



ROUNDEL

VOL. 15, No. 1

JAN.-FEB. 1963

ROUNDEL is published ten times each year. Views expressed are those of the writers and do not necessarily reflect official Royal Canadian Air Force opinion or policy.

Annual subscription rate is \$2.00 in Canada, USA and Mexico; \$3.25 elsewhere. Individual subscriptions, made payable to the Receiver General of Canada, should be sent to the Queen's Printer, Ottawa, Ont.

RCAF Association members, who receive ROUNDEL by virtue of such membership, should forward address changes and material for their section of the magazine to Ass'n Hdqts., 424 Metcalfe St., Ottawa, Ont.

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ROUNDEL

Published on the authority of
the Chief of the Air Staff, Royal Canadian Air Force

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COVER CAPTION

Shot by Cpl. Bill Whitehead over Niagara Falls, the Yukon has ranged around the world on transport assignments during its first year of RCAF operations (see pgs. 16-17).

page

ARTICLES

Below the Sun	2
Operation Man on the Moon	6
Pilot Training — 1965	12
Canada's First Air Training Plan — Part Three	18
Scouting in the Air Division	24
Canada's First Military Aircraft	26

PICTURE STORY

Operation Rotation	16
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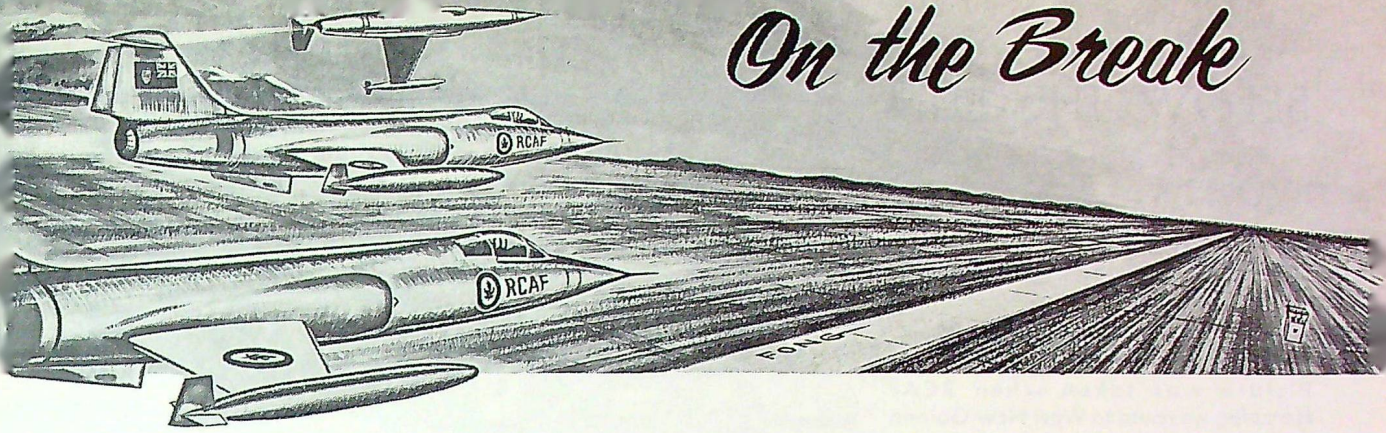
FEATURETTES

General Norstad Bids Adieu to NATO	5
Scale Model Collection	27
Theological Thermionics	28
Parachuting Record	29

DEPARTMENTS

On the Break	1
The Suggestion Box	29
Letters to the Editor	32
Aircraft Album	inside back cover

On the Break



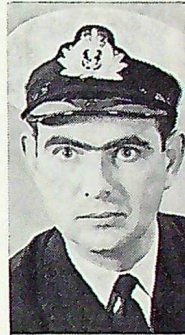
MAGAZINES, like humans, must have their own developing individualities by the time they've reached their mid-teens. Otherwise, they'd be pretty dull and in grave danger of being put prematurely on the shelf. Thus *ROUNDEL* enters its 15th year in new attire and with all the confidence of its human contemporaries that this will be its best year yet.

We think this month's table of contents offers a fair sample of what's in store for readers: a look at current RCAF operations around the globe, a glimpse or two into the future, and — just to keep the proper perspective — penetrating glances at our service's history. Balance, as you 5BX and XBX students know, is the key to a well-rounded personality.

THERE wasn't much time for "making like tourists" on the pre-Christmas *Hercules* flight which took equipment, supplies and mail to Canadian armed forces in New Guinea and South Viet Nam. Nevertheless, S/L Russ Bowdery used his camera and pencil to good advantage en route (see page 2).

It was a typical Air Transport Command operation, the kind that ATC's chief public relations officer Bowdery loves to publicize. For him it was a quick trip back to familiar territory — during World War II S/L Bowdery flew *Liberators* in the Far Eastern theatre of operations.

SPACE program changes occur so often these days that the author of our intriguing story on page 6 is keeping his fingers crossed that it won't be out of date before publication. Lt. Cdr. Ray Ross, our first navy by-liner, has himself changed jobs since "Operation Man on the Moon" was written. In December he was transferred from the Joint Staff's directorate of strategic studies



Lt. Cdr. Ross

Calif., preceded his Ottawa appointment in 1960.

OUR second "look into the future" this month comes from W/C Jim Diack, whose last *ROUNDEL* contribution (entitled "New Era in Air Transport") appeared exactly three years ago. Since monitoring production of the *Argus* and *Yukon*, he's been closely associated with the development of the RCAF's newest aircraft, the *Tutor* jet trainer (see page 12).

The author is currently a staff officer in AFHQ's directorate of aircraft engineering. A graduate in engineering physics (aeronautics) from the University of Toronto and a Master of Science in jet propulsion from the California Institute of Technology, W/C Diack has been in the RCAF since 1943. He has served in quality control organizations, aero-engine officers' school, and maintenance activities at RCAF Stations Claresholm and Namao.



S/L Bowdery



W/C Diack

At Paton 5/12
Editor

BELOW THE SUN

Photos and story by SQUADRON LEADER R. M. L. BOWDERY
Air Transport Command SOPR

Midway Island "gooney birds" (Pacific albatross) begin a courting dance. Picture was taken when RCAF *Hercules*, en route to West New Guinea and South Viet Nam, stopped at Midway for crew rest and refuelling.



Members of No. 116 ATU at Biak: (kneeling, l. to r.) F/L F. B. Stover, F/L A. E. Richards, F/L R. A. Bell; (standing, l. to r.) Sgt. R. Lovejoy, LAC D. J. Bauer, Cpl. H. R. Wright, LAC R. K. Coffey, LAC D. P. MacDonald, LAC R. S. Nickerson, Cpl. L. Zadworny.

Just south of the Equator, in far eastern waters, a small island basks under a tropical sun. Biak, West New Guinea, is "home" to the officers and men of the RCAF's No. 116 Air Transport Unit.

Last summer, in response to a request from the United Nations, the Canadian government agreed to send to New Guinea a pair of amphibious *Otter* aircraft and the men to fly and maintain them. The

two *Otter* aircraft and the majority of the personnel attached to No. 116 ATU were airlifted to Biak aboard two *Hercules* transports of No. 435 Sqn. The aircraft departed Trenton in the early morning hours of 30 August, and arrived at Biak in a torrential, tropical downpour some three days later.

Flight Lieutenant A. E. Richards is officer commanding No. 116 ATU. He has two other pilots working

with him, F/L R. A. Bell and F/L F. B. Stover. Senior member of the eight-man maintenance crew is Sgt. R. Lovejoy.

Wing Commander R. G. Herbert, DFC, holds the position of air advisor on the staff of the Commander, United Nations Force, New Guinea, with headquarters at Hollandia, West New Guinea. In addition to the Canadians, the international force consists of 1000 Pakistanis,

and a detachment drawn from the UN emergency force in the Congo, made up of Swedish, Indian, Irish, Brazilian and Nigerian personnel.

In accordance with an agreement between the Indonesian and Netherlands governments, a UN temporary executive authority will assume administrative responsibility for the territory. Later, this authority will be transferred to the Indonesian government. Sometime prior to 1969, the inhabitants of West New Guinea will have an opportunity to select their future administrative control, i.e., whether to remain with Indonesia or to become a totally independent nation. This act of self-determination will be under United Nations scrutiny.

The RCAF *Otter* force is being used by the UN staffs in New Guinea as a reconnaissance and air transport unit, primarily in the coastal areas of the territory.

The island of New Guinea, of which West New Guinea comprises the western portion, is located im-

mediately to the north of Australia, is about 1,500 miles long and 500 miles wide, with a total area of 306,000 square miles (over 150,000 of which makes up West New Guinea). Population estimates run as high as 700,000. New Guinean topography presents a study in contrasts, with some of the most extensive swamps in the world overshadowed by mountains (Mt. Carstensz, 16,536 ft; Mt. Wilhelmina, 15,585 ft) that rise to a sufficient height to maintain glaciers a scant 350 miles from the Equator.

Operations with the *Otter* aircraft include flying across inhospitable jungle and swamps to the various landing strips, to similar trips to lagoons near the various settlements along the coast.

Sergeant Lovejoy, when queried about his tropical sojourn, said, "You ask what is New Guinea like? To start with, the ocean is crystal clear and beautifully blue. Swimming in the hot, salty water is our main recreation. The country is real storybook jungle, with tall, green



Mokmer Air Base on Biak Island, West New Guinea, is "home" for No. 116 ATU.

F/L H. R. Glenn, No. 435 Sqn. *Hercules* captain, visits natives in village on Biak.



F/O R. K. Bryden examines New Guinean handicrafts during brief pre-Christmas stop at Mokmer.



trees pushing their lush growth towards the lowering rain-laden clouds. On a typical flight out of Biak, the *Otter* takes off and struggles upward through the hot, humid air — destination is Monokwari on the Main Island. Within three hours Monokwari comes in sight and we land.

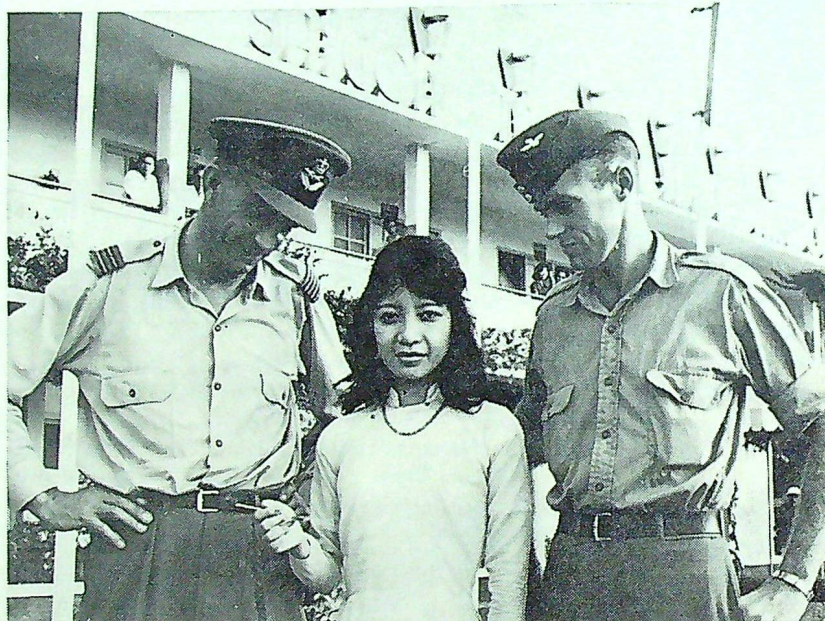
“The *Otter* bumps along the rough coral strip, bounces into the air and labours out across the steaming jungle to the sea. Here, along the shore, a few huts mark a small native settlement. Later, we come down to a noisy landing on a wartime strip of steel matting. Pau Puans slip quietly out of the jungle and watch with fascination — one of them tries to smoke a proffered cigar, still in its sanitary cellophane wrapper. Close to the end of a long day, we continue on our way through a tropical cloudburst. The torrential rain neither cools the air nor lowers our dangerously high cylinder-head temperatures. The aircraft approaches Jefrons strip, where silent skeletons of rusted aircraft dot the jungle and lie in the clear waters of a nearby lagoon. Our day is finished, and by 1900 hrs. the sudden darkness of the tropics draws a black curtain over the day.

“Next morning we return, passing our stops of yesterday, and by late afternoon we are circling Biak. It seems strange to hear over the intercom, ‘Well, here’s home . . .’”

★ ★ ★

The pre-Christmas resupply mission to the Far East was headed by W/C E. E. Hurlbut, o/c of No. 435 Sqn. From Trenton the *Hercules*, with its 13½-ton payload, flew to home-base Namao where ground-crew gave it a thorough inspection; then to Elmendorf, Alaska, where the crew rested following an 18-hour workday.

Next morning they were off, via Cold Bay for refuelling, to Midway Island — encountering winds aloft up to 160 knots. After a 12-hour



F/L W. J. Simpson and LAC G. W. Gibson meet Mlle. Nguyen-Thi-Tieng at Saigon International Airport.

crew rest at Midway they routed through Wake Island, “on the other side of tomorrow”, and Guam before making good ETA at Biak. Four hours later, having unloaded the cargo destined for the United Nations’ RCAF contingent and eaten a hasty meal, the globetrotters were off to Manila for an overnight stop.

At 1000 hrs. next day they headed for Saigon, where willing hands of the Canadian Army contingent in the International Truce Commission there helped unload the remaining freight and mail. Three hours later the *Hercules* took off for Tokyo, where a two-day crew rest brought men and machine up to par again for the long flight home. ☉



F/L H. R. Glenn, RCAF *Hercules* captain; Cuong Pham Binh, South Viet Nam Army; and Maj. R. E. R. Borland, Canadian Army member of the International Truce Commission in Saigon.

APOLLO will cost about \$20 billion (ten times the cost of the Manhattan atom-bomb project in World War II). It represents the most challenging task the U.S. has ever undertaken except in war, even overshadowing the immense ICBM program.

Aside from the prime stimuli of competition with the U.S.S.R. and scientific exploration, the Americans cite other reasons for wanting to go into space and specifically to the Moon. For instance, there are the military implications of manned space flight. In a program of APOLLO's magnitude, as technological barriers are broken and technical talents developed, a ready capability of carrying out eventual military assignments is ensured.

