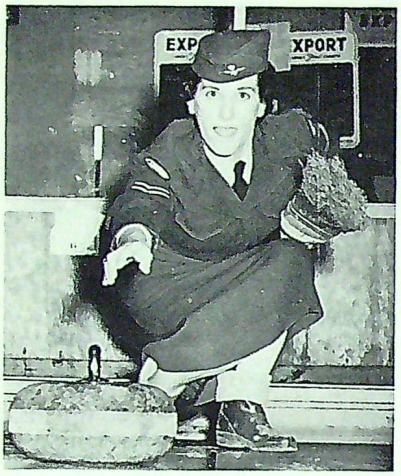
Wing Cdr. H. E. Bridges, D.F.C., C.O. No. 409 Sqn.

With more than 2,500 servicemen and their dependents stationed at Comox—plus civilian employees —adequate housing facilities are always a problem. Some families live in Comox or Courtenay and many servicemen rent summer cottages at the nearby resort areas; however, the supply of PMQs is slowly increasing.

In 1953 about 200 single and duplex apartment units were completed and an eight-room elementary school was built. In September 1954, the PMQ area was officially named Wallace Gardens, in honour of The Honourable Clarence Wallace, Lieutenant Governor of British Columbia at that time. On the same day the Archbishop of Canterbury dedicated three stained glass windows for the Protestant Chapel. The windows were given by Mr. Wallace in memory of his son, Flying Officer C. A. Wallace, who was killed in action in 1941.

Additional housing facilities were made available to station personnel in 1956 with the opening of 50 duplex (100 homes), limited-dividend houses in Tyee Park near the village of Comox. A further 100 homes are under construction at Wallace Gardens.

Aircrews at Station Comox are not the only persons interested in flying. The station is probably unique in the R.C.A.F. in that both the Protestant and Roman Catholic padres are ardent flyers. Both religious denominations enjoy an active church membership and both choirs are often guests for Sunday services in churches in Comox and Courtenay.



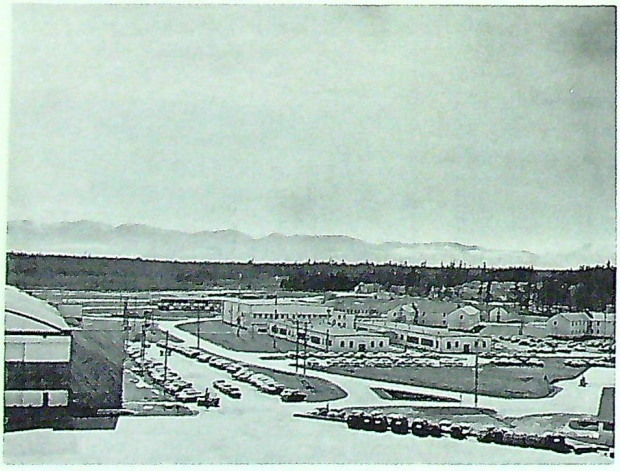
Curling is a popular Comox sport. Cpl. Margaret Park figures it's all in the way you hold your tongue.

Largest city on Vancouver Island is Victoria, the capital of British Columbia. Located on the southern tip of the island it is easily accessible by rail or road from Comox. The 120-mile route to Victoria passes through the "Hub" city of Nanaimo, and over the famed Malahat drive on the Island Highway.

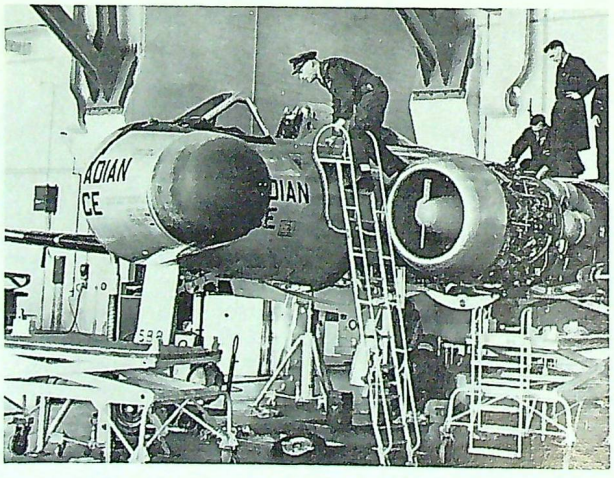
The trip to the mainland can be made by air directly from Station Comox or by car or bus to Nanaimo and then by ferry to Vancouver. The steamer trip takes less than three hours.

Station Comox might well be called the "garden spot" of the R.C.A.F. Certainly its setting between the mountains and the sea plus its year-round moderate climate, gives it one of the most attractive natural locations of any station in the service.

Portion of Station Comox layout: hangar line on left, station headquarters in centre, barracks on right.



Inquisitive CF-100 gazes around maintenance hangar while in for inspection



The R.C.A.F. Benevolent Fund

The Royal Canadian Air Force Benevolent Fund was established in order to assist serv and former members of the R.C.A.F. and their dependents in time of financial distr

SERVING PERSONNEL can obtain full information from their units' Orderly Roon FORMER MEMBERS can obtain it from:

- The local Benevolent Fund Committee.*
- Any Wing of the R.C.A.F. Association.
- Any District Office of D.V.A.
- Royal Canadian Air Force Benevolent Fund (Inc.), 424 Metcalfe St., Ottawa, Ont.

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*This address is obtainable from any of the other three sources.

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