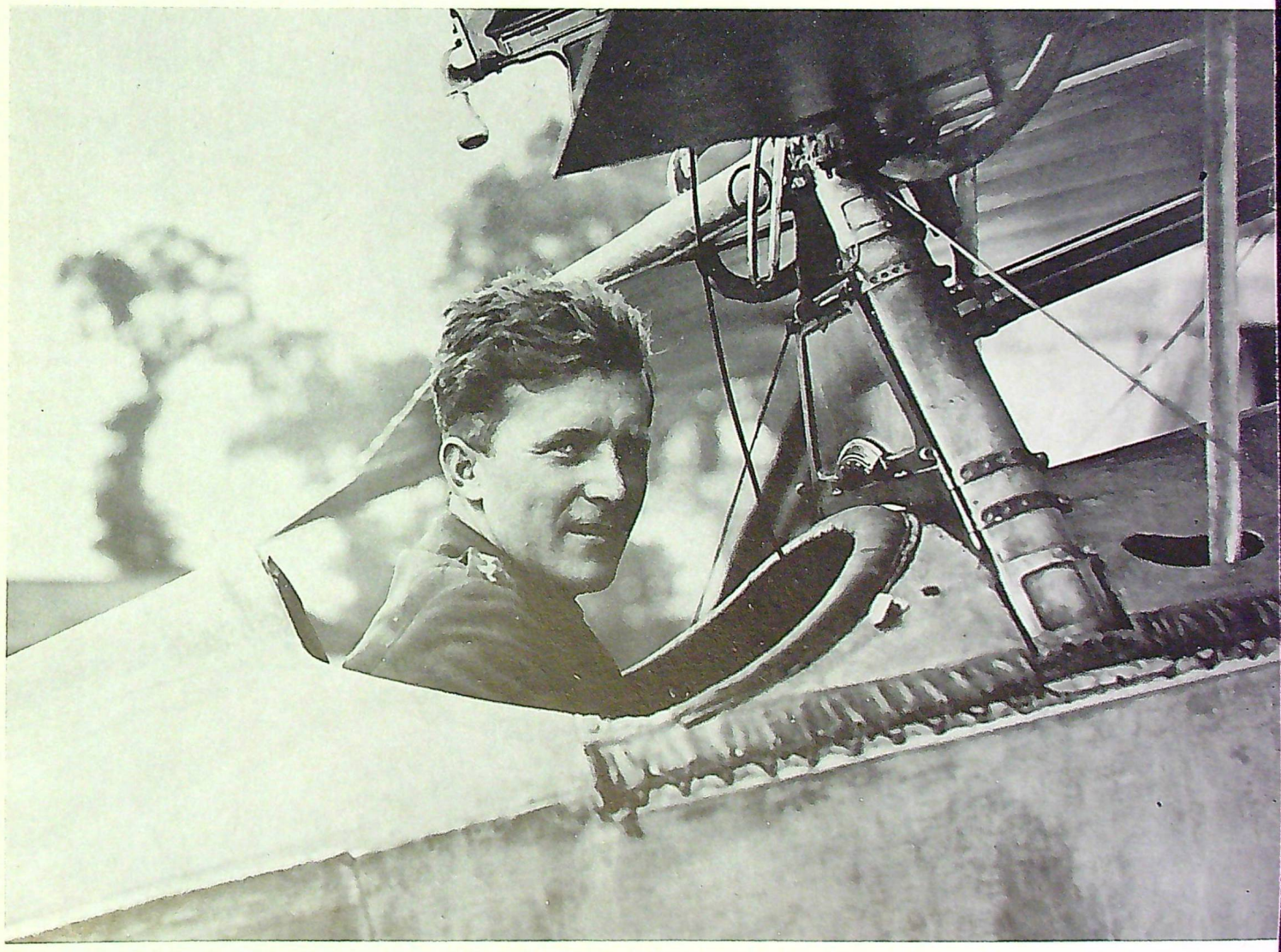
The CROUNDEL

Vol. 8, No. 8
OCTOBER 1956



ROYAL CANADIAN AIR FORCE

THE Roundel

Issued on the authority of
THE CHIEF OF THE AIR STAFF
Royal Canadian Air Force

Vol. 8, No. 8

OCTOBER 1956

* * * CONTENTS * * *

This Month's Cover

In tribute to Air Marshal W. A. Bishop, V.C., C.B., D.S.O., M.C., D.F.C., who died on 11 September 1956 at the age of 62, we print this photograph showing him as a Captain in No. 60 Squadron, R.F.C., seated in a cockpit of the Nieuport Scout on which he flew to fame in the skies of France in 1917 and became the first Canadian airman to win the Victoria Cross. On two tours of duty on Western Front he destroyed 72 enemy aircraft and established a tradition of gallantry and achievement in air combat which has been - and will ever remain - the inspiration of Canada's fighting airmen.

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SGT. SHATTERPROOF DRAINS THE PRODUCT

Sir:

When a great public figure, mature in years and rich in honours, retires from the Service of his Sovereign, he is seldom permitted to enjoy that rest which is his due. Yearn though he may to devote the remainder of his days to the breedings of pigs, the cultivation of herbaceous borders, or cabinet-making, the world will have none of it. Long before the banquet is held at which he bids farewell to his friends and colleagues before staggering off into private life, he is approached by organizations whose talent-scouts have been watching him ever since he broke his first lance in the inter-departmental lists.

It is pointed out to him that almost anyone can induce a pig to propagate, and that not even the Minister of Agriculture can pollenize a perennial any better than the humble bee. On the other hand, neither the bee nor the pig can sit with dignity on a board of directors. It takes a *man* to do that.

Should he, still dreaming of quiet hours with his mitre-box and glue-pot, retort that it also takes a man to get an ulcer, he is reproachfully reminded of those dedicated captains of industry who have not hesitated to offer up their duodenums on the altar of Canadian prosperity. Will be — *can* he — follow his own personal inclinations while there is still a hovel without television or a teen-ager without a Cadillac?

By such compelling appeals (or by others no less irresistible) the weary executive is usually won over. He sees his duty and he does it. Before he has had time to cash his first pension cheque, he finds himself once more trussing up his points and plunging back into the *mêlée*. And when at last, with his digestive tract patched like an old inner tube, he finally settles down to the construction of his first cabinet, he has neither the time nor the strength left to do more than make his own coffin.

Only at the eleventh hour, Sir, was I myself spared from the fate I have just described.

* * *

Not long ago I received a letter from the president of a nationally known brewery, inviting me to call upon him the next time I should be in the City. He had, he said, certain proposals to make that might be of interest to me when I should be retired from the Service. Thus, the following weekend found me seated in his office, exchanging those urbanities which prelude all intercourse with the world's merchant princes.

"And now, Sergeant Shatterproof," he said at last, "before I tell you why I have asked you here, let us - er - taste the Product." He smiled. "Possibly you are already familiar with it."

Such a possibility, I admitted, did exist.

He turned to a silver-bound firkin that stood on a rack beside his desk. Taking one of the tankards which hung beneath it, he deftly filled it and handed it to me, averting his face as he did so.

"You must excuse me for not joining you, Sergeant," he said. "The Product is, to me, rather like candy to a confectioner. I've long since lost all taste for it."

As you may imagine, Sir, his words left me somewhat aghast. Mastering my emotion, however, I made suitable sounds of commiseration, and drank to the speedy recovery of his palate.

"I understand, Sergeant Shatterproof," he resumed presently, "that you will be leaving the Air Force in about two years' time. Is that correct?"

"I am", I told him, "at Her Majesty's disposal. Should it be her gracious wish that the old warhorse go to pasture, she can rest assured that the Royal Canadian Air Force now stands four-square against the winds of circumstance. L.A.C. Bladder, whom I have long been grooming to step into my shoes, will see to it that the foundations I have laid are not lightly undermined. In his loyal breast there burns—"

"Precisely", said the president. Deftly he relieved me of my empty tankard and refilled it —and my heart bled for the man as I noticed the involuntary grimace of revulsion with which he handed it back to me.

"Well, Sergeant," he continued, "as soon as I heard the rumour, I called a meeting of our directors. We must act fast, I urged them, if we are to anticipate the offers that will soon come cataracting in upon Sergeant Shatterproof from Britain and the United States."

I thanked him for the compliment.

"To put the matter in a nutshell," he went on, "we would like you to accept a directorship in our corporation. The salary is, of course, nominal — ten thousand a year — but your duties will not be arduous. Apart from sitting at the board's meetings, you will merely be asked to — ugh! — taste each brew, either personally or by proxy. The *cachet* of your approval, we feel, will be of inestimable assistance in encouraging the sale of that life-giving beverage" — he winced perceptibly — "in the manufacture of which my associates and I have spent our lives. It is, I think, a mission that will call forth all the idealism for which your name has become a byword. We are, furthermore, prepared to pay you five thousand dollars in cash for the exclusive rights to your forthcoming book, 'The Prepandial throughout the Ages'."

To say that I was unmoved, Sir, would not be true; but, despite my samplings of the Product, the statesmanlike caution of the Shatterproofs warned me against making any hasty decisions.

"I am", I said, "deeply touched by your confidence in me. Surely, though, I should know something about the actual art of brewing?"

"It is not essential," he said, "but it certainly would do no harm." He pressed a buzzer. "Our Mr. Grogblossom will show you around the plant. I would accompany you myself, but the mere smell of the Product—"

* * *

"This", Mr. Grogblossom informed me, "is where the whole operation commences. The barley, which has just started to germinate, is dumped into these hoppers, whence it passes into the boilers in the room below."

"Barley, then," I said, "is the basis of all your beer?"

Mr. Grogblossom nodded, swallowing hard.

"I wonder," he said, apologetically, "if you'd mind referring to it as 'the Product'. It would make things a little easier on me if you did. And now" — he led the way down a flight of stairs—"hold your nose. This is where the going begins to get rough."

As we debouched on to the next floor, an exquisite aroma greeted my nostrils — an aroma that I quickly identified as that of hops and boiling barley-water. I inhaled deeply. Mr. Grogblossom looked at me in dismay and clapped a handkerchief to his nose. Briefly, and in a muffled voice, he explained this stage of the process, then hurried me on. . .

And so, Sir, my tour continued—through the cooling-room, the fermenting-room with its quarter-acre of foam-crowned vats, the warm storage, the cold-storage, until finally we emerged into the rattle and clatter of the bottling-plant. Normally, I would have been spellbound by the majestic spectacle of six-hundred bottles marching out in unending procession every minute of the day and night, but now I was aware only of a feeling of profound depression.

For the past hour I had seen not a single face expressive of that serenity of spirit one would expect to discern in men called to such high tasks. The brewmaster, I was informed, drank only water. One of the inspectors had developed so acute an allergy to the Product that a teaspoonful of it in a Welsh Rabbit would put him on his back for a week. In a word, I had been in a purgatory where strong men lose their taste for ale.

* * *

"Ah, Sergeant Shatterproof," exclaimed the president when I reentered his office. "Pray sit down. You'll have a refresher, of course?"

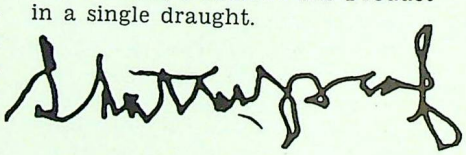
Then it was, Sir, that I experienced the darkest moment of my life. My hand shakes even now as I write of it.

I almost said "no"!