Another rationale for going into space is an economic one. It has been suggested that the lunar project might pay for itself or at least help write-off its cost by spurring the development of many devices with wide application on Earth. There are others who see a possibility that space could open the way to international co-operation that would dispel the spectre of war. And of course, there are the hard-to-define reasons of wanting to go to the Moon just because it is there.

THE MOON TRAJECTORY

To obtain a proper perspective of manned lunar flight we should first consider the lunar trajectory. The mean distance from the Earth to the Sun is of the order of 93 million miles. The mean distance from the Earth to the Moon is about one quarter of a million miles. The Moon's diameter is 2,160 miles — about a quarter of the Earth's diameter. There are some who say that the Moon was once a part of the Earth, filling the hole which is now the Pacific Ocean.

The path followed by a vehicle from the Earth to the Moon may be

considered in three phases. First, a powered phase, during which the vehicle is accelerated to a high velocity a few hundred miles above the Earth. This is followed by an unpowered phase during which the vehicle follows a path whose shape is determined by the influence of the gravitational fields of the Earth and Moon and by the vehicle's velocity and position at the end of powered flight. Finally, the vehicle may be required to perform a manoeuvre near the surface of the Moon.

Consider the unpowered flight of the vehicle. As noted, the shape of the path followed by the vehicle during this portion of its flight is determined by the vehicle's initial velocity and position and the gravitation fields. Since the initial velocity and position are the only elements of the problem under man's control, the problem reduces to finding those combinations of vehicle velocity and position which will yield paths intersecting or coming close to the Moon. The duration of the voyage to the Moon depends, of course, on the initial velocity. It has values slightly in excess of four

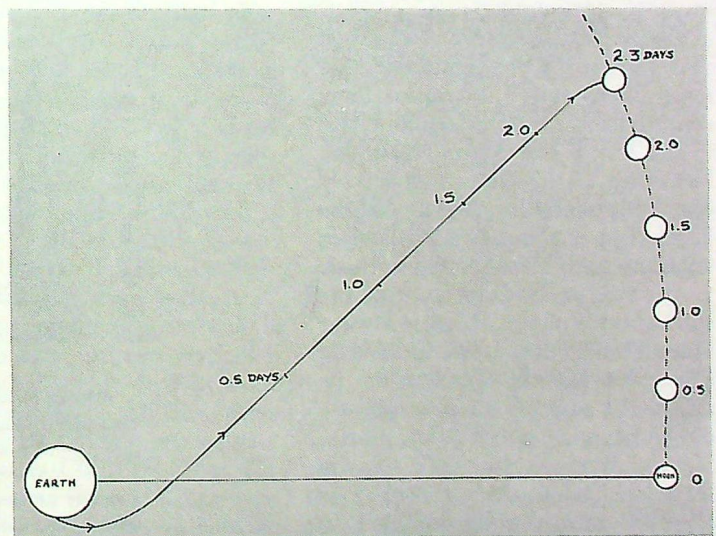
days at a velocity of 34,800 ft/sec, decreasing to about 2½ days at a velocity of 35,000 ft/sec and to about 1½ days at a velocity of 35,500 ft/sec. The velocity in the vicinity of the Moon is fairly independent of the initial conditions — at least over the range of initial conditions mentioned here — and has a value of about 9,000 ft/sec.

Figure 1 shows the path of the vehicle as it would appear to an Earth-based observer. The voyage takes approximately 2½ days, during which time the Moon moves through an angle of approximately 30°. The vehicle starts in a direction pointed considerably behind the Moon. However, its path is curved by the Earth's gravity, and at the end of the first half-day it is moving in almost a straight line towards the point where it will intercept the Moon some two days later. Near the end of the voyage the path is again slightly curved, this time due to the influence of the Moon's gravity.

THE MOON'S COMPOSITION

Scientists cannot predict just what the first men on the Moon will

FIGURE 1 — Flight path to the Moon.



find, but they believe knowledge of our own planet will be vastly enlarged. On the scarred face of the Moon are inscribed the records of past events that have clearly been cataclysmic. There is good reason to believe that these records span most, or all, of the Moon's lifetime of about four and a half billion years. Because the Moon has virtually no atmosphere, it has been spared the erosion that has repeatedly wiped clean the slate of the Earth's history.

The Moon is so much smaller than the Earth that the range of vision, or horizon, is far less. Thus an astronaut or lunarnaut standing in the center of the crater Clavius will be unable to see its walls. The walls are many thousands of feet high but at a distance of 70 miles (the radius of the crater) they lie beyond his horizon. Some lunar mountains reach heights almost as great as Mt. McKinley in Alaska. But many look like gently sloping hills. The U.S. Army is carrying out a survey of the Moon's surface visible to the Earth, based on photographs taken by astronomical telescopes. Thus when the first American steps out of a capsule onto the Moon, he should carry in his hand a detailed map of his immediate surroundings.

The first Americans on the Moon will land within a rectangle 375 miles wide and 1,700 miles long, centered on the lunar equator and to the left of the central meridian. Not only is this area a relatively easy target within sight of the Earth, but it abounds with land in a variety of different configurations.

Approximately 41 percent of the total surface of the Moon is always hidden from view from the Earth, since the Moon's rotation on its axis is the same as its average rate of revolution about the Earth. Somewhat more than half can be seen because the Moon's orbit is elliptical and slightly inclined to

the Earth's orbit. There are no positive indications of an environment on the far side which differs generally from that of the observable face. The telemetered photographs of the other side of the Moon obtained by a Russian space probe lacked the definition to provide new evidence of a conclusive nature that this face is vastly different from the familiar one, although it does appear to be less rugged.

Temperatures on the Moon average about 212°F for surfaces facing the Sun but drop in the night to -243°F or less. Convection, so important in the presence of an atmosphere, is totally absent on the Moon — the great temperature variations on the dark and sunlit surface of the Moon are a consequence. Because of the smaller mass of the Moon (1/80 of the Earth's mass),

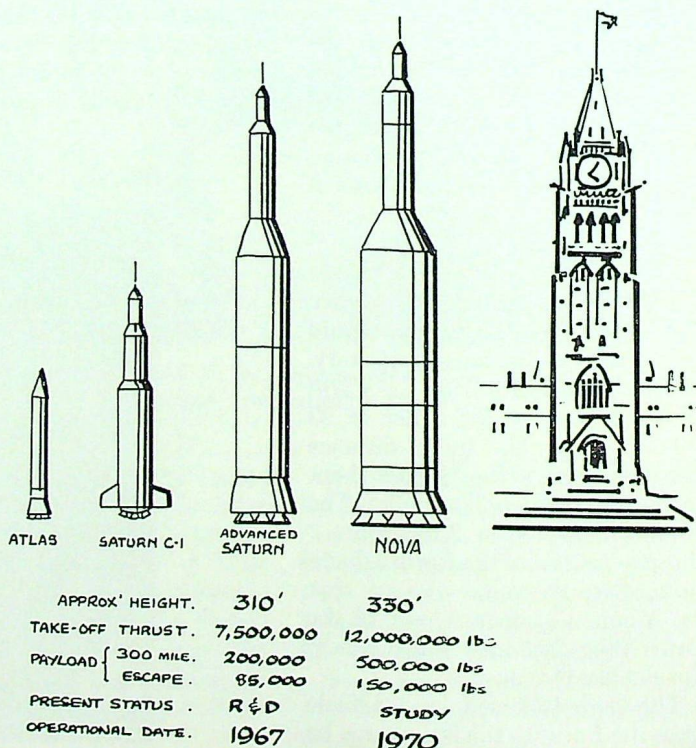
the gravity on the surface of the Moon is approximately 1/6 of that on Earth.

All of this means that the first crew on the Moon will face a bleak, relatively unknown domain. There will be no oxygen, no wind, no clouds, no rain, no atmosphere to screen out solar radiation and meteors. The men will have to wear insulated and probably air-conditioned Moon suits equipped with oxygen tanks, walkie-talkies and life-lines attached to the ship at all times. The heart won't have to pump so hard, however, and an ordinary step will become an 18-ft. stride.

APPROACHES TO THE LUNAR MISSION

Before looking at the various methods that have been considered

FIGURE 2 — NOVA and Ottawa's Peace Tower are of equal height.



for placing a manned capsule on the Moon, it will be worthwhile to examine briefly the characteristics of the launch vehicles that are likely to be available for such a mission. There are only two such vehicles in the planned U.S. inventory: the ADVANCED SATURN and the NOVA. Figure 2 shows a comparison of these two boosters and indicates the important parameters.

With the target of placing a man on the Moon in the 1960's, the U.S. has been considering various mission approaches and launch vehicle configurations. All involve sending the three-man APOLLO capsule to the vicinity of the Moon, via three different routes: direct ascent, earth rendezvous and lunar rendezvous.

The direct flight scheme would have used the NOVA vehicle to send 150,000 lbs directly to the Moon. In the Earth orbit rendezvous method, which until recently was NASA's officially favoured approach, two ADVANCED SATURN vehicles would be launched. They would rendezvous in a parking orbit above the Earth. One would carry the spacecraft and the propulsion rocket to send this to the Moon. The other would be a tanker to complete fueling of the Moon rocket. The final lunar payload would again be 150,000 lbs.

The lunar rendezvous method (figure 3), which at present is the most favoured mode, will use a single ADVANCED SATURN launch vehicle and will place an 85,000 lb payload into a lunar orbit after a nominal 60-hour journey. Only two of the three men in lunar orbit will land on the Moon.

The Moon-bound spacecraft will have three parts: the command module, housing the three man crew; the service module with supplies, engines and propellants; and the small landing bug. After arriving in the vicinity of the Moon (figure 4), the spacecraft will be

propelled into a 100-mile high lunar orbit (1). Then two of the crew will crawl into the bug and detach it (2).

By firing small engines briefly, the crew will put the bug into an elliptical orbit that will dip to within ten miles of the lunar surface. The two men will study the area below them, trying to recognize the topographical features. If anything has gone wrong, they will still have a chance to join the mother ship and return to Earth without landing. But if all is well, they will make their landing attempt on their next close approach (3). Using retro-rockets, they will check the motion of the craft, making it descend slowly to the Moon. They will be able to hover for about one minute and move sideways up to 1,000 ft. in search of a good landing place. Finally the craft will settle down, steadying itself on four slender legs. When the mother ship is about 3° behind their zenith, the crew will fire their rockets and rise vertically leaving their landing gear behind. The crew will place the bug in an elliptical orbit (4) to rendezvous with the mother ship (5) they will then transfer to the APOLLO capsule to rejoin the third astronaut.

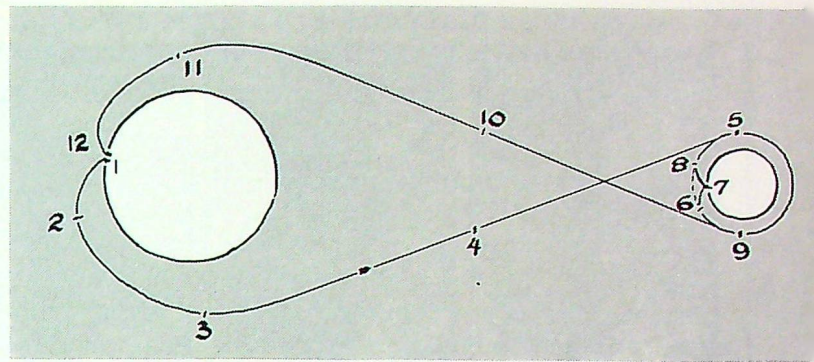


FIGURE 3 — Lunar rendezvous sequence: 1. Launch. 2. Establish coasting orbit. 3. Earth escape. 4. Midcourse correction. 5. Brake into lunar orbit. 6. Descent with two-man landing bug. 7. Ascent with bug. 8. Rendezvous. 9. Lunar escape. 10. Midcourse correction. 11. Re-entry. 12. Touchdown.

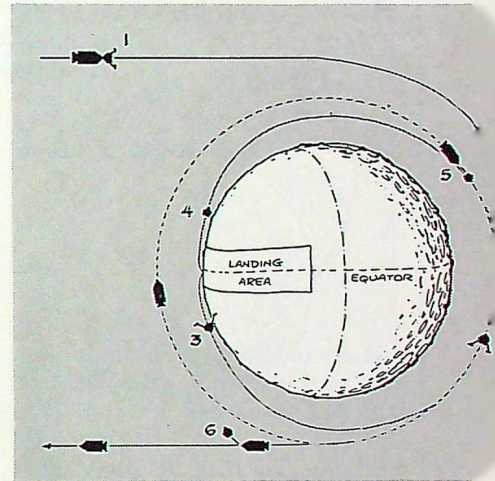


FIGURE 4 — Detailed view of flight sequence in the vicinity of the Moon.

The bug will be jettisoned (6) and the spacecraft propelled sufficiently to escape the Moon's gravitational field and head back to Earth.

REASONS FOR LUNAR RENDEZVOUS SCHEME

In deciding on the lunar rendezvous method, NASA officials left themselves several outs. They said they would continue studies of all three alternatives. They cautioned

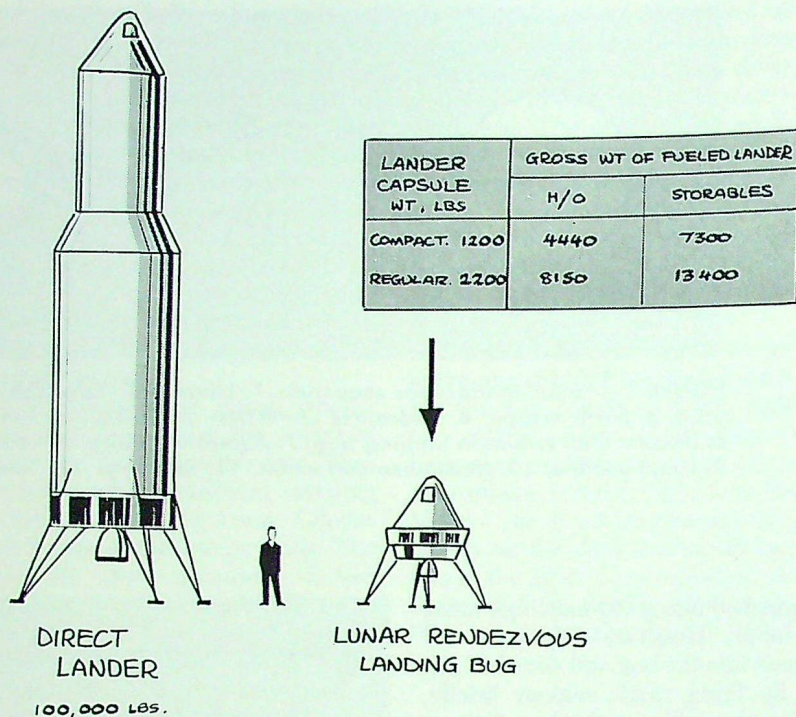


FIGURE 5 — Lunar spacecraft.

Since the key point of the lunar-rendezvous scheme is the rendezvous operation, it is well to make a few remarks on the probable ease by which the operation may be done. Studies on a rendezvous simulator indicate that pilots can perform rendezvous fairly easily by either visual or fully instrumented techniques. Also the stability of the low altitude lunar orbit is good. Because of the low revolution rate of the Moon, the amount of drift of the landing bug out of the orbital-rendezvous plane is small for small stay times and presents no severe ascent trajectory problems. The rendezvous need only be performed at about 5,000 ft/sec in contrast to the 25,000 ft/sec required for earth-orbit rendezvous, thus reducing the errors associated with launch timing. Finally, there are no interferences or holdbacks in rendezvous attempts because of atmospheric conditions.

The use of a single moderate-size launch vehicle in the lunar-rendezvous scheme should keep launch preparations to a minimum. As discussed before, the use of a small lunar lander should increase the chances for a safe lunar landing. With respect to the lunar-orbit rendezvous operation, the discussion in the preceding section suggests that the rendezvous itself should be a fairly easy and reliable operation. In this connection, it should be kept in mind that hitting and landing on the Moon is in reality a rendezvous problem of the first order. If the exploration vehicle is equipped with sufficient instruments and equipment to perform this task, then there should be adequate equipment to perform the relatively simple lunar-orbit rendezvous. It is also well to keep in mind that in-flight atmospheric refueling — probably a more difficult rendezvous problem — is routine these days.

In conclusion, the following inferences might be drawn with

that any of several assumptions that they were proceeding on might be exploded as work progressed. They said that it was important to retain flexibility, so that, if unexpected hurdles arose, the program could be re-oriented with minimum delay.

One reason why emphasis is now being placed on the lunar rendezvous approach is the substantial reduction in escape weight required. (85,000 lbs vs 150,000 lbs for the other alternatives). This reduction is, of course, a direct result of the greatly reduced energy requirements brought about by leaving a sizable mass in lunar orbit rather than landing it. Illustrated above are the two choices in the basic lander capsule.

The lunar approach calls for one

more step than that of the direct mode, the step of lunar orbit rendezvous. Has the use of this additional step led to an over-all gain or not? Consider the specific problems of landing on the Moon's surface. The landing operation will probably be one of the most difficult parts of the entire mission. Also the magnitude of the problem will depend greatly on the size of the vehicle that must be landed. The small lunar ferry of the lunar-rendezvous scheme has a decided advantage here. Another example is the launch-vehicle itself. The launching and operation of a large vehicle or the launching of two smaller vehicles is a great deal more complex than the launching of a single smaller vehicle.

regard to the lunar-rendezvous mission approach:

- The return vehicle and associated propulsion system can be tailored more to their intended purpose; that is, their design is not influenced by lunar-landing considerations.
- The lunar-landing vehicle itself can be optimized for landing.
- A safe return of the primary vehicle is permitted in event of a landing accident.
- The lunar-rendezvous approach mission can probably be made a year ahead of the earth-rendezvous scheme and several years ahead of the direct ascent.
- A considerable savings in cost should accrue.

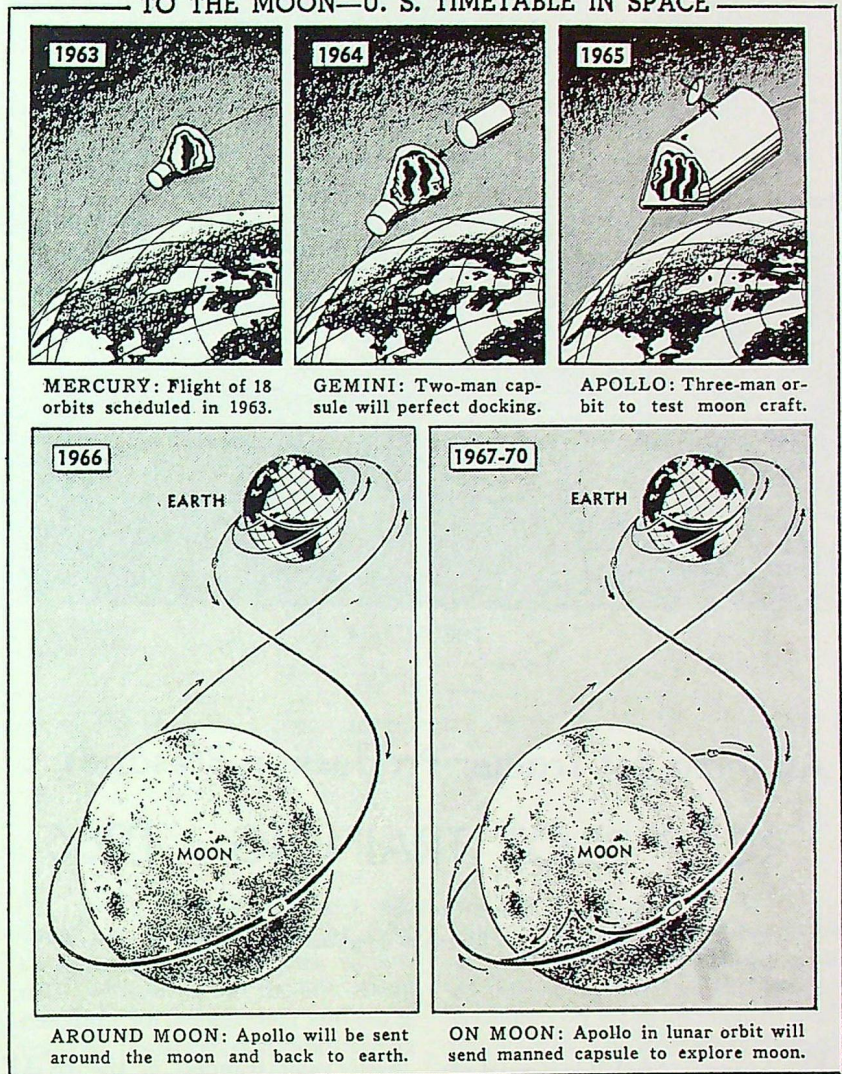
There are still many known and unknown hazards to be coped with which could force a change of plans. No one knows, for instance, whether human bodies can tolerate a full week of zero gravity. No one is sure just how hostile the lunar surface may be or what the threat from storms of deadly particles may be.

Perfection of liquid hydrogen technology and checkout and assembly of huge boosters will have to be accomplished. Means to permit astronauts to carry out a count-down and trouble-shoot difficulties prior to take-off from the Moon will have to be devised. Methods of coping with the high re-entry heat levels on returning to the Earth and of bringing the spacecraft in for a gentle landing will have to be perfected.

In the face of so many problems and based on experience in other space endeavours it is likely that the lunar mission timetable (see cut) will advance many times before the mission is accomplished, but there can be no doubt that indeed this mission or a very similar one will be successfully completed, and within the decade of the 60's.



TO THE MOON—U. S. TIMETABLE IN SPACE

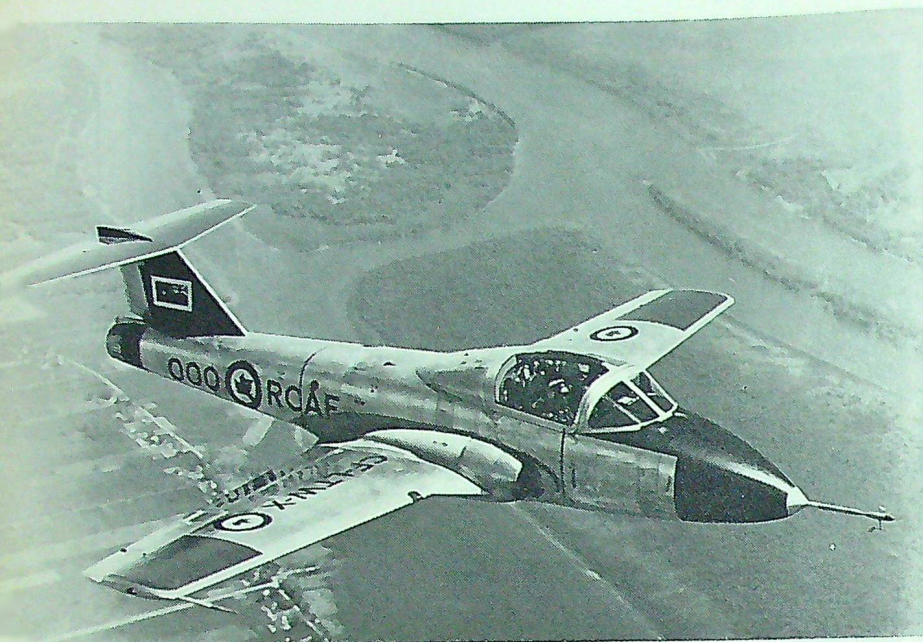


Courtesy NEW YORK TIMES

SPACE RACE

I'd aviate 'most any crate
But I am doubtful if I'll
Enter a race through Outer Space
In a ballistic missile

A. Klinge



THE TUTOR

Ab Initio Jet Trainer Production Presages . . .

RCAF PILOT TRAINING – 1965

By WING COMMANDER J. A. G. DIACK
 Directorate of Aircraft Engineering, AFHQ

KNOWLEDGE and skill, essential elements in all spheres of human endeavour, can only be acquired through training and experience. The level attained is principally dependent upon the direct application of the training to the human function to be performed. With these factors in mind, the RCAF is planning the introduction of major changes in pilot training by 1965 — changes which will depart from long-standing procedures, and will require use of new aircraft specifically designed for jet-age training.

During the last quarter-century

basic pilot training in the RCAF has undergone numerous organizational and procedural changes, but aircraft used in this role have not changed significantly. In World War II the *Tiger Moth* won fame as a trainer and stories of its flying qualities are legend. At the end of the war the *Harvard*, which had been used as an advanced trainer, assumed the basic trainer role, reflecting considerable upgrading in power and performance characteristics. Now it is the *Harvard* which must give way to an aircraft of higher power and superior perform-

ance: the *Tutor* basic jet trainer, now in production for the RCAF.*

The *Tutor* was designed in Canada by Canadair Ltd., and the 190 aircraft currently on order are being manufactured at Canadair's Cartierville plant north of Montreal. Design of the aircraft, identified by Canadair as the CL-41A and by the RCAF as the CT-114, was started seven years ago. During the period of design, mock-up and evaluation, close liaison was maintained between the design team and RCAF specialists to reflect in the aircraft features which experience had shown necessary for good training effectiveness. A prototype was built as a company-financed venture, and subjected to RCAF preliminary evaluation which concluded that general handling characteristics and cockpit layout were praiseworthy features, particularly from the standpoint of instructor-student mutual observation and monitoring. The production aircraft has a number of installation changes from prototype configuration, notably power plant and electronic equipment, and features further improvements in handling characteristics.

The general configuration and leading particulars of the aircraft are shown in the cutaway illustration. In comparison with the *Harvard*, it is slightly longer but has a shorter span, and at 7300 lbs. the *Tutor* is approximately 1500 lbs. heavier. Beyond these few relative details there is little realistic comparison possible between the present and future basic trainers. Major differences in configuration are the side-by-side seating arrangement, the jet power plant and the tricycle undercarriage. Most striking physical characteristic is the T-tail assembly.

The aircraft is powered by a General Electric Co. CJ610-1B engine, being produced in Canada as

* ROUNDEL, Vol. 13, No. 10, Dec. '61.

LEADING DIMENSIONS

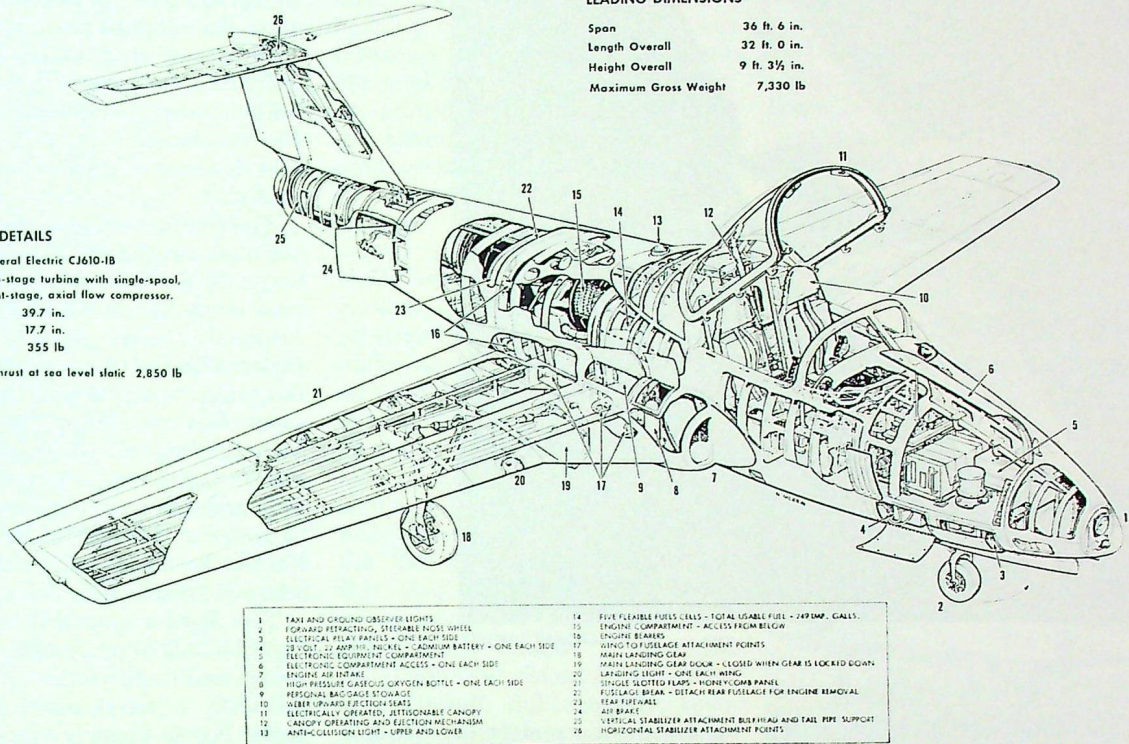
Span	36 ft. 6 in.
Length Overall	32 ft. 0 in.
Height Overall	9 ft. 3½ in.
Maximum Gross Weight	7,330 lb

ENGINE DETAILS

Type: General Electric CJ610-1B
 Two-stage turbine with single-spool, eight-stage, axial flow compressor.