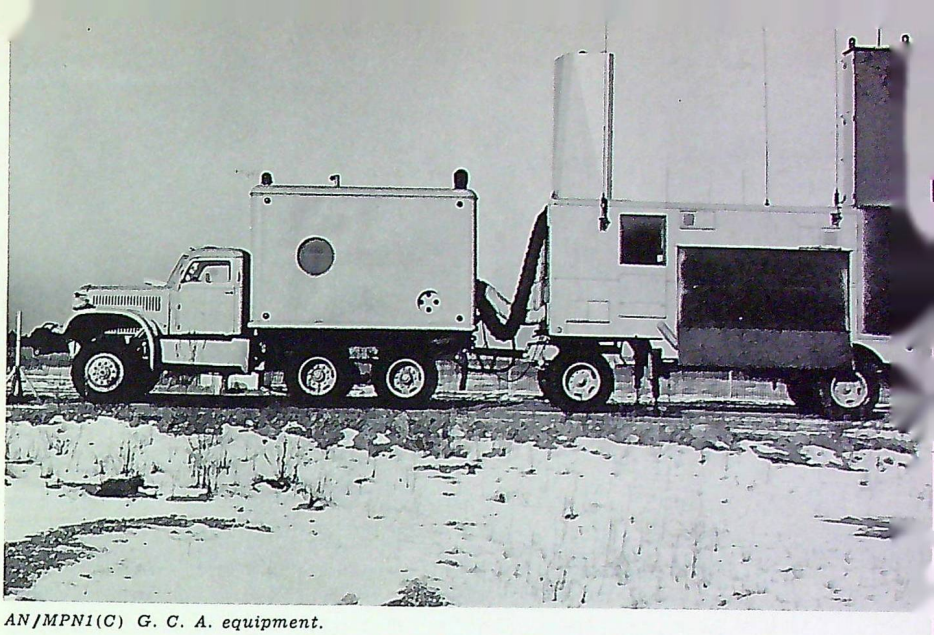
Well may you blench, Sir, as you read those words. But have no fear. The awful implication of what was happening flashed through my mind. With a mighty effort, I shook myself free of the insidious influence that had already begun to affect me; and when the president handed me the tankard, I took it from him in a firm grasp. Our eyes met.

"Mr. President," I said in ringing tones, "I thank you for the generous offer you have made me. I must, however, decline to accept it."

With that, I drained the Product in a single draught.



THE G.C.A. STORY



AN/MPN1(C) G. C. A. equipment.

BY FLIGHT LIEUTENANT D. C. CLAIR
Directorate of Radio Navigation, A.F.H.Q.

(Many of our readers, no doubt, first heard of Ground-Controlled Approach during the stirring days of the Berlin Airlift, in 1948 and '49. Vital though its contribution was to the success of that operation, G.C.A. was still in its comparative youth. In the present article, Flt. Lt. Clair tells us the story of the remarkable equipment which now occupies so important a place in the everyday flying operations of the R.C.A.F. The author, who joined the R.C.A.F. in 1937 as a wireless operator mechanic, remustered to aircrew and became a navigator during the war. He was attached to R.A.F. Transport Command in India and Burma during 1945, then served for a time with No. 120 Transport Wing of the R.C.A.F., in Europe. Returning to Canada in 1946, he re-entered the field of telecommunications.—Editor.)

WHAT G.C.A. IS

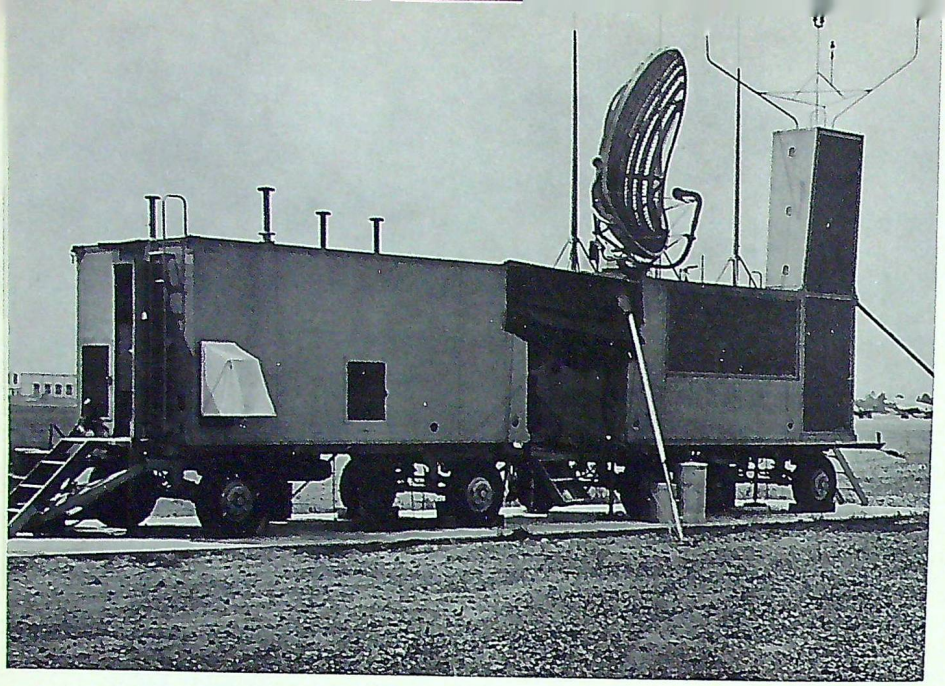
For the benefit of those to whom the letters "G.C.A." are no more than another set of the initials that bedevil this electronic age, it might be as well to explain that they stand for the words "Ground-Controlled Approach". Ground-Controlled Approach is a radar system that can provide guidance to a degree of accuracy sufficient to enable an aircraft to land safely under conditions of very low ceiling and visibility. The G.C.A. equipment, which is located on the airfield and operated by controllers, "picks up" and follows the aircraft's track on its indicators. The controllers, by passing to the pilot information as to the various headings and altitudes he should maintain, bring him down to a point from which he can successfully complete the landing. The development, nature, and operation of the equipment used by the controllers to accomplish their task forms the subject of "The G.C.A. Story".

THE DEVELOPMENT OF G.C.A.

Radio Beam Systems

The problems of ensuring a safe landing under conditions of reduced ceiling and visibility were recognized quite shortly after the military and commercial possibilities of the aeroplane had been generally accepted. The earliest history of attempts to provide blind-landing assistance reveals the use of "talk-down" methods, when the anxious pilot hopefully circled the general area of the airfield while the control-tower operator tried to guess his position by the sound of his engine and thus steer him in the right direction. To say the least, neither the controller's ear nor any of his acoustic aids were very accurate, and it is a matter of record that many of the early "guided" approaches ended in disaster. The situation was further aggravated by the crankiness of the aircraft communications equipment of the day. In addition, the human tendency to trust the evidence of the eyes in preference to that of the ears led the pilots of that era to the belief that the ideal blind-landing system would consist of a dial on the instrument panel which would indicate when they were approaching the runway on the proper heading and glide angle. Engineers both in Europe and North America set themselves the task of justifying this belief, and during the 1930s several systems based on the use of radio beams were developed.

The principle of all of these system was to project into the airspace beyond the end of the runway, a pair of radio beams, one of which would furnish an extension of the runway centre-line and the



AN/MPN11(B) G. C. A. equipment

other a suitable glide-path angle. These were later augmented by placing "markers" at various positions along the beam as a means of indicating to the pilot the progress that he was making in his approach to the runway. The aircraft, of course, was fitted with special receivers and indicators to receive and display the information provided by beam and marker. As a result, the pilot had before him a cross-pointer instrument which, if everything worked properly, he could use to keep himself on the beam to a safe touch-down. As research made higher radio frequencies available, these were used for further landing-aid developments, and, by the start of the Second World War, several agencies in the U.S.A. and Europe had "successful" blind-landing systems, all of which used some form of beam presenting the pilot with an instrument indication of the heading on which to fly.

As the war progressed, the need for a standard blind-landing system was appreciated by the U.S. military services. The outcome of their considerations led to the S.C.S.51, a two-beam system which provided a directional or localizer beam operated at 100 megacycles and a glide-path beam in the 300-megacycle band. It was, in fact, a modification of the Instrument Landing System (I.L.S.) that had been developed by the Civil Aeronautics Authority and is currently in use at many commercial and military airports throughout the world.

G.C.A.

Although the S.C.S.51 was adopted by the U.S.A.A.F. as the official blind-approach system, the search for something better continued. The head of an interested group at the Massachusetts Institute of Technology was a Dr. Luis Alvarez, who must be credited for originating the idea of G.C.A., and who was one of a team set up at M.I.T. in 1940 to develop the then new field of microwave radar.

One day, while observing tests of a new anti-aircraft radar, Dr. Alvarez noted how accurately it followed all the manoeuvres of the target aircraft and fed the information into the gun director. Watching these tests, he reasoned that if radar information could enable an anti-aircraft gun to shoot down an aircraft, it should be accurate enough to direct the aeroplane to a landing. Pursuing the idea further, the anti-aircraft radar was moved to East Boston, and, with a member of the laboratory staff serving as pilot, tests were carried out to prove Dr. Alvarez' theory. A movie camera was fitted to the radar antenna and a light mounted on the undercarriage of the aircraft. The radar equipment tracked the approaching 'plane almost to the ground and the movie film indicated that the tracking was steady enough to be used for control purposes. The next step was to prove that the control information could be passed to the pilot by voice radio, thus eliminating the need for an instrument or other type of cockpit presentation.

The point to be determined was whether, given accurate instructions by radio, a pilot could follow them well enough to make a blind landing. An experimental set-up, still using the anti-aircraft radar, was put into operation at Quonset Point Naval Air Station in March 1942, and it was established that the talk-down principle was practicable. The first serious set-back was encountered when it was observed on further tests that the anti-aircraft radar would not track accurately when the aircraft was less than three degrees above the horizon. Experiment to this point had determined that the requirement was for a radar capable of an accuracy of 0.1 degrees and which would function below the three-degree limit experienced with the A.A. radar. As none of the radars then under design would meet these requirements, Dr. Alvarez and his group set out to develop one.

This project, which was authorized on 8 June 1942, utilized the services of 36 engineers and more than 60 specialist technicians. Its successful culmination in December of the same year, as G.C.A. Mark I,

attests to the outstanding achievement in organization and teamwork that was attained. It is significant to note that, while the development was proceeding, production engineers from Gilfillan Brothers, a Los Angeles radio manufacturing firm, were working alongside the design staff so that, if the equipment proved acceptable, no time would be lost in getting into production. Thus, by 22 December 1942, the G.C.A. Mark I set — the first true G.C.A. equipment — was positioned at Quonset Point ready for its first test.

On the morning of 22 December, Ensign Griffin, U.S.N., taking off from Quonset in a Navy trainer with the wind-screen soaped over and a safety pilot aboard, carried out the first completely blind landing under G.C.A. The trials continued, and experimental blind landings became a routine matter until the afternoon of 1 January 1943, when a snow-storm closed down the field at Quonset, bringing about the first G.C.A. emergency. A flight of Navy PBYs, due to land in half an hour, was overheard by the G.C.A. crew reporting the deteriorating weather conditions to the control tower and asking for assistance. The G.C.A. staff, appreciating the situation, put the equipment into operation and, passing information via the control tower, enabled all aircraft to land safely. The story of this emergency soon became common knowledge among Service flying personnel — and grew in the telling. The important initial victory had been achieved.

* * *

Demonstrations before senior officers of many Services followed, and general acceptance of the G.C.A. principle and equipment soon became fact. Gilfillan Brothers and Bendix were both authorized to proceed with the production of the G.C.A. Mark I under the military designation AN/MPN1 (modified versions of which are still in use at many locations throughout the world). While production of this equipment was progressing, the development group continually sought for improvements, which in due course were incorporated in the production models.

In July 1943, the Mark I equipment was set up and operating at R.A.F. Station Elsham, in England, and proved by demonstration the ability of G.C.A. to cope with groups of aircraft returning from the great saturation raids on Germany. The tests continued through to September, and a great deal of information on the operational capabilities of G.C.A. was obtained. Finally the equipment was turned over to the R.A.F. Coastal Command for operational use until it could be replaced by a production model AN/MPN1. By this time, the various Allied Services had inaugurated training programmes for G.C.A. technicians and operators in preparation for the delivery of production models, which started in July 1944.

The first unit to go into service in an operational theatre was at a U.S.A.A.F. Ninth Air Force night-fighter base at Verdun, France, in December 1944. In a few weeks, G.C.A. had proven itself to all concerned by being instrumental in the recovery of several P-61s.

Gradually, as more sets became available, the number of G.C.A. units in use in operational areas increased, and by VE-Day a dozen were located in Europe in addition to installations in Alaska, the Aleutian Islands, and the South Pacific. Indeed, it has been stated that the dollar value of B-29s saved by G.C.A. at Iwo Jima more than equalled the total cost of the G.C.A. development programme. By the end of 1945 its use was general. From that time to the present, it has continued to serve as a safe and effective landing-aid. Improvements have been made and newer versions of the equipment produced. A steady programme of development promises more refinements with increased operational advantages for the future.

G.C.A. IN THE R.C.A.F.

Many R.C.A.F. aircrew had been exposed to G.C.A. during the closing months of 1945. Certainly those who served with the squadrons of No. 120 (Transport) Wing in Europe during the winter of 1945-46 will retain fond memories of the sterling performance provided by the unit at Berlin's Gatow airport. It was not until 1947, however, that the R.C.A.F. entered into an active G.C.A. programme involving the procurement of equipment.

To inaugurate its entry into the G.C.A. field, the R.C.A.F. purchased six AN/MPN1(C) units from the U.S.A.F., which were immediately turned over to Gilfillan Bros. for modification. To provide a trained nucleus of personnel, one telecommunications officer, three technicians, and ten flying control tradesmen were sent to San Bernardino, California, where they were given a two-month training course in the operation and maintenance of the equipment. At the conclusion of the training period, the personnel and equipment were dispersed.

Quadradar light-weight equipment.

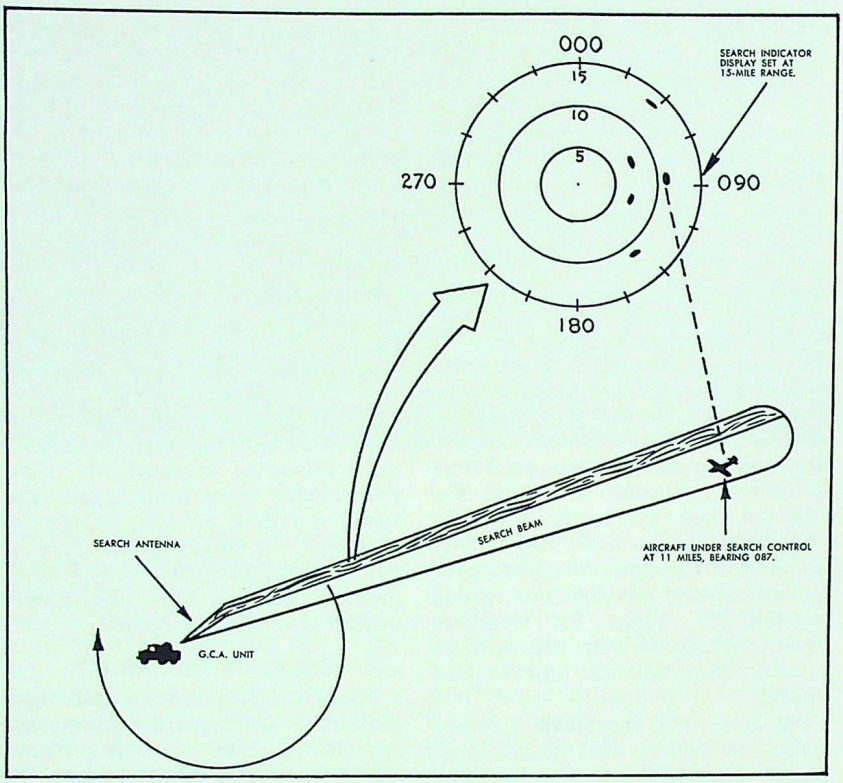


Fig. 1: Search function.

Three of the units, along with a complement of technicians and operators, were sent to London, Ontario, to establish a G.C.A. school. Another party was despatched to Edmonton to take over control of the R.C.A.F. unit which had been operated for some time by U.S.A.F. personnel. The remaining two equipments were placed in storage against future requirements.

The G.C.A. School was moved from London to Dorval in 1948, where it continued to operate for a period of one and a half years. During its operation, sufficient technicians and operators were trained to support the programme as it then existed. This consisted of the six units purchased and one borrowed from the U.S.A.F. for use at Fort Nelson.

Although the desirability of keeping the G.C.A. School in operation to produce trained personnel against future requirements was generally appreciated, shortages in the Radar Technician and Flying Control trades made this impossible. The school was closed down in May 1949. The three equipments used by the school, along with the two held in storage, were installed at Summerside, Chatham, Rockcliffe, Greenwood, and St. Hubert. The first phase of the R.C.A.F.'s G.C.A. programme had been completed.

* * *

Early in 1950, an investigation was launched into the availability of new types of G.C.A. equipment with a view to augmenting the original six sets. Equipments under development in the United Kingdom and the United States were studied, as was the possibility of Canadian production. After several months it was decided that the AN/CPN4 equipment manufactured by Gilfillan Bros. would be procured. This equipment, which introduced many improvements upon the older AN/MPN1 set, was designed as a unit suitable for airlift in C-119 type aircraft.

The initial order for four of these equipments was placed in March 1950. Arrangements were made with the U.S.A.F. to provide training for R.C.A.F. technicians and operators, and training began in April 1951. To satisfy an increased requirement for G.C.A. units to serve the growing number of operational bases in Canada and Europe, six additional equipments were ordered in August 1951. By December of the same year, delivery of the first three equipments had started, the initial installations being completed at St. Hubert and North Luffenham.

Increased activity within Training Command and Air Defence Command necessitated a further revision to the number of equipments ordered, and in June 1952 the total had reached fourteen — a figure that was subsequently raised to seventeen. After delivery of the first ten, a change was made in the design of the trailers housing the equipment, and the last seven units provided to the R.C.A.F. bore the designation AN/MPN11(B). The difference between the CPN4 and MPN11(B) equipments is restricted to housing: the CPN4 trailers had been designed to facilitate airlift, and this requirement was dropped in the MPN11(B). The sets are electronically alike.

By October 1954, the increasing number of G.C.A. units scheduled to go into service introduced a requirement for Canadian-trained G.C.A. operators. A small school was therefore established at Ayl-

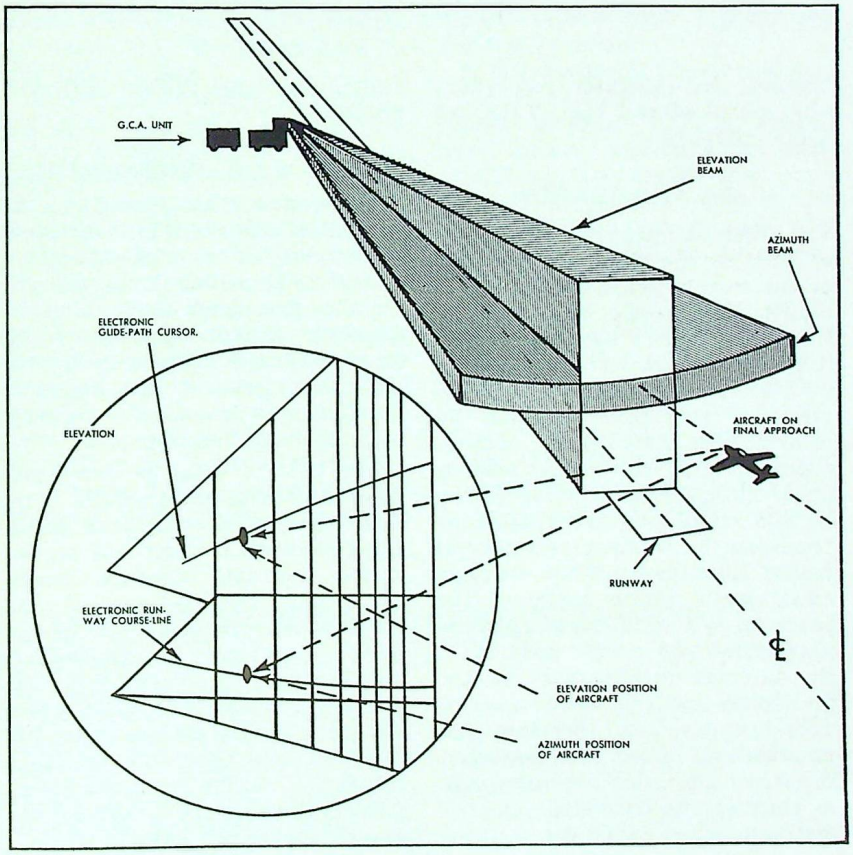
mer, Ontario. The school, which at first graduated four operators every two months, is still in operation, and the output of students has increased to four every three weeks and may go higher. As the new equipments were delivered, they replaced the old AN/MPN1 units, which were withdrawn from service, subjected to Depot overhauls, and redeployed to other sites. At the present time, the R.C.A.F. owns twenty-three heavy G.C.A. units, composed of six AN/MPN1 sets, ten AN/CPN4, and seven AN/MPN11. Twenty of these are now installed and in operation, while the three remaining sets are expected to be installed shortly. Completion of this work will end the second phase of the R.C.A.F.'s G.C.A. programme.

It is of interest to note that from the few laboured training approaches carried out in 1948, the R.C.A.F.'s utilization of G.C.A. had increased until, in each of the months of July and August 1955, more than 7,000 G.C.A. approaches were made.

G.C.A. EQUIPMENT AND ITS FUNCTION

The G.C.A. equipment used in the R.C.A.F. is a self-contained installation mounted in trailers for purposes of mobility. It consists of two separate radar systems and extensive communications equipment, and it comes complete with its own Diesel power unit. It is capable of controlling all aircraft within a nominal range of 40 miles, guiding them from the point of initial pick-up to touch-down on the runway.

Fig. 2: Precision radar scan-areas and presentation.



Surveillance Radar System

One of the two radar systems included in the G.C.A. is the "surveillance" or "search" radar. This system, which consists essentially of a transmitter-modulator, receiver, indicator, and antenna, radiates a suitably shaped beam which is rotated through 360 degrees, "painting" all reflecting objects that come within its range, and providing, on an associated cathode ray tube indicator, an actual map of the airspace surrounding the installation. As the surveillance radar has a nominal range of 40 miles to a height of approximately 9,000 feet, all aircraft flying within this zone will present reflecting targets to the radar beam and will appear as "blips" on the indicator display. The bearing and distance of an individual aircraft from the G.C.A. installation is determined by the position of the blip relative to the centre of the indicator. Reference to Figure I will help to clarify the function of the surveillance radar system.

The surveillance system is used to effect the initial pick-up of an aircraft and guide it to a position from which a final approach to the runway can be carried out by utilization of the "precision" radar system.

Precision Radar System

The second radar found in a G.C.A. unit is the precision radar system, the function of which is to track the aircraft down the optimum flight- and glide-path during the final approach to the runway. The precision system is brought into play after the aircraft under

control has been positioned off the end of the runway by means of the surveillance system.

Unlike the search system, which "scans" in a horizontal plane only, the precision scans in both vertical and horizontal planes, as both the heading and glide-path (angle of descent) of the aircraft are of extreme importance during the final phase of a G.C.A. approach. Final scanning in both elevation and azimuth is accomplished by using a single transmitter feeding alternately to two separate antennae in a fixed time-sequence.