Length 39.7 in.
 Diameter 17.7 in.
 Weight 355 lb

Take-off thrust at sea level static 2,850 lb



- | | | | |
|----|---|----|--|
| 1 | TAXI AND GROUND OBSERVER LIGHTS | 14 | FIVE FLEXIBLE FUELS CELLS - TOTAL USABLE FUEL - 249IMP. GALLS. |
| 2 | FORWARD RETRACTING, STEERABLE NOSE SPIRE | 15 | ENGINE COMPARTMENT - ACCESS FROM BELOW |
| 3 | ELECTRICAL RELAY PANELS - ONE EACH SIDE | 16 | ENGINE BARRIERS |
| 4 | 28 VOLT, 27 AMP Hrs. NICKEL - CADMIUM BATTERY - ONE EACH SIDE | 17 | HINGE FOR FUSELAGE ATTACHMENT POINTS |
| 5 | ELECTRONIC EQUIPMENT COMPARTMENT | 18 | MAIN LANDING GEAR |
| 6 | ELECTRONIC COMPARTMENT ACCESS - ONE EACH SIDE | 19 | MAIN LANDING GEAR DOOR - CLOSED WHEN GEAR IS LOCKED DOWN |
| 7 | ENGINE AIR INLETS | 20 | LANDING LIGHT - ONE EACH WING |
| 8 | HIGH PRESSURE GASEOUS OXYGEN BOTTLE - ONE EACH SIDE | 21 | SINGLE SLOTTED FLAPS - HONEYCOMB PANEL |
| 9 | PERSONAL BAGGAGE STORAGE | 22 | FUSELAGE BRIM - DETACH REAR FUSELAGE FOR ENGINE REMOVAL |
| 10 | TWO UPWARD EJECTION SEATS | 23 | REAR EJECTION SEAT |
| 11 | ELECTRICALLY OPERATED, JETTISONABLE CANOPY | 24 | AIL BARRIERS |
| 12 | WINGUP OPERATING AND EJECTION MECHANISM | 25 | VERTICAL STABILIZER ATTACHMENT BULKHEAD AND TAIL PIPE SUPPORT |
| 13 | ANTI-COLLISION LIGHT - UPPER AND LOWER | 26 | HORIZONTAL STABILIZER ATTACHMENT POINTS |

the J85-CAN-40 by Orenda Engine Division of Hawker-Siddeley Canada Ltd., Malton, Ont. It is an eight-stage, axial-flow compressor engine with two-stage turbine and annular combustion chamber. The sea level static thrust rating is 2850 lbs. Engine control is exercised by a power lever at each pilot position connected to a fuel control unit which, sensing rpm, compressor inlet temperature and discharge pressure, meters fuel flow in accordance with requirements of engine for appropriate lever setting. Operation of the engine at 100% rpm without time limit has been specified to simplify engine control by students. Other features of the engine and power plant installation are variable incidence inlet guide

vanes, anti-icing of nose bullet, inlet structure and guide vanes by use of compressor bleed air, and use of bleed air for windscreen anti-icing, cockpit pressurization and power plant zone cooling.

The power plant is located in the forward fuselage section immediately ahead of the fuselage break point. Engine changes and periodic inspections require splitting of fuselage at the break point to provide adequate access, but routine adjustments and servicing can be carried out on the power plant through under fuselage access doors. Bifurcated ducts direct inlet air from the leading edge wing-fuselage junction to the engine.

The *Tutor's* structural considerations are based on the most recent

military specification. Hence the latest state-of-the-art requirements are being applied in the design. Designed for 7.33g manoeuvre load, the aircraft has additional strength features for ruggedness: underfloor longitudinal skid beams designed for 8g vertical load, the fuselage fuel cell area bulkhead designed for 24g forward load, and the engine mount designed for 16g. The fuselage is of semi-monocoque construction with wing loads distributed into the fuselage at main and rear spar wing attachment bulkheads. Vertical fin loads are transmitted into the fuselage through fin spars integrated into the fuselage structure.

The fuselage comprises four main areas which from front to rear



CANADAIR PHOTO

are: a nose section housing the nose landing gear and equipment compartments; pressurized cockpit section, containing crew seating, controls, instruments and canopy; a centre section containing fuel tank, air ducts and power plant, and a rear fuselage section containing the speed brakes, jet pipe, integral fin and lower rudder hinge.

In the equipment compartment major components of the normal and emergency ultra-high frequency communication equipment, identification, navigation and intercommunication equipment are located. Main elements of the electrical system, except engine driven generator are also located in this area. Easy access to the compartment for maintenance and servicing is provided through large hinged panels on each side of the fuselage.

The cockpit is an air conditioned and pressurized section of the fuselage. A width of 55 inches accommodates the side-by-side seating

arrangement comfortably. Instrument and control installations are designed for operation from the left-hand seat; however, flight instruments and most controls are duplicated for the right-hand seat position. Where duplication has not been practical or necessary, near-central location of instrumentation and controls has been arranged to permit use by either pilot. The instrument panel contains an annunciator illuminated display to alert the pilot to a fire condition in engine compartment or to any of ten cautionary conditions which might arise. Instrumentation and controls for the high pressure gaseous oxygen system are also centrally located on the instrument panel. The instructor position in the right-hand seat has two over-ride controls to permit immediate correction of a student error in undercarriage selection or elevator trim. The cockpit is enclosed by a large single piece jettisonable canopy, hinged behind the ejection seats, and nor-

mally operated by electrical actuators. The ejection seats provide for safe escape at altitudes down to 150 feet above ground level with or without prior canopy jettison. It is the first standard catapult-equipped seat to have a seat separator installed.

The centre section accommodates the main elements of the propulsion system. Five interconnected flexible cells comprise one fuel tank of 264 Imperial gallons capacity in the forward end of this section. Aft of the fuel area bulkhead is the power plant area containing the engine, hydraulic system components and electric starter/generator. Re-fueling and oil servicing are readily carried out through refilling points located on the top and side of fuselage, respectively.

The flight control system is essentially of conventional design, using push-pull rods or torque tubes to transmit control movement. Power boost is not required for the controls and stick loads are reduced by tab operation. The ailerons have spring tabs and the right-hand aileron incorporates a geared tab while an electrically activated trim tab is fitted to the left-hand aileron. Similarly, a geared balance tab and electric trim tab are fitted to the elevator. Deceleration of the aircraft in flight is accomplished by use of hydraulically-activated speed brakes, located on both sides of the rear fuselage. Hydraulically-activated flaps are installed in each wing; mechanical interconnect ensures symmetrical flap deflection.

The majority of services in the *Tutor* are provided by the hydraulic and electrical systems; the former operating flaps, undercarriage lowering and retraction, and speed brakes; the latter operating instruments, electronic equipment, lighting and trim actuators. The electrical system provides for a variety of requirements: 28 volt DC from generator or from two nickel-

cadmium batteries, 400 cycle AC 115 volt single phase from a static inverter and the same power characteristics in three phase AC from a rotary inverter. The use of a static inverter permits in excess of 25 minutes of essential services, i.e. lighting, communication and instruments, following failure of the primary generating system. The two 22 ampere-hour batteries also provide an internal engine start capability.

Performance and handling characteristics of the *Tutor* appear at first glance to be more in keeping with advanced trainers or operational aircraft than with that of a basic trainer—for instance, such figures as 0.73 mach number at 30,000 feet, 4.6 minutes to 15,000 feet, 13 minutes to 30,000 feet and a service ceiling of 43,000 feet illustrate that it is indeed a high-performance aircraft. There are, however, characteristics inherent in the aircraft which clearly reflect its trainer excellence: good low and high speed handling qualities, full manoeuvrability, ease of ground handling, 70 knot stalling speed (flaps down) with stick shaker warning, excellent spin initiation and recovery and minimum obstruction to visibility in addition to layout features previously noted.

A one and a half hour training mission, used to illustrate the *Tutor's* capability, is made up of the following: take off and climb to 15,000 feet, 15 minutes manoeuvre, a practice forced landing, return to base, complete five touch-and-go circuits and land. Fuel reserves associated with this mission provide for an additional 20 minutes operation at maximum endurance power. For maximum range mission, the aircraft has a range of 765 nautical miles. Under IFR conditions this range is reduced to 600 nautical miles when the required reserves are taken into account. Critical landing and take off distances are

about 2,500 feet at sea level. Preliminary confirmation of these performance characteristics has been obtained from tests undertaken on the prototype aircraft. Though major differences will be present in production aircraft the performance is expected to be relatively unchanged.

Prior to full integration of the *Tutor* into Training Command operations, a comprehensive program of structural and flight testing is underway to establish airworthiness and detailed functional suitability of the aircraft and its installed equipment. The program commenced late last year and will be completed in mid-1964, approximately six months after delivery of the first production aircraft. The first stage in this testing is the power plant compatibility trials to determine suitability of the J85 installation provisions in the prototype aircraft. Subsequently, specification compliance testing will be initiated by Canadair Ltd. on the prototype and completed on a production aircraft. Two aircraft will be assigned to Central Experimental and Proving Establishment early in 1964 for conduct of climatic trials (both low and high temperatures), electronic equipment evaluation, and performance and handling trials. By the spring of 1964 the first production aircraft will be delivered to Training Command, where the adjustments necessary to integrate the aircraft into the operational and maintenance environment will be determined and effected prior to commencement of student training in early 1965.

Concurrently with the flight trials, structural testing will be undertaken to verify airworthiness and determine fatigue life of the structure. Static and repeated load tests are planned using two test aircraft assemblies. Upon completion of the structural and flight test program, any precautionary limitations ap-

plied to aircraft operation will be removed and the full capability of the trainer can then be realized.

Upon the introduction of the *Tutor* into Training Command a change in the organization for training is planned. The present Flying Training Schools (FTS) and Advanced Flying Schools (AFS) will be combined to form units which will be identified as Flying Training Schools. These units will undertake the full syllabus of pilot training to wings standard using the



CANADAIR PHOTO

Tutor as basic trainer and the T33 as advanced trainer aircraft. The organizational change accompanied by the introduction of all-jet training is expected to result in a more effective and homogeneous program, designed to meet the present and future needs of the RCAF.

During the past five years new aircraft have been introduced into each of the RCAF commands except Training Command—aircraft which have increased the operational capability of the RCAF to fulfill commitments. Now Training Command enters a period of re-equipment to compliment the changes in other commands and, through the development of high levels of pilot skill, to ensure a continuing growth in operational effectiveness. ●

OPERATION ROTATION

Photos by CORPORAL W. WHITEHEAD

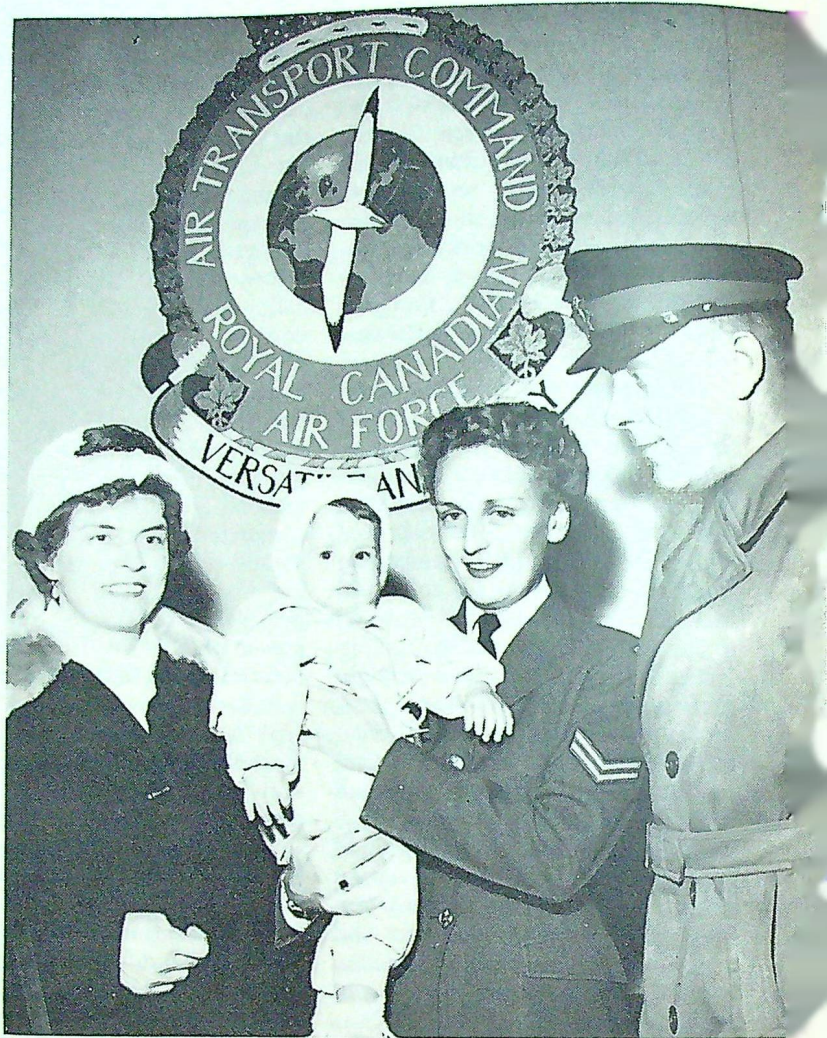
ROTATION of units of the Canadian Infantry Brigade in Europe, including the airlift of everything from kit-boxes to kiddies, was conducted between RCAF Station Trenton, Ont., and the international airport at Dusseldorf, Germany, late last year. It was the first time that the NATO-assigned soldiers and their families have been moved by air, and No. 437 "Husky" Sqn. *Yukons* and crews proved equal to the task.