The beam radiated by the precision antennae scans through 20 degrees horizontally and 7 degrees vertically; and, as these sectors are, by prearrangement, aimed along an extension of the runway which it is wished to serve, the result is the projection of two wedge-shaped scan areas covering the optimum flight- and glide-path to the runway. Echoes from target aircraft flying within the scan zone will tell the G.C.A. operator whether the aircraft is high or low, right or left of the preferred path, and its distance from the intended point of touch-down. The reliable range of the system is ten miles. Some indication of the accuracies achieved by the precision system is provided by the fact that a 25-foot deviation from the glide path is detectable at a range of one mile, with the accuracy increasing as the runway is approached. Figure 2 illustrates the precision radar function and display.

Communications System

In addition to the two radar systems, a communications system is vital to the operation of a G.C.A. unit. To enable the G.C.A. operators to pass control and guidance information to aircraft, a variety of communications equipment has been provided. By means of a panel adjacent to each operating position, the operator can select any one of several H.F., V.H.F., or U.H.F. channels.

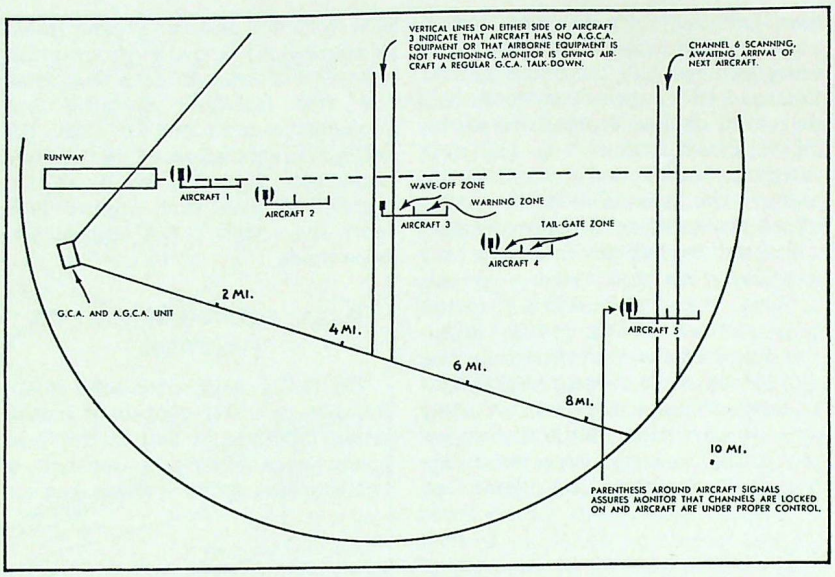


Fig. 3: A. G. C. A. operation as displayed on azimuth portion of AZ-EL monitor scope.

G.C.A. OPERATION

A ground-controlled approach is effected by the close co-ordination of the search, precision, and communications systems. After the initial radio contact has been established, the aircraft is identified positively and guided to a predetermined geographic position by means of the search radar. On arriving at this point, the pilot is given an approach heading to the airfield, together with pertinent information on weather and general traffic conditions. When the aircraft comes within range of the precision system, the indicator display shows the actual position of the aircraft with respect to the glide-path and course-line cursors. The operator then provides the pilot with all information necessary to correct the actual approach path to that of the optimum. Control instructions are continued until the pilot is in visual contact with the ground.

RECENT G.C.A. DEVELOPMENTS

Two noteworthy innovations in the G.C.A. field which have occurred in the past few years would appear at first to be pulling in opposite directions. One tends toward a more elaborate G.C.A. apparatus, the other towards a much simpler one. They are, however, two separate developments aimed at meeting quite different requirements.

The first of these is Automatic Ground-Controlled Approach (A.G.C.A.). Developed by Gilfillan Bros., this equipment is essentially an accessory to the standard heavy G.C.A. units discussed earlier. The A.G.C.A. equipment effectively replaces the voice control-element used in the precision approach phase of a normal G.C.A. let-down. Electronic control signals are routed from the A.G.C.A. to the aircraft's V.H.F. (or U.H.F.) communications receiver, and thence through a decoder unit to the automatic pilot,

enabling a completely automatic approach to be executed.

Briefly, the A.G.C.A., which is capable of controlling six aircraft on final approach at one time, works in the following manner.

A.G.C.A. Channel 1 scans back and forth over an area ten miles long and one mile wide along the final approach path. When an aircraft appears in this area, Channel 1 "locks on" to it and Channel 2 takes over the scanning job. As soon as Channel 1 has locked on to its target aircraft, this aircraft becomes invisible to all other channels. As each aircraft appears in the scan area, the six channels take over the respective aircraft successively. Once an aircraft has been locked on to, automatic control signals are passed to the autopilot. The aircraft automatically conforms to these signals and confirms receipt of the information back to the A.G.C.A. unit.

Behind each aircraft, a protective tail-gate, two miles long, is provided. Should number 2 aircraft start to overtake number 1 and enter the latter's tail zone, a warning bell and light in the overtaking aircraft and the A.G.C.A. unit are activated. If aircraft number 2 slows down, nothing further occurs. If, however, the overtake is continued, further warning bells and lights are engaged, and the overtaking aircraft is automatically overshot for another approach after the last aircraft in the A.G.C.A. circuit.

In the event of an aircraft failing to keep within limits that ensure completion of a safe landing, it is given an automatic go-around, as in the case of the overtaking aircraft. Warnings are provided if the monitor equipment indicates that an aircraft is not responding to A.G.C.A. signals or is not equipped with the A.G.C.A. airborne element. In this case, the aircraft may be guided to a standard G.C.A. approach by voice instruction from the A.G.C.A. monitor operator.

The monitor operator located at the A.G.C.A. unit is provided with a complete display of the situation enabling him to take necessary corrective action should a malfunction of the equipment occur. A cross-pointer indicator, similar to an I.L.S. indicator, is also provided on the pilot's instrument panel to permit monitoring of the automatic let-down by the pilot. Reference to Figure 3 will help explain the A.G.C.A. function.

It is a matter of record that approaches carried out during I.F.R. conditions under A.G.C.A. control have been accomplished more smoothly and accurately than those effected by manual control. No doubt we shall hear a great deal more about A.G.C.A. in the coming years.

The second development to stir considerable interest has been the introduction of a number of lightweight, low-cost G.C.A. equipments. These units are intended to provide G.C.A. facilities for airfields where the traffic density does not warrant the expensive outlay that a large-scale equipment requires. They are essentially a simplified version of the larger equipment, capable of providing the same services but at a reduced rate.

One of these equipments — Gilfillan Quadradar — will shortly be introduced into service by the R.C.A.F. This unit weighs some 2,500 pounds as opposed to 15 tons for an AN/CPN4. As its name implies, it is capable of providing four functions. In addition to search and precision displays somewhat similar to those available on the larger G.C.A. sets, the Quadradar may also be employed as a height-finder and airport taxi-control radar. The operational usefulness of this equipment, as compared to that of the more costly and larger units, will be watched with interest.

CONCLUSION

While an attempt has been made to provide a background résumé with a view to general understanding of G.C.A., considerable detail has been omitted. Perhaps, in the attempt, its complexities have been oversimplified. Lest this impression has been created, it should be stated that in its standard form, G.C.A. equipment utilizes some 1,200 electronic tubes and is extremely expensive both in initial outlay and in the skilled staff required to operate and maintain it. There are, unfortunately, no inexpensive solutions to the problem of blind landing!

SQUELCH

A visitor to the White House was surprised to find Abraham Lincoln applying blacking to his shoes.

"Mr. President," he exclaimed, "you black your own shoes?"

"Yes," said Lincoln. "Whose shoes do you black?"

(*"Consol Dealer": U.S.A.*)

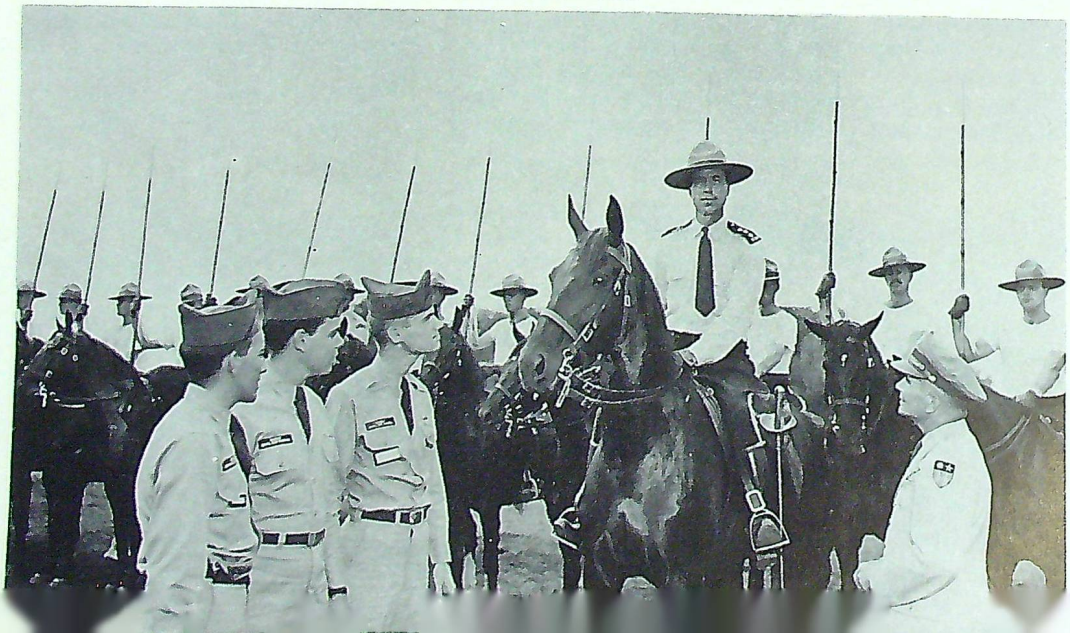
Royal Canadian Air Cadets

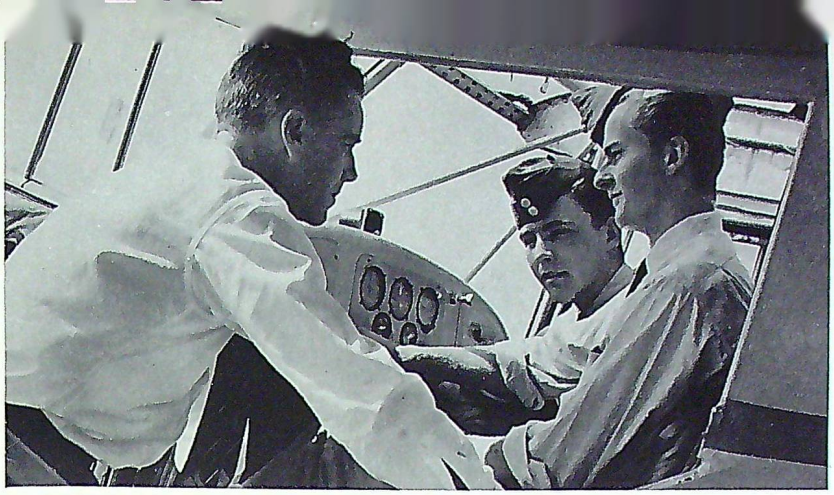
SUMMER, 1956

Another highly successful summer for the Air Cadet movement was recorded this year when more than 5,500 cadets were engaged in special activities and advanced training courses. On these pages will be found pictures of some of the highlights of the various summer projects.