The first group to leave Trenton was an advance party of the Royal Canadian Regiment in mid-November. The men of the First RCR Battalion replaced the First Battalion of the Canadian Guards at Soest, West Germany, who, upon their return to Canada, took up residence at Camp Picton, Ont. In December tactical sub-units of the Fort Garry Horse of Camp Petawawa were flown to Germany.

The rotation of the troops and

their families was accomplished in good time with a minimum of disruption — passenger and freight flights alternated between Trenton and Dusseldorf so that luggage was on hand when a passenger flight arrived at destination.

No. 3 Canadian Army Movement Control Group, attached to the RCAF's No. 2 Air Movements Unit, assisted in the administration, flight bookings and innumerable other details associated with such a large scale operation.



Cpl. "Mickey" McCormick, flight attendant, holds her tiniest passenger, Carol Ann Nielsen, 14-month old daughter of Sgt. and Mrs. S. A. Nielsen, prior to flight from Trenton to Dusseldorf.



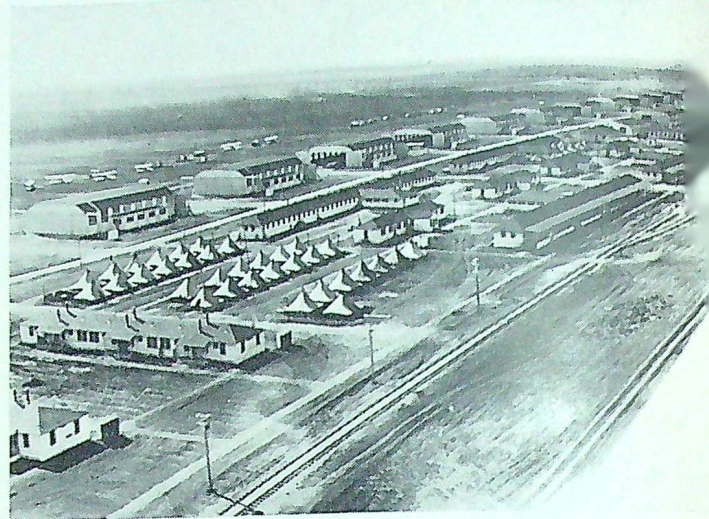
All set for her first flight, 17-month old Michel Joordens hangs on tightly to her dad and doll before boarding the Yukon.



Transportation technician explains seating arrangements to Peter Waite, 6, as sister Pamela, 10, and mom and dad look on.

"All aboard, please" — destination: Germany.





Camp Everman, one of the three fields outside Fort Worth, Texas, used by RFC during the winter of 1917-18.

CANADA'S FIRST AIR TRAINING PLAN

Third of Four Parts TRAINING IN TEXAS

BY MR. R. V. DODDS
Air Historical Section

TEXAS was invaded by the Royal Flying Corps in September 1917. An advance party of RFC and American personnel arrived in Fort Worth on the 26th and established a headquarters there. Construction crews had been racing against time to finish three aerodromes in the vicinity, known locally as Hicks, Benbrook and Everman fields. Officially they were designated Fields Nos. 1, 2, and 3, and the complex was known as Camp Taliferro.

A depressing sight met the eyes of the advance party as they inspected the fields into which the RFC and their Canadian and American trainees were to start moving in a few weeks. The construction crews had lost the race, and the

aerodromes and barracks were not ready. At one field construction of barracks, hangars and other buildings had barely started, and water mains, sewage disposal facilities and power lines were not finished. Despite every effort by the Americans, it was almost three months before the fields were finished.

Although both staff and trainees initially met many inconveniences, there appears to have been surprisingly little delay in the training program as the result of the move to Texas. The School of Aerial Gunnery, for instance, completed one course at Camp Borden on 30 October and on 5 November started a new course at Camp Taliferro. The two RFC wings from Borden and Deseronto ceased flying in

Canada on 14 November and took to the air again in Texas three days later, despite a 1,600-mile rail journey.

One of the American squadrons found itself in new, unfinished barracks at Hicks field, without camp equipment, water or sewage works. The squadron's hangars were packed with aircraft still in their crates, as they had arrived from Canada, and no tools had been issued to the Americans. Within eight days, though, the packing cases had disappeared and the aircraft were ready to fly.

Favourable weather conditions prevailed through most of the winter but at times the RFC ran into heavy rain and even snow. No sub-drainage had been provided for the

flying fields and rain turned them into thick, sticky mud. On one occasion 40 propellers were broken during a single morning's flying, and for a period of one month the average number smashed was 10 a day. Undercarriages also suffered and the RFC was forced to devise a type of wire mesh mud guard.

The American squadrons, which had been partially trained before leaving Canada, continued their instruction under the RFC in Texas until ready to leave for overseas. The first to go was the 17th Aero Sqn., which left on 19 December 1917 with 25 pilots and a full complement of ground officers and men. Even after arriving in France in early February they continued their close RFC association, being attached – in flights – to RFC fighter squadrons.

In addition to the American personnel who had been formed into the four US squadrons in Canada, other American trainees were attached to the two RFC wings in Texas. As the original American squadrons finished their RFC training and departed, new squadrons were formed from these trainees. In January three more American squadrons, Nos. 22, 27, and 28, completed their training and left for overseas, and three more, Nos. 139, 147, and 148, left in February. The remaining three left in March, bringing to the agreed-upon total of 10 the number of American squadrons trained by the RFC.

BACK TO ONTARIO

In April 1918 the RFC packed up and returned to Canada. During its stay in Texas the RFC rolled up 67,000 flying hours and trained or partially-trained 1,960 pilots, both American and RFC cadets. In addition, 69 ground officers and 4,150 men were trained in various ground trades and skills.

The RFC staff and the young Canadian cadets learned that the

legend of Texan hospitality was no myth. Fort Worth went all out to make the visitors welcome. Numerous facilities for the Canadian and American airmen were set up in Fort Worth, and the citizens opened their private homes to the visitors.

The RFC staff personnel were impressed by the quality of the American pilot trainees, most of

Texas in the fall of 1917. The various ground units, such as the Cadet Wing and the School of Aeronautics, carried on without interruption in Toronto, as did No. 44 (North Toronto) Wing. It was decided that for the time being, at any rate, the wing would remain on its Leaside and Armour Heights aerodromes and the RFC would see if training



Pre-flight test on a Canadian-built JN-4.

them young men straight out of university. The Americans, on their part, were equally impressed by the standard of the training given by RFC. Most of the RFC instructors were officers with flying combat experience over France, who were able to pass on this experience to the trainees.*

Not all of the RFC moved to

could be carried on there throughout the winter. As it turned out the men of the North Toronto Wing beat the winter and established themselves as the pioneers of cold weather flying in Canada.

Before scoffing at the apparent timidity of the RFC in the face of what residents of many areas of Canada would refer to as "a mild

* The Texas training agreement can perhaps be regarded as the forerunner of the BCATP or the RCAF's NATO training program which ran through the 1950s. More than 30 years after the training scheme, the Canadians, and this time the RCAF, returned to Texas. This was in the spring of 1949, when a 70-man contingent, headed by an air vice marshal,

flew to the state capital of Austin and presented a Canadian totem pole in memory of the Texan boys who died while serving with the RCAF during World War II. More than 600 young Texans came to Canada and joined the RCAF, before the entry of their own country into that conflict.

winter climate”, conditions must be viewed in their proper light. In 1917 neither the British nor the Canadians had any experience with winter flying in this country. Aircraft engines were, under the best of conditions, temperamental by today’s standards. The idea of an aircraft floundering about trying to take off or land in deep snow appeared to be practically an impossibility – at least in the sense of operating a large-scale flying training scheme and teaching would-be pilots how to fly. In addition, pilots were exposed in open cockpits, without the refinements in protective clothing that came later.

The first heavy snow fell in November, and Capt. H. V. Ackland of No. 89 Sqn. took off and landed successfully in a foot of it. Experiments soon showed, though, that six inches of snow was the maximum depth that could be handled by the wheeled undercarriage of the *Jenny*, as far as training was concerned, and the RFC turned to an adaptation of the ski or, more appropriately, the North American Indian toboggan.

THE RFC GETS SNOWBORNE

The principle of utilizing something that slid instead of turning around came fairly easily and it is possible that the RFC Canada may have known something about the flying on skis that the Russians had been doing. However, regardless of whether they took the idea from someone else or not, the real job was to design something that actually worked well. The wing itself, the RFC’s Repair Park, and Canadian Aeroplanes Limited were all involved in a series of experiments before a suitable ski was devised that incorporated the proper length, width, bow curve, anchorage, and other technical features.

Lieutenant Alan Sullivan, in his account of RFC Canada activities, describes the immediate success of

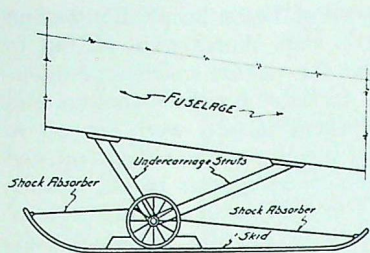


FIG.1

EXPERIMENTAL

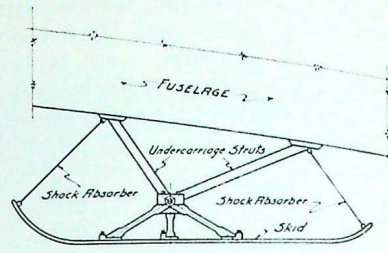
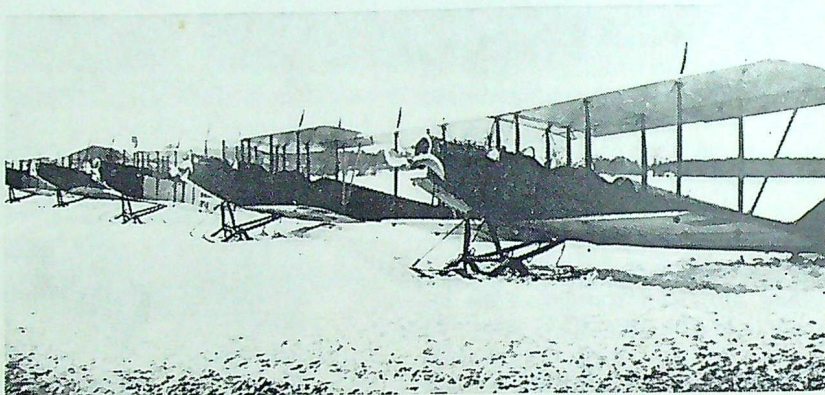


FIG.2

ADOPTED

Pioneering cold-weather flying in Canada, RFC designed these skis and fitted them to JN-4 trainer aircraft.



the skis, once a proper design had been developed:

“Once in regular use, the efficiency of these shoes became very noticeable. The slight bump observable in the best of landings smoothed itself out into a gently cushioned settling in which the actual first contact with the snow was imperceptible. Similarly, in taking off, the sensation was as in a toboggan darting without friction down a steep slope. Breakage in propellers and undercarriages became reduced to a minimum, and frequent landings soon ironed out the white expanse of the aerodrome to an unusually good surface.”

The RFC found that in actual practice there was little difficulty in operating the aircraft engines during the cold weather experienced in the Toronto area. Gasoline, oil, and water were drained each

night, and oil and water were heated before being replaced in the morning. Exposed water connections were wrapped with felt and cloth, and the oil gauge was moved from the rear to the front seat, thus shortening the connecting piping between the engine cylinders for maximum warmth.

It was feared that the cold might lead to abnormal stresses on portions of the rigging, which was given a particularly close inspection during the cold weather. As far as the RFC was able to ascertain, though, there were no accidents that could be traced to mechanical or structural failures brought about by the low temperatures.

Various types of ointment and coverings were tested as protection

for the instructors and trainees while airborne, including evil-smelling whale oil. There must have been widespread relief when it was found that this particular item did not provide the answer. Ultimately chamois masks which covered the face, with holes for the eyes and mouth, were found to provide the best protection, and thigh-length flying boots were issued. The electrically heated flying clothing which was by then in use on the Western Front did not reach the RFC in Canada, but they got along quite well without it.

The winter of 1917-18 was more severe than usual in southern Ontario, both as regards snowfall and temperature. Flying continued, however, on 26 days during January, 21 days in February, and 25 days in March, at daytime temperatures often well below zero. During this time some instructors registered an average flying time of 2 hours 25 minutes a day for the whole three-month period.

Apart from the expected quota of frozen ears and noses, the winter training brought unusual adventures. One pupil showed both de-

termination and a true homing instinct when, after a forced landing more than two miles from his home base, he taxied back to the aerodrome across fields and along country roads.

The success of No. 44 Wing's winter flying operations and the lessons learned during this period may be judged from the resultant decision of the RFC to carry out training for all squadrons in eastern Canada during the winter of 1918-19. The end of the war, of course, put a halt to RFC Canada operations in November 1918.

GROUND SCHOOLS

While flying training was going on down in Texas and at North Toronto during the winter, the non-flying units of the RFC in Canada continued their growth.

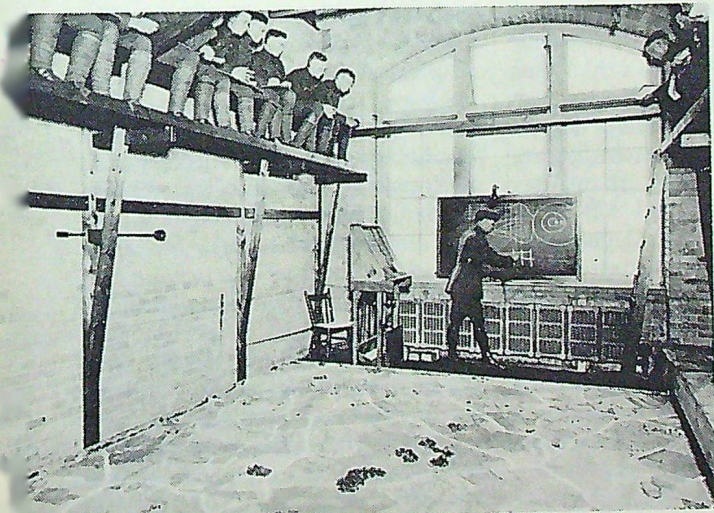
The Recruits' Depot had spent the summer under canvas at Leaside, having outgrown its quarters in downtown Toronto. With the approach of the cold weather the problem of accommodation for the now greatly-swollen depot arose. It was solved when the Toronto Board of Education loaned to the

RFC, without charge, the large Jesse Ketchum School and most of the attached park area, which was used as a parade and sports ground. The depot moved into its new quarters on 17 November. Cadets arriving in Toronto had previously gone direct to the Cadet Wing, but now, with the Recruits' Depot in its new, permanent home, it received cadets as well as ground tradesmen. A band was formed, aided by surplus canteen funds, and drafts of men leaving for Texas were played to the station. It was also much in demand for dances and hockey matches.

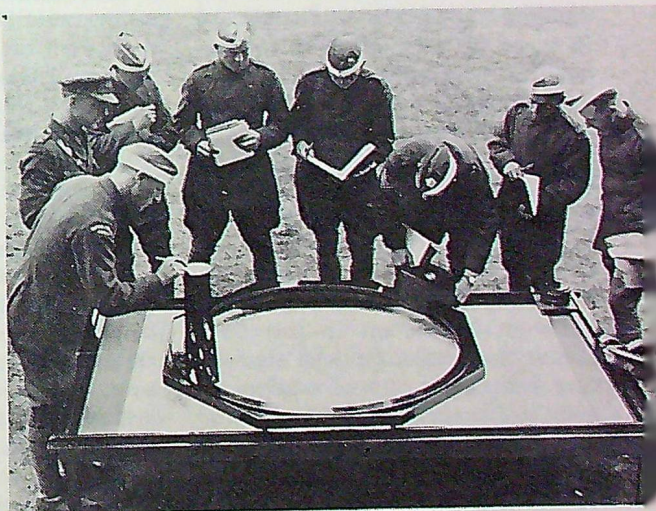
Like the Recruits' Wing, the Cadet Wing had spent the summer under canvas, at Long Branch. When Nos. 42 and 43 Wings left for Texas the Cadet Wing moved into the two vacated stations.

The School of Military Aeronautics continued its expansion throughout the winter and additional quarters were occupied. The University of Toronto, which had turned over so many of its buildings to the RFC, made Wycliffe College available, and a remodeled hotel, Haydon House, four miles from the

Artillery observation class at No. 4 School of Military Aeronautics, Toronto.



Cadets learn how to plot a course at same school. Note white bands on their caps, signifying aircrew trainees.



school, was also occupied.

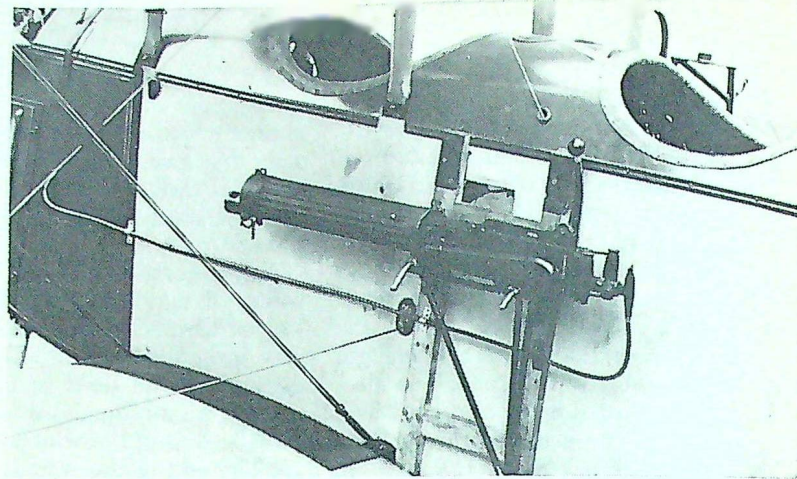
In January 1918 the RFC Canada noted its first anniversary. Hoare had gone out through the snow to look at his first aerodrome site on 26 January, 1917. Just one year later, two of his wings and the School of Aerial Gunnery were busy down in Texas, and his third flying wing was working out the problems of cold weather flying and training at North Toronto. Other units in the Toronto area were carrying on without interruption, and the size and scope of the training scheme as a whole had grown enormously.

FORMATION OF THE RAF

On 1 April 1918, shortly before the Texas contingent returned from the south, the RFC merged officially with the RNAS and the Royal Air Force came into being. Thus the RFC Canada became the RAF Canada.

The new service adopted customs, traditions, regulations and procedures from the two services which had spawned it. Some of these were soon dropped, such as the ringing of bells, shipboard-style, to announce the hours. Others, though, were retained, including the custom of saluting the flag as it was raised and lowered, and the use of port and starboard in place of left and right, in connection with aircraft and aerial navigation.

Back in Canada at full strength, the RAF continued to add to its training program, particularly with regard to aerial gunnery. From its very first days the RAF in Canada had recognized the importance of training pilots as aerial marksmen, although instruction in this field had at the beginning been elementary because of lack of equipment and instructors. The amount of armament instruction given at the Cadet Wing, and later at the School of Aeronautics steadily increased,



Vickers machine gun was first mounted on side of JN-4 fuselage, synchronized to fire through propeller arc.

as did the live, airborne gunnery training that the cadets took at the School of Aerial Gunnery.

The school's aerial operations had started with Lewis guns which permitted firing from the rear cockpit. As the RAF Canada obtained synchronizing gear, to permit forward firing through the JN-4s propellers, it was able to provide more realistic gunnery training.

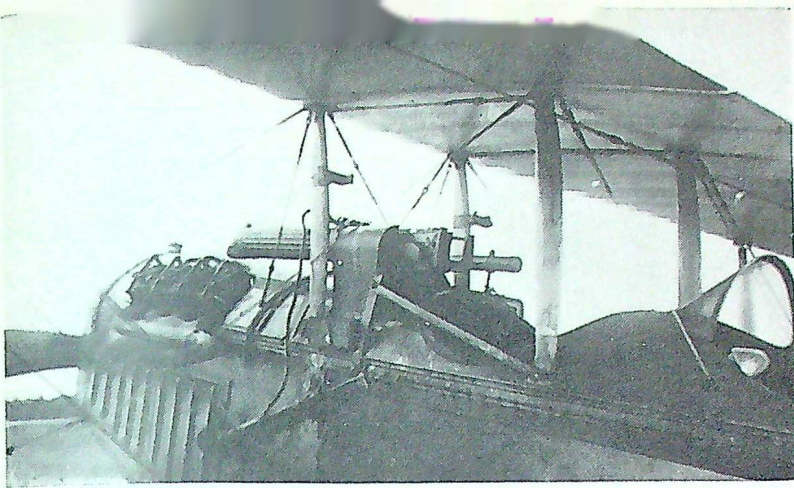
The school had been formed at Borden, but even before the move to Texas it became apparent that it needed its own home. A 300-acre site was selected in the autumn of 1917 at Beamsville, near the shore of Lake Ontario between St. Catharines and Hamilton, and work progressed on the new field while the school was down south. When it returned to Canada it moved on to its new aerodrome where, despite initial barracks deficiencies, it enjoyed better facilities than ever before.

The RAF training in Canada was subject to constant change as the result of information from the Western Front and advice from the UK authorities, and in May 1918 the School of Gunnery amended various of its training methods, to make the instruction more realistic. Amongst the changes was the introduction of deflection sights.

Camera guns were used during the training, and the cadets also fired with forward-facing synchronized Vickers against ground targets and banners towed behind other aircraft. Full-sized silhouettes of aircraft were mounted on rafts off the shore of Lake Ontario and these were used as ground targets, as was a fast, armour plated launch. The cadets also fired on a dummy trench, enfilading it while diving from 1,000 to 100 feet.

The school was constantly experimenting with means of providing realistic gunnery training to the cadets. One of the devices, which was employed for a time in Canada and also in Texas, was a cage-like device which ran over the ground, suspended from a cable stretched between two high poles. The cadet stood in the cage, firing a Vickers machine-gun at a ground target as he travelled over the ground. This particular training device, however, was not practicable and it was later abandoned.

The school's name was changed in July 1918 and it became the School of Aerial Fighting, more descriptive of what it now taught. By now its staff totalled 92 officers and 700 men, and its output for that month was 262 cadets. The school now flew four squadrons, one of



Later the same gun was mounted as shown above. Photos were taken at School of Aerial Gunnery, Camp Borden.

them being devoted to observer training, and flying time, with guns, had risen to 11 hours for each trainee.

A second school, closely associated with the School of Aerial Fighting, was formed in May 1918. This was the Armament School, which instructed a cadet in the various phases of aircraft armament before he took to the air. The new unit relieved the School of Aerial Fighting of much of the ground instruction it had previously given, freeing it for more airborne work, and also handled a considerable amount of the training previously given by the School of Military Aeronautics. The school was located at Hamilton, where it occupied a large factory building provided by the Canadian Westinghouse Corporation. Cadets went to the new Armament School from the School of Aeronautics, and then proceeded to one of the flying training wings for elementary pilot training.

Artillery observation and aerial reconnaissance had been an important part of the RFC's job from the first days of the war, and in fact, its only real job at the very beginning. The rapid development of aerial fighting and bombing did not diminish in any way the importance of the RFC as regards reconnais-

sance and spotting for the artillery.

Like other phases of RAF Canada training, instruction in these two fields had at first been limited, but its development matched that which had taken place in flying instruction, gunnery, bombing, and aerial tactics. Associated subjects such as wireless, map reading, compasses, and procedures, were stressed at the ground schools, and in the spring of 1918 special training was begun at North Toronto, to provide a final stage in the cadets' artillery observation and reconnaissance work.

An Artillery Co-operation School was formed at Leaside, to which the cadets reported after receiving elementary flying instruction at Borden or Deseronto. The training was made as realistic as possible. Smoke puffs were set off on the ground, at varying distances from the station, simulating shell bursts from the battery whose fire the airborne trainee was supposedly directing. The trainee, from an altitude of 2,000 feet, was required to locate the shell bursts on his map and wireless their map references to the ground. It was possible to come close to actual battle conditions, with the trainee correcting and directing the fire of the imaginary artillery battery below. At

the same time the trainee was required to pass other information to the ground, including matters such as troop movements and location of barbed wire.

One of the school's ground training aids was a pair of large maps, incorporating no less than 1,360 electric light bulbs, which could be flicked on singly to indicate shell bursts. Each map measured some 20 by 40 feet, prepared from aerial photographs, and depicting sections of the Western Front. Some 80 targets were marked on each map and by an ingenious system of switches and contacts, lights could be flashed on to simulate the fire of one or more artillery batteries on a selected target. The cadets sat on elevated benches some six to seven feet above the maps, noting each shell burst.

Practice bombing was also done at Leaside. The trainee flew towards a ground target and adjusted his bomb sight for (he hoped) his correct altitude, speed and heading, and the proper wind speed and direction, and as the target came into his sights he pressed his wireless key. Ground stations were able to establish his position and determine the accuracy of his aim. This practice bombing was done at Leaside for convenience rather than because of any association with the school's primary purpose.

Refinements in flying training proper were also being incorporated into the scheme. Until mid-1918 the pupils had been told a lot of things they must do, and many things they must not do, as they learned to fly an aeroplane. They had, though, not been told too much about why their aircraft behaved as they did. A new system of flying training had been developed in the UK, and this was to have a profound, and beneficial, effect upon the RAF training in Canada.

(to be concluded)

SCOUTING IN THE AIR DIVISION

By MISS CHRISTINE MCKENZIE
Boy Scout National Headquarters



Starting a Saturday morning hike at Metz, France, are Tom Adkins, David Lewis, Wayne Calvert and Bill Collier. Behind them are the 600-year-old German gates, distinctive landmark in this ancient city near which is the RCAF's No. 1 Air Division Headquarters.

WHEN an RCAF family is posted overseas its members must face many adjustments. For the young boys in the family, however, there is one activity available which will make them feel right at home — namely, scouting.

For approximately 1,600 Canadian boys (RCAF and army dependents) in Europe and thousands more in Canada, the week of 17-24 February has special significance. This seven-day period is known as Boy Scout Week.

Boy Scouts and Wolf Cubs in the RCAF's No. 1 Air Division belong to the Maple Leaf region. Within this region are district group committees set up at each station, responsible for co-ordinating and supervising the boys' activities. Next to the boys themselves are the scoutmasters, who receive their training from the regional training team and/or at the international training centre at Gilwell Park in England. The provision of sufficient scoutmasters is as much a problem over-

seas as it is in Canada and the efforts of those men who have a genuine interest in youth welfare are particularly appreciated.

The Maple Leaf region maintains close communications with the Boy Scouts of Canada National Council in Ottawa so that the boys can step smoothly back and forth between scouting in Canada and in Europe. The Air Officer Commanding No. 1 Air Division, A/V/M L. E. Wray, OBE, AFC, is honorary president of the Maple Leaf regional council and the president of the region is A/C D. A. R. Bradshaw, DFC. The positions of chairman and regional commissioner are held, respectively, by W/C L. A. Hall and S/L F. I. Stephens.

Facilities available in the form of transportation and equipment are excellent, enabling the boys to carry out varied activities. Community demands on local meeting places are heavy and so the scouts are usually allotted specific time and space at the servicemen's recreation

hall or at a school, enabling other groups to share the facilities. A recent step forward was the setting up of a scout store at No. 3 Wing, Zweibrucken, where cub, scout, guide and brownie uniforms and equipment may be purchased.

One of the many good points of overseas scouting is the similarity of its program to that in Canada. Cubs and scouts may continue just where they left off at home and vice versa. Also, because of common interest, friendly contact may be made with the local French and German Scouts and, through them, with the local people.

Camping, hiking and outdoor sports are major activities overseas as well as in Canada. However, in the former camping is often done with mixed European and Canadian troops, so that opportunities for international scouting are exploited. To spend summer camp in places like Schwarzwald (Black Forest) or in the mountains near the beautiful town of Heidelberg on



Maurice Desarmeaux, Billy Swain, Marcel Jolicoeur and Richard Rheame, of the 1st Nickel Belt Rotary Boy Scouts Group, tour Station Uplands under guidance of F/O C. Thomas, radio officer with No. 410 Sqn.