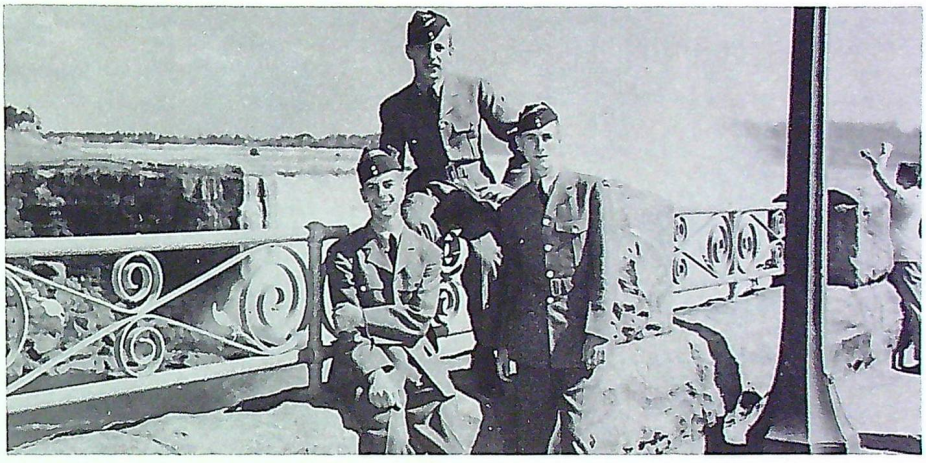
Cadets of five different countries are shown in this photograph which was taken as the visiting overseas party arrived in Vancouver for a two-week tour of British Columbia. Great Britain, Norway, Sweden, Holland, and Denmark are represented.

A highlight of the U.S. Civil Air Patrol visit to Canada was a day in Ottawa, where the Mounties put on their famed musical ride.



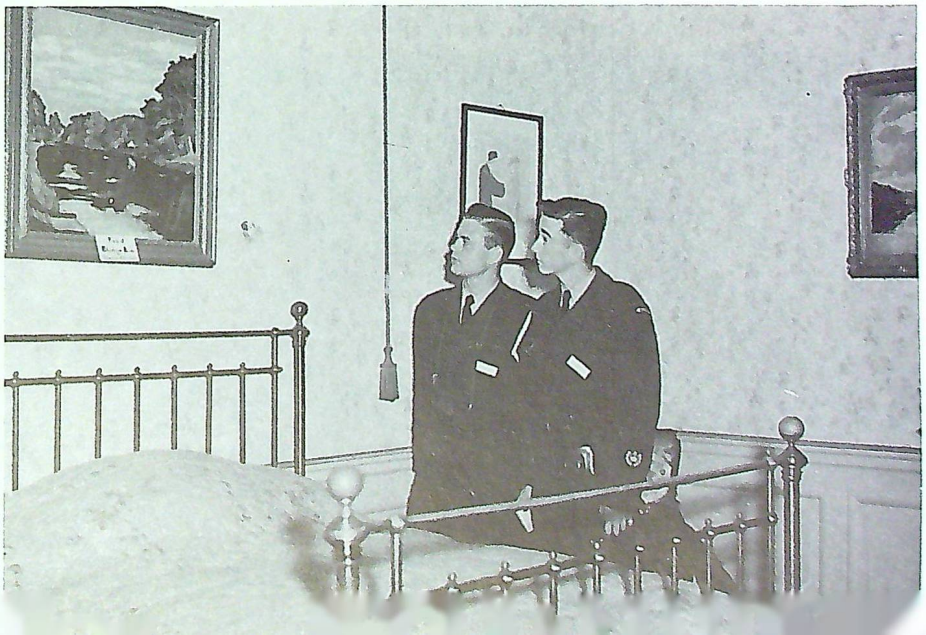


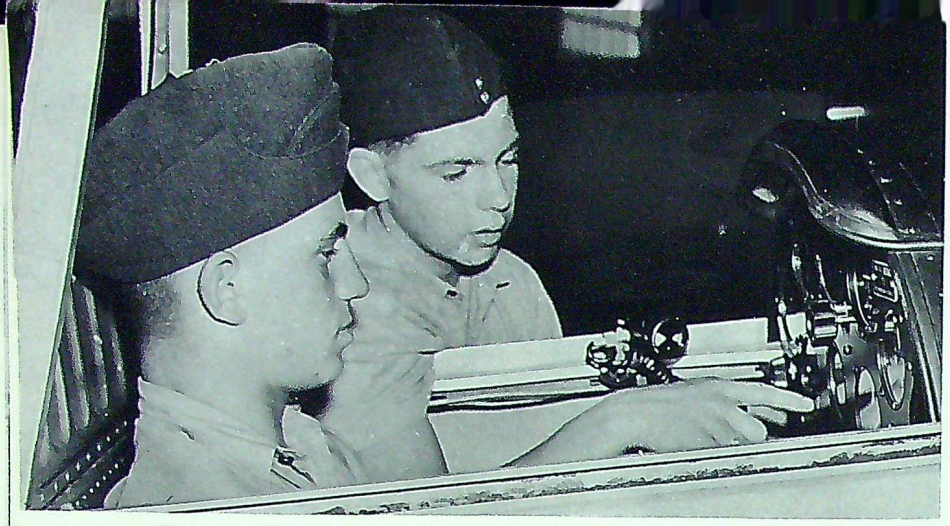
No less than 323 cadets received pilot training this summer at approved flying schools and clubs across the country. Two hundred and fifty of the lads trained under R.C.A.F. scholarships, while the remaining 73 received special League awards. Successful graduates earned private pilots' licences in addition to the Air Cadet Flying badge.



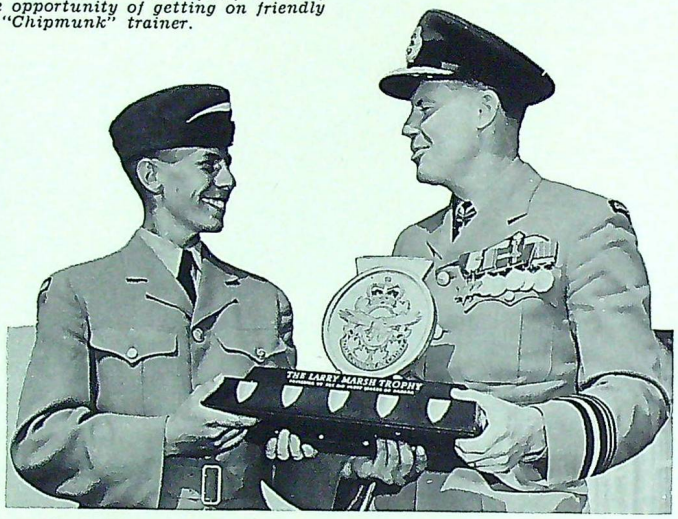
A highlight of the Drill Instructors' Course for 100 cadets held at Camp Borden was a series of week-end visits to Niagara Falls, Toronto, and other points of interest in the area.

Fifty-eight Air Cadets made trips overseas by air this summer as part of the League's international exchange visits scheme. Two of them are shown here beside the bed in Blenheim Place, where Sir Winston Churchill was born.





Close to 5,000 cadets attended the three summer camps at Abbotsford, Clinton, and Greenwood. At camp, the cadets appreciated the opportunity of getting on friendly terms with actual Service aircraft — in this case, a "Chipmunk" trainer.



A colourful addition to the Drill Instructors' Course held at Camp Borden was the National Drill Competition between the east and west. Cadet R. W. Slaughter, of Winnipeg, captain of the winning western squad, accepts the Larry Marsh Trophy from Air Vice-Marshal J. G. Bryans, C.B.E., A.O.C. Training Command.

These smiling cadets were members of the Canadian International Drill team which defeated a U.S. Civil Air Patrol team in the presence of more than 30,000 spectators at the Minnesota State Fair, thus bringing the coveted Beau Trophy to Canada for the sixth time in nine years.

The Party Line

FOOD SERVICES IN THE R.C.A.F.

BY WING COMMANDER M. ST. C. CLARK
Head of the Food Services Branch, R.C.A.F.

"'Neath the crust of the old apple-pie
There's something for you and for I.
It may be a pin
That the cook's just dropped in,
Or it may be a dear little fly;
It may be an old rusty nail,
Or a piece of a pussy-cat's tail—
But, whatever it be, it's for you and for me
'Neath the crust of the old apple-pie."

(Until fairly recent years, Service diet has been one of the chief sources of inspiration for the cartoonist and the camp bard. We have only the most fragmentary records of the songs which were sung by Caesar's legions as they swung along the roads of Gaul, but we can be pretty sure that the disgruntlement of the singers' bellies was well represented in them. Today, owing to general recognition of the vital part played by proper feeding in the maintenance of morale and efficiency, the Air Force poet has been forced to delete food from the list of his legitimate themes. For, among good airmen, where there are no grounds for complaint, there can be no worth-while songs.

In the following article, Wing Commander Clark describes for us how the R.C.A.F. takes care of its personnel's inner men and women. The authoress, who graduated in Home Economics from the University of Manitoba, began her career with a period as an intern at the University of Minnesota Hospital. Immediately before joining the Women's Division of the R.C.A.F. in 1942, she was employed as a dietitian in the Montreal General Hospital. After serving for three years as Command Messing Officer at No. 4 Training Command, she was appointed as Director of Dietetic Services in the Dept. of Veterans Affairs. She rejoined the Air Force two years later as Head of the Food Services Branch. She is also a past-president of the Canadian Dietetic Association.—Editor.)

INTRODUCTION

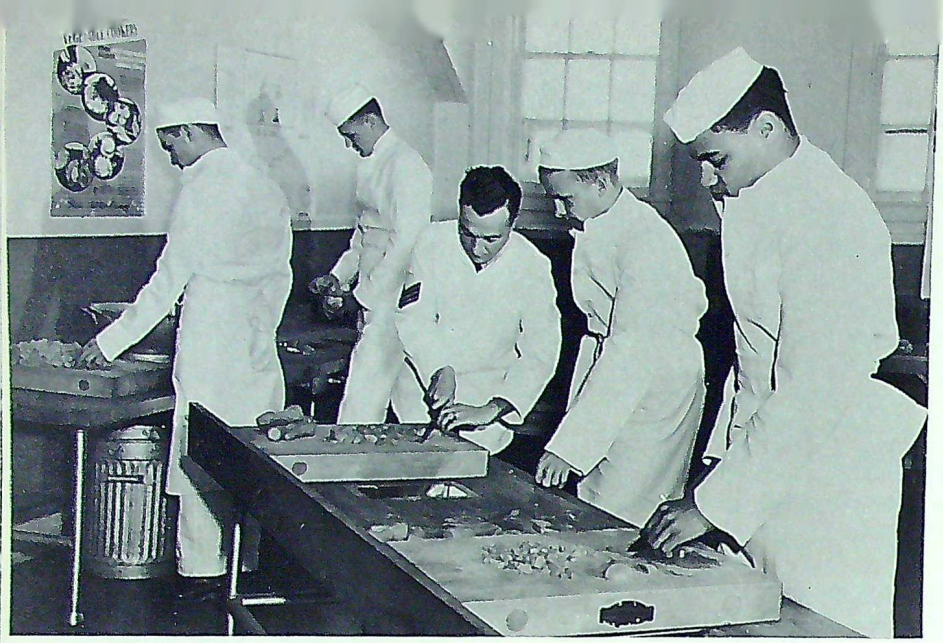
IT IS to be doubted if many of the men and women in the R.C.A.F., eating their meals in Air Force dining-rooms, ever give a second thought to the complexity of feeding a military force. Even fewer stop to reflect that the aim in feeding an armed service is to guard against the impairment of either health or efficiency that would result from an inadequate or improper intake of food. What Air Force personnel *do* know, however, is that they enjoy good food and that they appreciate eating their meals in a pleasant environment. Acceptability of food is recognized as the paramount factor in the good nutrition and high morale of Service personnel. The activities of the Food Services Branch are therefore concentrated both on the provision of highly acceptable meals and on the means by which they can be provided, not only in the "static" unit, but in every circumstance dictated by the exigencies of the Service.