F/L A. McDonald signs his autograph for Scout Richard Pook and Cub Owen Smith following father and son banquet at which the former Golden Hawk pilot was guest speaker.

the edge of the Neckar Valley, hike up to Luxembourg and Belgium or to motor down to the International Chalet at Kanderstag in Switzerland is not a "once in a lifetime" thing, but a common occurrence. Just as common is a weekend spent with neighbouring French, English, German or Dutch boy scout troops. Scouts from all over the world meet at the international scout camp at Wilts, Luxembourg, where many camping grounds and chalets are available for the use of scouts in Europe. Camp sites are free, and the cost at the chalets is minimal. The following event gives an example of good international scouting.

Early last fall, 18 boy scouts from the "Red Patch" region (Canadian Army, Soest) attended a "Jamborette" at Arnsberg, Germany, along with 100 scouts from Western Germany, Holland, Great Britain and the U.S.A. whose families were stationed in Europe. Language difficulties were quickly overcome by

the camp directors who brought the national groups together in cultural exchanges, camp-fire sing-songs, hikes, games, sports and tours of the local area. The breakthrough of the language barrier was further accomplished by a few English-speaking German and Dutch scouts, who taught the Canadian, American and British scouts to speak simple German and Dutch phrases. By the end of camp the scouts had made rapid progress and were carrying out simple conversations with one another. The Canadian boys came back with many souvenirs and photos to send home to friends in Canada, plus a new appreciation of international living.

The RCAF has shown a keen interest in Canadian scouting overseas and is giving full moral and active support to the movement. In addition to providing a healthy and enjoyable recreation, scouting also builds up good international relations as the path across the world is well-trodden by boy scouts. ☺

F/L J. W. Gourlay, scout master of the 2nd Bells Corners Troop, and Scout Donald MacDonald, son of G/C J. K. MacDonald, on familiarization visit to RCAF Stn. Rockcliffe. F/L Gourlay is one of many serving officers and airmen active in scouting in Canada and Europe.



Canada's First Military Aircraft:

THE BURGESS-DUNNE HYDRO-AEROPLANE NO. 1

By K. M. MOLSON, Curator, National Aviation Museum

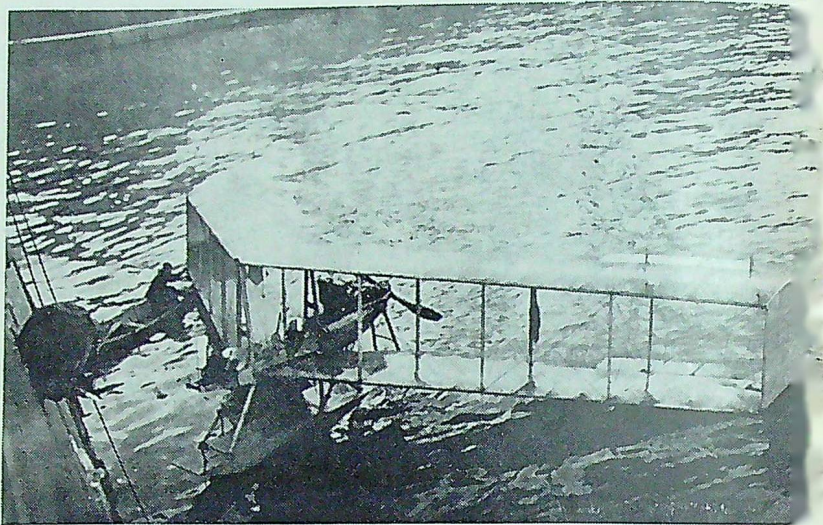
THE Canadian Aviation Corps was Canada's first military aviation organization, and while its career was extremely brief and not very glorious, it seemed essential that the National Aviation Museum have some relic to commemorate its existence. The story of the Canadian Aviation Corps has been told several times.* Unfortunately, none of these stories states the specific type of Burgess-Dunne aircraft that was purchased and used by it, nor do the official records indicate this either.

Before a model of the proper Burgess-Dunne could be made for museum display, it was essential to establish just what type was used. No photographs of the actual Corps machine had been printed in contemporary publications, and when this quest for information began, no photographs were known to exist.

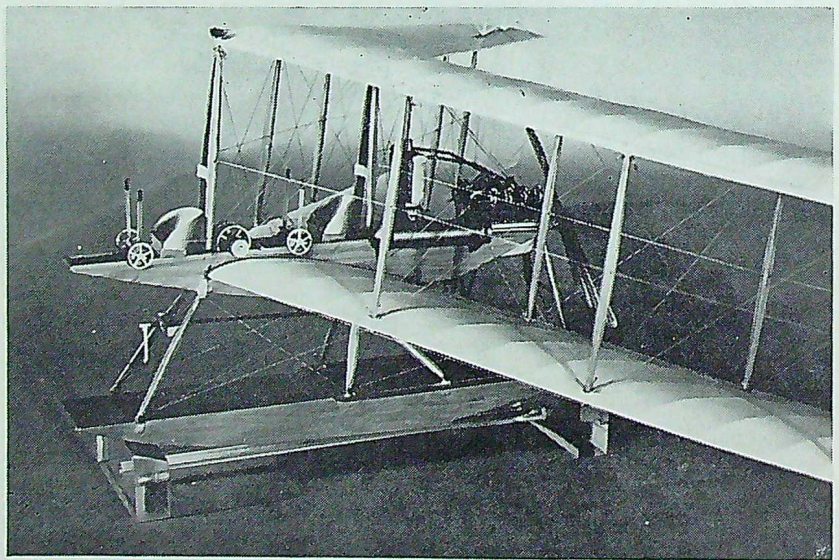
The design of the Dunne aeroplanes began in 1904 when Lieutenant John William Dunne, of H. M. Balloon Factory at Farnborough, who was employed as a man-carrying kite designer, developed an interest in powered aircraft. He had some theories of how an inherently stable aeroplane might be made. These theories were developed and tried at Blair Atholl in Scotland in great secrecy until he left the Balloon Factory in 1910. At this time the Blair Atholl Aeroplane Syndicate Ltd. of London was formed by the Marquis of Tillibardine to further develop these ideas. Several new Dunne designs were prepared until the development of the type terminated in England in 1913.

These aeroplanes comprised both

* *ROUNDEL*, Vol. 11, No. 8, Oct. '59.



The original Burgess-Dunne of the Canadian Aviation Corps, being brought alongside a troopship at Quebec prior to being hoisted aboard for shipment overseas in 1914.



Scale model now on display at the National Aviation Museum in Ottawa. Note seating and controls arrangement.

monoplanes and biplanes, but the Dunne name will always be associated with large tailless four-bay biplanes featuring wings swept back with a steadily decreasing angle of incidence towards the tip.

In 1913 the Burgess Company of Marblehead, Massachusetts, obtained the rights to the Dunne patents in the United States and commenced the manufacture of them. The first Burgess-Dunne machine was flown by Mr. Sparling Burgess during late February of 1914. From then until 1916 some eight variants of the design were produced by the Burgess-Dunne Company, which claimed to have made substantial improvements over the basic Dunne aeroplane as developed in England.

Although the exact model of Burgess-Dunne aircraft acquired by the Canadian Aviation Corps in September 1914 was not known, certain facts about it were evident. It was a two-seater seaplane and undoubtedly a very early model. One of the main reasons for its purchase was understood to have been the fact that it was available at a moment's notice.

In the spring of 1961 the daughter of a well-known Ontario Provincial Air Service pilot asked if the Museum would be interested in looking at some old O.P.A.S. photographs. Our pleasure and surprise may be imagined when the top three yellowing photographs turned out to be the particular Burgess-Dunne aircraft of the Canadian Aviation Corps taken at the time it was loaded on board ship at Quebec City. One of these photographs is reproduced with this article.

From original drawings held by the National Air Museum in Washington, it was determined that the Canadian Aviation Corps machine was a modified version of the first Burgess-Dunne design, and thus it was possible to proceed with an order for the model of Canada's first military aircraft.

This model, now on display at the Museum at Ottawa's International Airport, is of a typical Burgess-Dunne design, a four-bay biplane with a single float, equipped with an early version of the Curtiss OX engine. What is surprising are the arrangements for seating the crew. The original Burgess-Dunne Hydro-aeroplane No. 1 was a single-seater only, and a pilot was ac-

commodated on top of a sled-like structure, protected from the wind by a small fairing. It is evident from examination of the photographs that the machine had been modified later to accommodate a second occupant and the fairing that surrounded the pilot was completely removed, leaving the two occupants sitting completely exposed to the elements. ☉

SCALE MODEL COLLECTION DONATED TO RCAF

A collection of over 130 model aircraft, relating the history of aviation since 1909 in countries which have contributed most to its evolution (namely Canada, France, Great Britain, Germany, Holland, Italy, Japan, USA and USSR) has been donated to the RCAF by its creator,

Mr. Andre Poulin of Montreal.

Mr. Poulin has spent some 10,000 hours over a 12-year period to complete his collection. This started in 1950 as a hobby and eventually developed into a small business and finally resulted in the manufacture of industrial and commercial scale models.

The monetary value has been set at a conservative \$20,000. According to Mr. Poulin the essential qualities required of a good scale model artist are natural ability, hard work, and continuous research.

Mr. Poulin is an ex-army lieutenant who saw active service from 1940 to 1945 with the St. Hyacinthe and Fusiliers Mont-Royal Regiments. He is married, has three children and resides at 6521 Des Erables, Montreal.

Having failed to achieve his goal of becoming a pilot and thus devote his life to aviation, he nevertheless applied his talents to building this collection with the intention of offering it to the RCAF.

"I know now that my collection rests in good hands and I promise G/C Hodgson to complete it and keep it up to date," he said. ☉



Mr. Andre Poulin donates his collection to G/C W. B. Hodgson, commanding officer RCAF Stn. St. Hubert.

THEOLOGICAL THERMIONICS

Extract from the magazine of the RAF Electrical and Wireless Schools,
July 1939.

THE lesson for today is taken from the second chapter of the book of the prophet Fleming,* beginning at the sixth verse:

And there dwelt nigh unto one of the gates of the great city of High Tension Battery, an official of the greatest importance, known as the Negative Terminal.

It came to pass that this official, seeing a number of Electrons gathered together a little way off, saith unto them:

“Get you gone, O ye of little mass, gird up your loins, and follow in the footsteps of your brothers and sisters before ye.”

And as they travelled through the narrow valley of Copper Wire, they were guided by a great pillar of fire, called the Indirectly Heated Cathode.

When they had come nigh unto this, a voice issued from the pillar of fire and cried unto them, saying, “Halt, ye have travelled far, and are doubtless weary. Prepare your camp, and rest.”

And they did so, numbering many thousands.

Wherefore they named the place Space Charge, as it is known even unto this day.

But on the morrow there came a mighty wind, known in those parts as the Electric Gradient, of such great magnitude that it swept the Electrons through the great Forest of Grid, up the steep slope of Anode Resistance, ceasing not until it had deposited them on the great Plain of Plate.

And there they did rebuild their camp, as they were weary and did hunger and thirst.

But presently there cameth an inhabitant of that part, an aged Atom of Molybdenum, renowned for his sagacity and piety throughout all the land.

And he drew nigh unto the Electrons and spake in this wise:

“There lieth, but a few days’ journey distant, a great city in a land flowing with electrolyte and honey.”

And the Electrons, knowing this to be their birth-place, made haste and journeyed without ceasing.

But lo, in their path there stood a great mountain, called Anode Load.

And there were two paths, one steep and rocky, passing over the top of the mountain, the other wide and smooth, passing around its foot.

And the two paths were known as Inductance and Capacity.

Whereupon the evil Electrons took the smooth path of Capacity.

But presently they came to the bottom of the great precipice of Dielectric, and they could not pass.

Then there sprang up a mighty tempest known as the Tank Circuit Oscillatory Current, which swept the Electrons against the precipice time and time again.

But they still could not pass, as it allowed no admittance.

And there they remain, even unto this day.

But the good Electrons took the rocky path of Inductance.

And it came to pass that they were attacked by a great army of warriors known as Lines of Magnetic Flux. Whereupon the Electrons cried out unto their Ruler of Positive Potential, and he heard their supplications.

He blessed them with kinetic energy, and on that day there collapsed many thousands of Lines of Magnetic Flux.

And presently they drew nigh unto the great city of High Tension Battery, where they were received with great rejoicing.

And the Ruler of Positive Potential spake in this wise:

“My children have been returned to me unharmed; let there be a great feast.”

Whereupon many fatted Atoms of Zinc were slaughtered, and many vessels of electrolyte made ready.

But afterwards the Electrons, having eaten and drunk to excess, dispersed throughout the city, destroying many vessels of electrolyte, killing many Atoms of Zinc and polarising the rest with fear.

And the Ruler of Positive Potential was exceeding wroth, and condemned them to be driven from the city by the Negative Terminal.

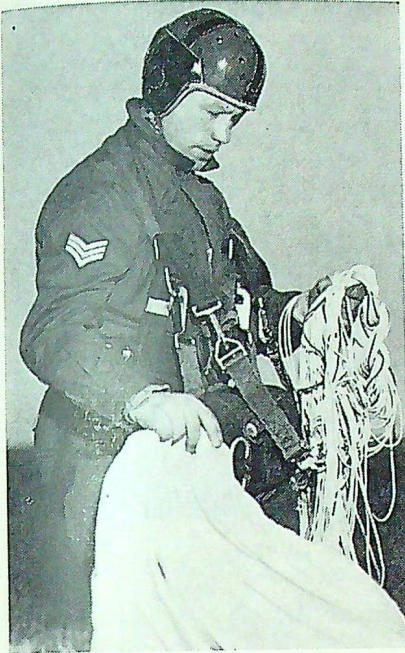
And so they wander, even unto this day.

Here endeth the lesson.

* Sir John Ambrose Fleming, inventor of thermionic valve or tube.

The Suggestion Box

The following individuals have received awards from the Suggestion Award Committee, Department of National Defence, for suggestions which have been officially adopted by the RCAF. Photographs of winners of \$100 or over appear below. Proper procedure for submitting suggestions is detailed in AFAO 99.00/01.