No hit-and-miss formulae can be applied to mass feeding if it is to be effective and if the results are to be satisfactory. Every aspect of the problem must be studied, planned for, and controlled.

Three guiding principles govern the provision of food to Service personnel in Canada today:

- The food must be compatible with the Canadian standard of living.
- The food must provide the nutrient elements essential to the maintenance of top physical health and efficiency.
- The entitlement of food must be equivalent for the Navy, Army, and Air Force, in all circumstances where similar food requirements will suffice.

The co-ordination of ration requirements is an inter-Service activity carried out by the Joint Services Food and Nutritive Committee, a sub-committee of the Principal Supply Officers' Committee. The Defence Research Board Panel on Nutrition, composed of civilian medical and scientific advisers, meets regularly to advise on specific nutritional requirements for the Serviceman.



A demonstration at the School of Food Services.

RATIONS

With the introduction of the revised ration scales in 1949, a new principle was established in feeding all members of the Canadian armed forces. No longer were N.P.F. (non-public funds) grants from Army and Air Force stations necessary to supplement the basic ration: the obligation for the provision of food became, for the first time, entirely a public commitment. This in itself was a great step forward.

Ration requirements vary constantly, and the changes have to be planned and provided for. For example, there is no need to remind those who have undergone training at the Survival School that the minimum planned intake is 600 calories per day. The high-carbohydrate confection, commonly known as the AFFP1, is survival feeding in the true sense of the word — small snacks which provide those food elements most likely to protect the survivor and bring him through the period of privation.

At the other end of the food-ladder is Ration Scale 3, issued to isolated northern detachments, with a maximum caloric value of 5,000 calories. Between these two extremes there exist several other ration scales, all of them for specific uses. Air Division units draw U.S.A.F. rations, which, with slight modifications in items normally issued to U.S. personnel, have proved to be very satisfactory.

The most flexible and the most widely used ration is R.S.1 (Ration Scale 1), which provides a cash allowance for purchase locally of commodities which add variety and zest to the meals. The most costly rations, and the most non-perishable and compact, are the Canadian Five-man Ration Pack and the Arctic One-man Pack.

The actual supply of rations to the Air Force is, of course, the responsibility of the Royal Canadian Army Service Corps. The food itself, however, like other materiel and supplies, is purchased by the Department of Defence Production — in accordance with specifications laid down by the user. The Food Services Branch is represented at meetings of the Canadian Government Specification Board, where food specifications are detailed, and is consulted in the selection of the grades and types of food to be stocked. As the user, the R.C.A.F. is also responsible for reporting complaints to the Army for investigation, reinspection, and correction. Quality control of food supplies is thus ensured by the co-operative effort of these various agencies.

RESEARCH AND DEVELOPMENT

Numerically, the heaviest commitment for feeding R.C.A.F. personnel has been carried out in the static situation. A great deal of emphasis has been placed on this type of feeding, and considerable improvements have been made. New concepts of mobility, as well as the requirements for small isolated detachments, dispersed squadrons, or flight feeding, can change the picture abruptly. Means of providing food in modified forms have to be developed from time to time to ensure a feasible logistic support.

The necessity for a food research and development organization to assist and advise the three Services was recognized in 1950, when the D.R.B. Food Research Group was authorized. Now, for the first time in the history of the Canadian Services, there is an organization, staffed with scientists and technical specialists, which can carry out original research into food problems and "vet" development in the whole vast area of food science and food technology.

Food is notably subject to rapid deterioration; it is heavy, bulky, and requires a great deal of time and a great number of people to process, prepare, and serve it. On operations, it may be essential to support Air Force personnel, even if only for short periods, with foods which are provided in the form of ration packs, or with food that is pre-cooked, dehydrated, or pre-processed in any of a number of ways, in order to cut down the bulk and weight and also the number of support personnel required for its preparation. The field of food technology is advancing quickly, and it is the responsibility of the Food Research Group to keep the Services informed of these advances in so

far as they can be applied to Service requirements. Since this area of activity cannot be segregated from the civilian food industries, and since so much can be gained from their experience and knowledge, a Defence Research Advisory Committee on Food Technology has been set up. Its meetings, like those of the Panel on Nutrition, are attended by Service representatives, who gain a great deal from the exchange of information and ideas, and are able to present their problems at first hand.

THE SERVICE KITCHEN

Any consideration of the provision of meals will inevitably lead to the important subject of accommodation. Out of the Second World War kitchen came millions of meals, and no one will discredit the noble rôle it played. Nor will anyone concerned with food services or construction engineering during that era ever forget what a trouble-maker it could be. The wooden construction was a haven for dry-rot and cockroaches. The flooring was continually under repair; paint jobs were always under way. Condensation and lack of ventilation provided working conditions almost intolerable to the staff. The bake-ovens, no matter how tenderly cared for, burned food just as readily as they baked; ovens intended for roasting could often barely warm a plate. Grates collapsed, and the continual outpouring of ashes tried the patience of the most saintly.

Lunch in the Airmen's Mess.

Today's modern kitchen, on the other hand, is a pleasure to work in. It has been planned functionally around its requirements. It has all the necessary working areas and adequate refrigeration. It is cleanable and durable, has good lighting and ventilation, and its various working areas have been related with ease of operation in mind. Possibly its greatest boon is to be found in the modern thermostatically controlled bake-ovens, roast-ovens, griddle tops, and ranges. Canopies are designed to withdraw heat; no longer are they vast areas of overhanging and inadequately ventilated metal sheaths resembling mediaeval torture-chambers, under which personnel worked and sweltered. Having known the inadequacies of the war-time mess so well, the Food Services Branch was more than enthusiastic when asked to co-operate in the preparation of the plans for the permanent standard accommodation.

In terms of manpower, food-service activities make no small demands. In fact, they require a substantial percentage of the total personnel on any unit. Every possible means must therefore be found to make the maximum use of mechanical equipment and, by employing only high-quality equipment, to minimize the maintenance required for it. This guiding principle is now accepted by all three Services when inter-Service scales of issue are recommended by the Joint Services Food and Nutrition Committee. As in the case of food, definite standards are established to control the purchase of equipment, either by the Directorate of Inter-Service Development or by the Canadian Government Specification Board in co-operation with D.I.D. The user is responsible in this instance also for the initial selection of the standard and type of the equipment, as well as for laying down its functional requirements. Service kitchens are now entitled to a full line of equipment such as would be found in any modern civilian installation.

MANAGEMENT

No one who has had any experience in the field of preparing food in large quantities will ever deny the importance of adequate food supplies and first-rate production facilities. However, the best material resources and rations possible will not, of themselves, ensure good meals. The "priceless ingredient" of the good meal is, and probably always will be, the human element — the skill and enthusiasm of the cooks and the food services attendants, the N.C.O. supervisors, and the food services specialist officers.

Badly manned food service installations in Service or civilian life are extravagant, inefficient, and invariably productive of poor meals. There is just no magic wand which can be applied to food services. Every single aspect of the many problems must be analyzed, evaluated, scheduled, and controlled; all the principles of Service management must be put into effect in the organization, supervision, and delegation of work. Consistently good meals have never been turned out by providing staff under a roster-system: hundreds of thousands of dollars' worth of food can be wasted annually if any part of its preparation or service is delegated to the

untrained or the unwilling. Food, if it is badly prepared or shamefully served, has gone through every process of production, processing, grading, packaging, purchase, and transportation, only to find its way, uneaten, into the garbage pail — thus failing completely in its purpose of nourishing those for whom it was intended.

The R.C.A.F., appreciating the foregoing facts, recognized food services as a specialized commitment when it established the Food Services Officers' List and provided top grouping for the highly qualified N.C.O. Food Services supervisors and superintendents. It also opened career fields for personnel engaged fully in the food services trades and it established positions for the employment of full-time civilian workers in addition to Service men and women.

* * *

No one will dispute the statement that good management is the keynote to the success of any operation. But what does "management" mean as applied to food services? It means the never-ending process of planning by the hour, by the day, by the week, and by the month, for each of the 365 days of the year.

The menu is the basic planning-tool, for, while it ensures the variety and adequacy of meals, it also dictates the work-load of the kitchen and must take into account the working capacities of staff and the limitations of equipment. Organization charts, duty analyses, work-sheets, shift and leave schedules — all must be prepared. Production control must be effected by the use of standardized recipes and standard techniques. Supervision must be provided. Time schedules must govern food production to ensure the freshness of the food and the retention of its nutrient qualities. The heavy N.P.F. commitment in the Air Force today, as well as the introduction into the ration scale of a cash allowance, requires a full knowledge of meal costing, budgeting, purchasing, and cost controls.

The local supervisor must set the food standards and ensure that they are maintained. He must also know how to deal with daily grievances of his staff, he must understand the technicalities of obtaining rations and supplies, and he must be thoroughly familiar with all aspects of food sanitation. The initial indoctrination of the worker is another of his responsibilities, and he must see that the endless process of on-the-job training is carried out and that trade advancement classes are not neglected. When he knows and does all these things, his efforts are reflected in consistently good food, in the high morale and productivity of his staff, in clean kitchens and dining-halls, and in well ordered and controlled food supplies.

* * *

Fortunately, there are many men and women who have aptitudes and real eagerness for food work. Given a favourable working environment, a clear statement of their duties and responsibilities, and an understanding of the aims, such people will constantly improve their techniques. Whether they cut meat, bake, roast, broil, prepare vegetables or salads, or whether they clean, scrub, wash dishes or serve food, they are doing an essential and worth-while job. Canadians are far behind Europeans in giving recognition to the accomplishments, skills, and artistry of those engaged in the preparation and service of food. None the less, we have numerous tradesmen and civilians in the Food Services Branch who have been with the R.C.A.F. for many years. This can only mean that somewhere along the line someone has said: "Joe, that was a really good apple pie!" That is the type of comment that keeps food services personnel with us and ensures that the next time the apple pie will be even better.

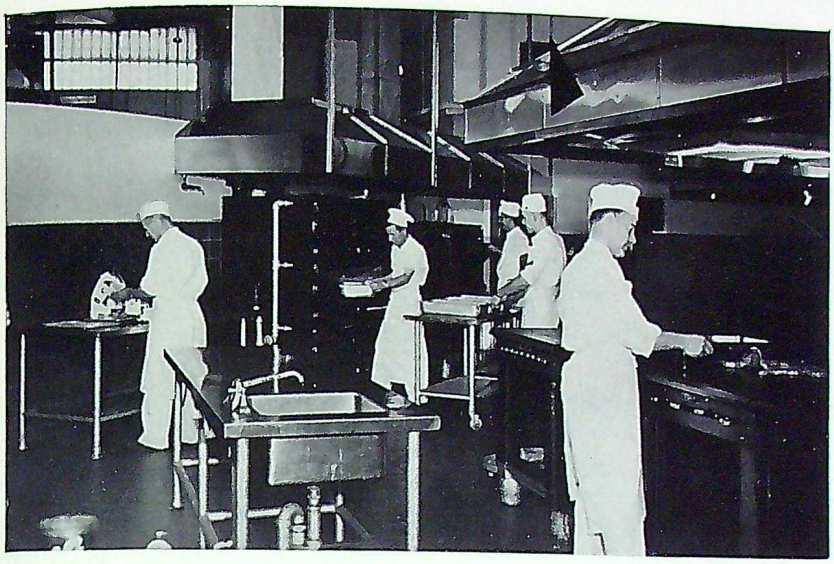
* * *

With the rapid developments taking place now in the fields of food technology and mass food-processing, the large-quantity Service kitchen of the future may have many reduced functions. It is quite conceivable that frozen pre-cut or freeze-dried meats will be used entirely — that prepared mixes will be in common use in the preparation of baked products. It is possible now that radiation preservation of foods will reduce substantially the requirements for refrigeration. The day may also come when the rations indent will be used to draw a 1000 pre-cooked frozen dinners or 1000 pre-processed dehydrated meals ready for flash-rehydration and heating. In 1956, however, we are still some years from the realization of such concepts.