PARACHUTING RECORD

Sergeant R. Crebo, an RCAF para-rescue NCO, has set a Canadian armed forces record for parachute jumping with his 400th jump.

This milestone was reached recently when Sgt. Crebo "bailed-out" of an aircraft flown by No. 111 Composite Unit, Winnipeg. During his 21 years of RCAF service, Sgt. Crebo has served for almost 17 years in the para-rescue trade. He completed two tours as an instructor at the RCAF's para-rescue and survival school at Edmonton and has been stationed at various RCAF units in the para-rescue sections. He is now NCO in charge of No. 111 Composite Unit para-rescue section at Winnipeg.

During his career Sgt. Crebo has participated in three actual para-rescue operations. On one occasion he jumped to rescue a 70-year-old trapper and he has jumped twice at crash scenes.



WO2 M. Shopka of No. 412 Sqn., Uplands, made a suggestion concerning an anstat antenna tensioner installing tool.



Sgt. T. L. Williams of Stn. Uplands made a suggestion concerning the repair and overhaul of liquid oxygen filler valves at unit level which was adopted officially by the promulgation of EO 55-65-GE-2GEA dated 7 August 1962.

Other award winners:

F/O J. E. McNeil
 WO2 E. C. Reid
 FS H. S. McGuirl
 FS H. W. O'Brien
 FS G. R. Ouimet
 Sgt. G. D. Vaughn
 Sgt. W. Stan
 Sgt. D. E. White
 Sgt. G. Stewart
 Cpl. J. Harrison
 Cpl. E. J. C. Rodda
 Cpl. J. H. MacDonald
 LAC R. Lesieur



Courtesy CANADAIR NEWS



RCAF ASSOCIATION

This section of ROUNDEL is prepared by Association Headquarters, 424 Metcalfe St., Ottawa, Ont.

PRESIDENT'S MESSAGE FOR THE NEW YEAR

As we enter a new year it is appropriate that we reflect on our achievements of the past 12 months. Foremost, I think, was our stand on nuclear weapons where the RCAF Association placed the best interest of Canada ahead of all else. I think that this is consistent with our resolve to support an efficient Air Force for the defence of our country. However, at the same time we should strive for peace, goodwill and friendship among all nations.

We must endeavour to increase the effectiveness of our organization so that our aims may be disseminated to as many Canadians as possible. I therefore charge every member to sign up, during the next six months, one new member so that our physical membership may be doubled during that period. Any Wing achieving this objective will receive suitable recognition at the 13th National Convention, scheduled for 26-27-28 September at the Bayshore Inn, Vancouver, B.C.

Let us go forward and make 1963 a great year for the RCAF Association. A happy and prosperous New Year to you all.

P. F. CONNELL,
National President.

Chief of the Air Staff A/M C. R. Dunlap and Mrs. Dunlap were patrons at the annual dinner dance of No. 306 (Maple Leaf) Wing at the Queen Elizabeth Hotel in Montreal last December.

WING BULLETINS

No. 404 (Kitchener-Waterloo) Wing is the first wing in Canada to have reached its quota of new members for the 1963 membership drive. This news was announced at a district re-union and social evening last November, attended by the national president and members of No. 440 (Oxford) Wing of Woodstock, No. 434 (Welland) Wing and No. 447 (City of Hamilton) Wing.

No. 431 (Krakow) Wing welcomed both National President P. F. Connell and First Vice-President G. E. Penfold to the Blue Ball — annual formal event staged by our Polish colleagues in Toronto.

No. 600 (Regina) Wing notes that air cadet membership in the area has increased by 30 percent since 1961. Recently the three squadrons sponsored by the RCAFA in Regina (Nos. 34, 41 and 703) held a banquet

Miss J. O'Hara, on behalf of the national headquarters staff, thanks all from near and far who sent season's greetings to the RCAF Association.





At No. 404 Wing re-union (l. to r.): T. Williams, J. Gray, G. Penfold, N. Teskett, D. Christenson, B. Johnson, B. Ker, R. Newton, P. Connell, R. Watterson, A. Paquette, S. Muncey.

attended by parents and guests. Events like this are credited with helping achieve this increase.

No. 441 (Kempenfeldt) Wing at Barrie, Ont., No. 406 (North Bay) Wing and No. 251 (Madawaska) Wing at Edmunston, N.B., all welcomed 1963 in new wing premises. Opening ceremonies had previously been performed at Barrie by G/C W. A. Hockney, Northern NORAD sector commander, and at Edmunston by Mr. D. McKenzie, president N.B. division RCAFA Maritime Group.


No. 500 (Winnipeg) Wing and No. 306 (Maple Leaf) Wing in Montreal collaborated in extending "hands across the sea" recently to Mr. and Mrs. A. F. Briggs of England, who came to Canada to visit the grave of their son, John, killed whilst undergoing flying training in 1953.

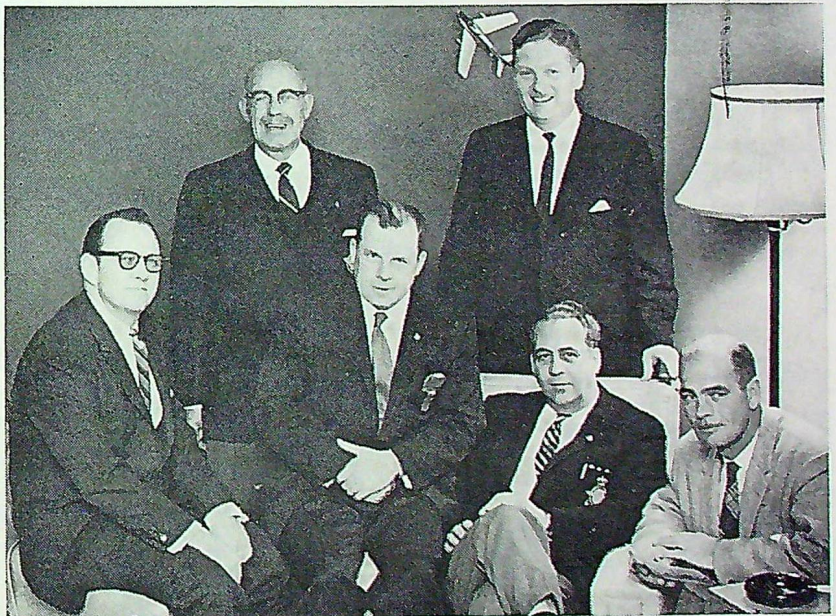
The Briggs were met at Montreal dockside and entertained prior to departure for Winnipeg by Maple Leaf Wing members, and again on their return journey as they passed through Montreal. In Winnipeg RCAFA members escorted them from the train to their hotel, took them to Brookside Military Ceme-

tery next day, and showed Mr. and Mrs. Briggs typical Winnipeg hospitality during their brief visit.

ANNUAL DUES

The 12th Annual Convention in

Halifax authorized an increase in yearly dues from \$3.00 to \$4.00, commencing 1 August 1963. The increase in revenue will be used to cover expanding Association operating expenditures. 



No. 406 Wing members at opening of their newly-renovated quarters in North Bay: (standing) D. Rumble and J. Barr, both past presidents; (seated, l. to r.) J. Gorman, A. Larden, President T. Farmer and J. Halliday.

Letters to the Editor

SPACE NEEDLE SKEPTICISM

Dear Sir:

May I kindly drop a line
Re volume fourteen, number nine?
Where Golden Hawks are flying by
The fancy diner in the sky.
Where are their shadows on the Fair?
I've looked and looked — they are
[not there!]

Jiggery-pokery, hocus-pocus,
Is it *me* that's out of focus?

Some nasty folk say pic was made
With pot of paste and razor blade!
Or was formation really flown
By your photographer alone?
Mr. Ed., please tell me true,
You wouldn't fool a chap—would you?

Jiggery-pokery, hocus-pocus,
Tell me quick; it *can't* be bogus.

W/C L. A. Yellowlees,
RCAF Stn. Camp Borden, Ont.

*Jiggery-pokery, hocus-pocus,
It is you, sir, that's out of focus.
Yes, this formation really flew.
We'd never try to mislead you.*

— Editor.

YUKON IN THE YUKON

Dear Sir:

You might be interested to know that when the first *Yukon* visited its namesake, the Yukon, this aircraft from No. 437 Sqn. landed at Whitehorse where a brief, but appropriate, ceremony took place. Mr. J. F. Delaute, executive assistant to the commissioner of the territory, presented a copy of the Yukon coat-of-arms to F/L J. S. Parmelee, captain of the aircraft (see cut).



By happy coincidence the aircraft and crew were from the "Husky" Sqn. and the Yukon Territory crest is surmounted by a malemute, which is frequently called a "husky". The *Whitehorse Star* published photographs and captions of the aircraft and crew and a radio interview between Mr. Delaute and F/L Parmelee was broadcast over the northern service of the CBC through station CFWH.

Mr. W. J. M. Gibson,
Director of Travel and Publicity,
Government of the Yukon Territory.

NO. 401 SQN. BROCHURE

Dear Sir:

An historical brochure, commemorating No. 401 Sqn.'s standard presentation is now available. Interested parties could drop a note to the address below, enclosing a slight token to cover mailing cost.

F/L H. J. Gray,
No. 401 Sqn. RCAF (Aux.)
4450 Sherbrooke St. W.,
Westmount, P.Q.

BOOKS WANTED

Dear Sir:

Station Chibougamau, one of our far northern outposts which is now on the RCAF map, is in the process of building up a station library, to help the boys while away the long winter nights.

Please advise your readers that if their libraries have any surplus books they would like to donate, to assist in the above endeavour, they would be most welcome.

Sgt. J. B. Cowley,
Secretary, Stn. Library Committee,
RCAF Stn. Chibougamau, Que.

NO. 412 SQN. PHOTO ALBUM

Dear Sir:

The personnel of No. 412 (T) Sqn. are interested in developing a comprehensive squadron album depicting the air transport role in the Ottawa area as it pertains to No. 12 Communications Flight and 412 (T) Sqn.

Could we appeal to your readers for assistance? We would welcome information and photos associated with operations of these units from the late 1930s to the end of World War II. We would, of course, return all the photographs after copying them.

F/L G. H. Goodale,
RCAF Stn. Uplands, Ont.

RCAFA LIAISON

Dear Sir:

The executive and members, Ontario Group, RCAF Association, would like to extend to you and your staff, congratulations for the excellent coverage your magazine gave the Association's National Convention in Halifax.

ROUNDEL will prove, we are sure, that it is the best possible media for the Association to introduce its aims, objects and activities to serving members in the RCAF, the future prospective members who alone can guarantee that our Association will continue to function down through the years.

W. H. Caverly,
President Ontario Group,
RCAF Association.

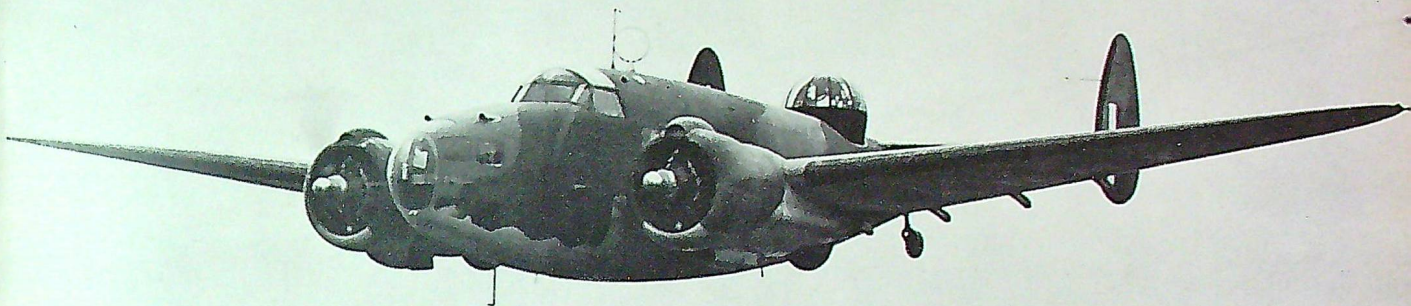
LANCS OVER ATLANTIC

Dear Sir:

Minor as your error may be in the "Aircraft Album" series (Vol. 14, No. 9, Nov. 62), I am obliged to mention that No. 408 Sqn. is not the only unit flying *Lancasters* in the RCAF. We in No. 107 Rescue Unit have three *Lancasters* on strength. They are our only aircraft and are, as always, doing a yeoman's service in the North Atlantic SAR area. One aircraft and crew is maintained on 30 minutes readiness around the clock, 365 days of the year and 18 minutes is our average time to be airborne from the sounding of the alert bell for an intercept over the Atlantic.

S/L G. G. Monson,
Officer Commanding, 107 RU,
RCAF Station Torbay, Nfld.

(Enclosed was a clipping from the *LONDON TIMES* showing a No. 107 RU *Lanc* which flew the Atlantic to participate in a Battle of Britain display last September. — Editor.)



Aircraft ALBUM:

Lockheed Hudson

The *Hudson* was developed from the Lockheed 14 transport, and became a familiar sight to members of the RAF, RCAF, RAAF, and USAAF. It was used for anti-shipping and anti-submarine patrols, air/sea rescue, meteorological operations, and sometimes for night bombing.

Hudsons were flown by No. 407 Sqn. from September 1941 until January 1943 on anti-shipping operations. They attacked enemy convoys at mast-head level, and bombed more than 400,000 tons of shipping. In Canada the RCAF flew 243 *Hudsons* with Nos. 11, 113, 119, 120, and 145 bomber-reconnaissance squadrons. No. 11 formed on 3 Nov. '39 to become the first RCAF unit to use the type. The first U-boats sunk by Eastern Air Command aircraft were victims of *Hudsons* flown by No. 113 Sqn. (31 July '42) and 145 Sqn. (30 Oct. '42), and in all EAC *Hudsons* made 28 attacks on German submarines. No. 11 Sqn. converted to *Liberators* in August 1944 but *Hudsons* continued to fly with operational training squadrons, with Nos. 121 and 167 (Composite) Sqns., and with No. 168 (Heavy Transport) Sqn. until after the war.

Roger Duhamel

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