Today, the Service kitchen is still a large manufacturing and food production centre. An R.C.A.F. unit with an average ration strength of 1000 personnel serves more than a million meals a year (from public sources) at a cost of approximately $350,000 for food alone. Add to this the food purchased, cooked, and served for casual meals and social functions, and the total raw-food cost is more likely to exceed $400,000. When one considers that food costs represent only about one half of the total related expenditures for meal service, it will be appreciated that the operation of the R.C.A.F.'s 126 kitchens is an expensive business.

TRAINING

In order to man the many food services installations with efficient and well trained tradesmen, No. 1 School of Food Services was opened in 1954. The school is operated as a simulated R.C.A.F. mess. The tradesmen actually engaged in the preparation and service of food are given instruction in large-quantity food production, while the senior



A modern R.C.A.F. kitchen.

N.C.O. supervisors and superintendents are provided with a refresher course in the techniques of kitchen and dining-room management. The benefit of this type of training is becoming more and more evident throughout the R.C.A.F. today.

Although the Air Force enjoys an almost across-the-board reputation for its food services, this is not a situation which can be accepted as permanent. Effort cannot be relaxed; for, in a matter of weeks, standards can change with alarming rapidity. The spring conference of the Command Messing Officers revealed many focal points for attention. One of considerable urgency is a revaluation by units of the essential and non-essential commitments imposed on a staff provided to meet only the public-fund food requirements. Another to be emphasized is flight feeding. More guidance is now planned for the benefit of the hospitalized patient, as it is well recognized that his return to health can be hastened by ensuring an optimum level of nutrition or a modified dietary régime. In either case, his stay in hospital can be rendered considerably pleasanter by the provision of personalized meals of top quality. The crews of high-performance aircraft are now being called on to select meals from foods which will best ensure their maximum physical efficiency on the ground and in the air. Food services personnel will have their imagination and resourcefulness taxed in the extreme to ensure that such food modifications as may be required for aircrew are always available at the right time and place.

CONCLUSION

We have tried here to show that food work is not quite the simple process — dull, monotonous, and repetitious — that some think it to be. Food services personnel know that it is a hard, demanding occupation, calling on every bit of patience, energy, imagination, and initiative they can muster. At the same time (and most of them will admit it) there is still "a joy in cooking" and a great personal satisfaction to be found in contributing at all levels to such an important and indispensable support element of the R.C.A.F. As long as their enthusiasm is fostered and their activities are fully supported, complacency and indifference are unlikely to set in, and the men and women of the Air Force will continue to be among the best-fed men and women in the world.

Twin Mach-Busters

Identical twins, Flying Officers Bernard and Gerald Gower, are shown holding their "Mach-Buster's" certificates. Members of the "Mach-Buster's Club" must have exceeded the speed of sound. The twins are both serving with No. 2 (Fighter) Wing, in France.

Feminine Gen

NOTHING SO RESTFUL

BY FLYING OFFICER H. L. SOUCY
No. 5 Air Division Headquarters, Vancouver.

(In this, her third article for "The Roundel", Flying Officer Soucy finds herself considerably less at home on an ocean liner than in the cockpit of an aircraft. Her two earlier articles were "Sou and the CF-100" and "Intercept", the former describing her first trip in a long-range jet fighter, and her second an exercise in which she took part while on course at Tyndall Air Force Base.—Editor.)

"WHAT you need," my friends assured me, "is a rest. And there's nothing so restful as an ocean voyage."

"I'd get seasick," I protested.

"Nonsense. You'll have a wonderful trip."

"I'd rather fly."

"Why, Sou, you're not nervous, are you?"

"In words of one syllable, yes."

"Ha, ha, ha! We'll get you a schedule of shipping dates . . ."

I got my ticket. It looked rather like a two-sheet country newspaper and it read like a forecast of disaster: " . . . said company is not responsible for missed connections, loss of baggage, mid-ocean sinkings, murder, mayhem, or madness of passengers resulting from this voyage . . ." No wonder they took my money before they showed me the ticket!

Eventually, I found myself on a Montreal dock beside my flight-bag, which lay forlornly grounded in the shadow of mountains of sea-baggage.

"You boarding this ship?" somebody official asked me.

Since I was holding my ticket in my hand, denial would have been pointless. He took the ticket, including the part which said " . . . will be retained by passenger . . .", and in its place he handed me a long green form.

"Fill this out and give it to the purser by five this afternoon at the latest," he ordered, eyeing me with suspicion.

Then he turned me over to a burly warder who herded me into the depths of the vessel, thrust me into a numbered cell, and left me to my own devices. Rushing to the porthole, I saw that I was still above the water-line. I looked about in the hope of spotting an ejection gear. None was visible, and I realized that the only way out was through the bustling labyrinths outside my door.

By the time a few tugs and several hundred whistles had pulled us afloat, the panic on board seemed to have decreased to about the proportions of a Montreal Christmas-shopping rush; so I made a reconnaissance sortie. Finding a way to go was easy: halls led in every direction. None of them, however, seemed to lead anywhere in particular. I returned to base and called "May Day" on the buzzer.

A steward responded. "Go topside till you reach 'B' deck," he said. "Then walk for'ard a way, turn starboard, back for'ard, and follow the passageway till you reach the companionway. Then go below to 'D' deck. When you get . . ."

One curious fact seemed to emerge from this double-talk:

"I go up to get down?"

"Aye-aye," he agreed cheerfully.

I turned in the direction indicated and immediately fell over a foot-high doorstep.

"Someone," I said with great restraint, "forgot to level out the floor."

"Oh, that's deliberate. You may appreciate it if we hit rough weather."

I sat looking at the obstruction and trying to imagine what sort of weather might make me appreciate a thing like that. I shuddered.

"Where," I asked, as casually as possible, "are the lifeboats located?"

"Topside. We'll have a boat-drill this afternoon" — and I thought I heard him mutter under his breath —"just in case."

We had the boat-drill. Bundled into a primitive sort of Mae West, I found my way with great ease to the wrong muster-station. Looking at the number of people lined up and then at the sample-sized boat being lowered creakily outside the promenade, I concluded that half the other passengers must also have come to the wrong station — I hoped!

I thought of the *Titanic* and began to ask if we were in iceberg waters; but just then a loud speaker interrupted with a briefing on emergency ejection procedures. On the second sentence the loud speaker ceased to function. A junior officer dashed madly up some stairs (I mean, a companionway) and presently the loud speaker resumed — with a concluding sentence. Meanwhile a sailor came along our ranks, telling us how important it was that we tie our lifebelt cords in a reef-knot. Since he demonstrated by tying my neighbour's cord in a granny-knot, I felt that he must have lacked faith in the recommended procedure.

Later, I filled out the long green form. It contained an array of personal questions which cast doubt on my antecedents, loyalty, ideology, motives for travelling, and my whole approach to the matter of Customs. If the ship did sink, I thought, they wouldn't even bother about rescuing such a threat to society as they seemed to consider me.

That evening, since we were still afloat, I retired almost with complacency. The feeling lasted until morning, when I awoke and gazed out of the porthole over my bunk. For a brief moment I glimpsed a rolling seascape of undoubted impressiveness; the next instant I was slapped in the face by a ton of grey water.

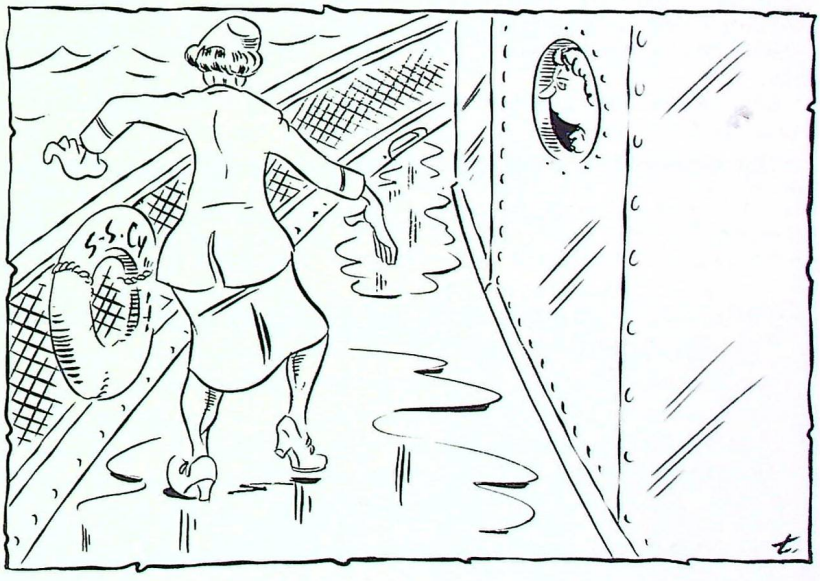
In one leap I had crossed the cabin and was hanging by my fingernails from the opposite wall, which was now tilted above my bunk. As it swung back to a location partially underfoot, I realized that the ocean had not got in after all. I pulled my nails out of the steel bulkhead and allowed the next roll to slide me back into bed, where I firmly proposed to remain buried for the rest of the voyage.

My cabinmates, however, had different ideas. Presently they dragged me up, insisting that I come out to sample the invigorating sea air. My protest that I had sampled it from the coast was of no avail: I was shepherded out to watch the shuffleboard. Huddled in my jacket, which the invigorating sea air was doing its best to tear from me, I watched, in complete apathy, heroic souls in shirtsleeves playing games. Fortunately, they drew everyone else's attention more than they did mine, so I was able to sneak back to the lounge. Here I discovered, by trying to move one of them into a more convenient position, that all the chairs were chained to the floor — a fact which filled me with further foreboding.

My fears proved needless. Although the weather roughened, I had no seasickness to distract me from the dangers and difficulties of the trip. The chief inconvenience that the motion of the vessel occasioned me was in the matter of my own movements. It is awkward to move one's foot up and down unless one knows which way is "up" and which is "down"— and that is a question not easily decided when floors are liable to become walls at any minute, and *vice versa*.

There was another factor that added to my confusion in getting around. Every hall and corridor— forward, aft, mid-section, topside, below, or sideways — looked the same. The only difference between them lay in certain indecipherable hieroglyphics on the walls. These, someone told me, were supposed to direct passengers to their muster stations if (or, as I felt convinced, when) the ship sank. At first I tried asking my way of any stray member of the crew whom I happened to meet; but, since I soon came to realize from their expressions that it was customary to keelhaul bothersome passengers, I desisted after the first day or so and simply called upon the gods of chance every time I stirred from the cabin.

A minor embarrassment which I experienced from the boat's motion was the difficulty of taking a shower. A ship's shower-stalls are, like all other shower-stalls, built on strictly vertical lines. Thus, when you suddenly find yourself lying on the wall and watching the water fall at an angle which a lifetime's experience tells you to be quite impossible, you are hard put to it to understand what is happening.



And when, a moment later, you fall down through the shower curtain, you begin to suspect that someone has suddenly repealed the law of gravity. One solution to the problem is to close the eyes and balance by feel instead of sight; but this raises another problem. Just as you grope for the soap, the dish holding it recedes and you are left thrashing wildly in mid-air.

One of the highlights of the trip was a tour of the bridge. Clutching the heaving rail:

"Why," I hesitantly asked the well-scrubbed young officer who was showing us around, "do they call this part a 'bridge' ?"

"Why, that's quite reasonable," he replied. "It's above the rest of the ship and extends from side to side, like a bridge."

"But a bridge starts somewhere and ends somewhere else, connecting the roads on each side of some obstruction. This doesn't connect anything to anything."

"Well, it -er -ah, here we have the wheelhouse! This is the main compass, and this is the auxiliary. This is the second auxiliary. . ."

I muttered something about the apparent dependability of their compasses, and the young man hastily directed our attention to the cubby-hole containing the ship's radar.

"Now, this is our main anti-collision device," he lectured, and spoke a few words about the working of radar. As the passengers craned their necks at it, he added off-handedly: "Of course, it's not working right now, but we always have a man up in the crow's-nest out there"—pointing to a tiny shack high on a mast forward of the bridge — "who acts as look-out."

Forestalling my comment on modern methods, he led us up on to the flying bridge. Here, having already shown us the main wheel in the wheel-house, and the auxiliary wheel on the bridge, he showed us the third one. When asked about its purpose, he admitted casually that this one was "in case both the others are broken."

But, despite the crew's all-too-evident doubts, the ship obstinately held together, and after a day or so I had become sufficiently relaxed to go and see the afternoon movie. This was shown in a room on the top deck—which, naturally, swayed more than any other part of the ship. The darkness of the room seemed to emphasize the motion, and I spent the two hours not so much in enjoying the show as in waiting for the splash as we tipped over completely. It was the first movie I had watched through a hundred-and-eighty-degree arc.

In addition to movies, we had horse-racing (a game in which the horses were wooden counters) and what was known as "dancing".

This latter sport, on a ship, bears a slight resemblance to that of the same name on land: both are accompanied by music. There the similarity ends. On land, a dancing-partner is an adjunct; on a ship, he is a necessity. The first notes of a ship's dance-band are the signal for the couples to lurch to their feet and begin staggering in all directions (at once) across the floor, supporting each other and dodging their falling neighbours. The dance comes to a temporary halt whenever the tilting of the deck manages to throw the whole company against one of the walls. The survivors then fight clear and look about for more stalwart partners with whom to face the next *mêlée*.

In such gentle pastimes as these our long voyage was whiled away; and at last we approached land. I looked forward eagerly to becoming reacquainted with it. Only one final hurdle remained to be cleared. Remembering the green form, and wondering if the Captain had radioed ahead that I was coming, I finally d i s e m b a r k e d and approached—Customs.

"This yours?" asked a uniformed man, separating my little flight-bag from a mountain of trunks.

"Yes," I admitted; and, before I could even begin to tell him that my aspirin tablets were not heroin, he had scribbled an initial on it and waved me on.

I had survived the voyage. With lifting heart, I realized that all Europe lay open before me. But before I plunged headlong into its delights, I must find a booking-agent.

I must exchange my return boat-ticket for a reservation on a 'plane.

BEGGARS

Beggars, however, one should entirely do away with! Verily it annoyeth one to give unto them, and it annoyeth one not to give unto them. (*Nietzsche.*)

R.C.A.F. Association

NATIONAL EXECUTIVE COUNCIL MEETING

The annual meeting of the National Executive Council of the Royal Canadian Air Force Association will be held in Ottawa on Thursday and Friday, November 22nd and 23rd.

U.S.A.F.A.'S 10TH ANNUAL CONVENTION

Air Vice-Marshal F. G. Wait, C.B.E., National President of the R.C.A.F. Association, accompanied by Mr. J. C. Gray, National Secretary, attended the Tenth Annual Convention of the United States Air Force Association at New Orleans on August 1st to 5th. Regular Air Force Officers attending the Convention included Group Capt. R. W. McNair, D.S.O., D.F.C., Group Capt. G. H. Newsome, A.F.C., Wing Cdr. J. R. D. Braham, D.S.O., D.F.C., A.F.C., Wing Cdr. A. G. Lawrence, D.F.C., A.F.C., and Wing Cdr. C. L. Gervais.

A total of 2,400 registered delegates and 1600 guests were present; and Mr. John Henebry, of Chicago, was elected president for the coming year.

The A.F.A. business sessions were conducted in a manner very similar to our own Convention routine, and the problems discussed were much the same as ours. The membership strength of the American Air Force Association, which of course includes associate members, is 42,000. The membership in the A.F.A. was increased last year by 11,000 as a result of an all-out drive. The membership renewal rate continues to be 80%.

The specific theme of this year's Convention was "Manpower in the Jet Age". The moderator for the Air Power Symposium was James Stewart, well-known Hollywood actor. The problems encountered in this field were ably discussed by leaders in the fields of science, industry, technology, and labour.

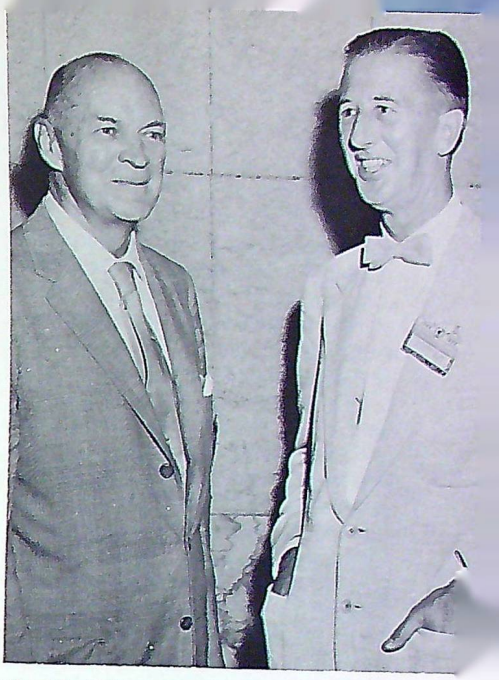
Manpower presents a great problem to the United States Air Force today. The great need is for highly trained technical personnel. The short term of service applicable to U.S. Servicemen is a continuing problem: no sooner is a man trained than his term of service expires.

Guided Missile Conference

Speakers at this Conference included the Honourable James H. Douglas, Under-Secretary of the Air Force, supported by generals of the Air Force's guided missiles programme. An Air Force spokesman said that "guided missiles, in the not-too-distant future, will replace piloted aircraft on about half the missions of Strategic Air Command and a third of those of Tactical Air Command."

Air Power Panorama

The Municipal Auditorium at New Orleans provided a display of the best aviation developments that science, industry, and the Air Force have to offer. The display was open to the public, and drew capacity crowds. This part of the programme was engineered by the "Industrial Associates" of the Association.



Mr. Gill Robb Wilson (left), president of the U.S.A.F.A., and Air Vice-Marshal F. G. Wait at the Convention.

Air Power Luncheon

The guest speaker was General Nathan F. Twining, Chief of Staff. In his address, General Twining said: "Our airplanes and equipment are the world's best. I was certain of this before my visit behind the Iron Curtain, and I saw nothing in

AIR MARSHAL W. A. BISHOP

As we write these lines, the death of Air Marshal W. A. Bishop has just been announced. The R.C.A.F. Association has sent a tribute of flowers, accompanied by a message expressing all its members' deep regret at the passing of one of the greatest fighting pilots of the First World War. To quote from an editorial in *The Ottawa Journal*, "in his slipstream was the inspiration of a multitude of those who came after him in the clear trails of the air, an inspiration we remember today as we mourn the death of this brave Canadian."

Moscow to make me change my mind." He also remarked that "Russia has provided many incentives to its tactical and scientific men, and for this reason we in the West are challenged now as we have never been in the past."

* * *

Since his return from New Orleans, Air Vice-Marshal Wait has expressed his opinion that our own Association has some way to go before we should undertake any of the bigger projects tackled by the American Association. Perhaps we have no desire to go quite as far as they do, but there are many good projects sponsored by them that we should eventually consider.

As a first step, he feels, we should continue unceasingly to increase our membership; secondly, we must pursue our efforts to obtain the full support of Industry, both by means of Industrial Memberships and in other ways. A strong Association, working hand in hand with industry, could become, in Canada, as influential a body as the American Association is in the United States.

CORRECTION

It is regretted that in listing the members of the National Executive Council for 1956-57 in the July-August issue of "The Roundel", the name was omitted of Air Vice-Marshal K. M. Guthrie, C.B., C.B.E., immediate past-president.

Mr. G. A. Ault, Q.C. and former R.C.A.F. wing commander, who has recently been appointed as the Association's legal adviser.

LIFE MEMBERSHIP

In accordance with a change in our by-laws, which has been approved by the Secretary of State, any person eligible for regular membership or serving membership in the Association may become a regular life-member or serving life-member of the Association upon payment of the life-membership fee of $50.00, providing that such person shall have had continuous service in the Association for a period of five years.

TORONTO WINGS

The North American *première* of "Reach for the Sky" was held in Toronto on September 20th. The film is the story of Group Captain Douglas Bader's life.

The *première* was sponsored by the three Toronto Wings of the Association — Nos. 437 (York) Wing, 408 (Toronto) Wing, and 430 (Warsaw) Wing — under the chairmanship of Mr. George Penfold. The proceeds will be used for Air Cadet flying scholarships.

Air Vice-Marshal F. G. Wait was host for the occasion, and he was accompanied by Mrs. Wait. Among the distinguished guests in attendance were the Lieutenant-Governor and Mrs. Louis Breithaupt, Premier and Mrs. Leslie Frost, Mayor and Mrs. N. Phillips, and Air Marshal C. R. Slemon, Chief of the Air Staff.

Flt. Lt. M. E. Ferguson.

NEW E.A. TO NATIONAL PRESIDENT

Flt. Lt. M. E. Ferguson has been recently appointed as Executive Assistant to the National President. He succeeds Flt. Lt. R. J. Palmer.

Flt. Lt. Ferguson was Command Air Cadet Liaison Officer for 8 years. His knowledge of Air Cadet work will prove very valuable in assisting Wings which now sponsor Air Cadet Squadrons, as well as in advising those Wings which are desirous of engaging in this work.

SCIENCE AND RELIGION

(The scientist's) religious feeling takes the form of a rapturous amazement at the harmony of natural law, which reveals an intelligence of such superiority that, compared with it, all the systematic thinking and acting of human beings is an utterly insignificant reflection. This feeling is the guiding principle of his life and work, in so far as he succeeds in keeping himself from the shackles of selfish desire. It is beyond question closely akin to that which has possessed the religious geniuses of all ages.

(*Einstein.*)

INTERLUDE IN MOROCCO

THE Black Forest of Germany and the lush vineyards of France may be a continent away from the blistering plains of French Morocco, but to the men of the R.C.A.F. Air Division, the trip is all part of their regular routine.

In February 1954, when No. 1 Air Division of the R.C.A.F. was seeking a gunnery range to keep its fighter pilots in practice, the French Air Force offered the use of its base and range at Rabat, in N. Africa. Each of the 12 fighter squadrons based in Europe are sent there, one at a time, for a three-week period of gunnery training. As soon as one squadron completes its tour, it returns to its base in France or Germany and is replaced by another. When moving-day arrives, the squadron pilots leave their base and, four flying-hours later, rejoin their groundcrew who have been airlifted to Rabat by *North Star*.

The French Air Force base is well suited to the job on hand. The range is located just a few minutes' flying-time from the aerodrome, thus eliminating the need for drop-tanks, and the Moroccan weather is ideal.

To add a little zest to the air-to-air firing, each pilot participates in the shoot for the Chadburn Trophy. This trophy, named after a famous Canadian fighter pilot of the Second World War, is awarded to the wing which obtains the highest annual average in gunnery. The average is obtained by assigning to each pilot one exercise on which he is given marks that go to make up his wing's total score.

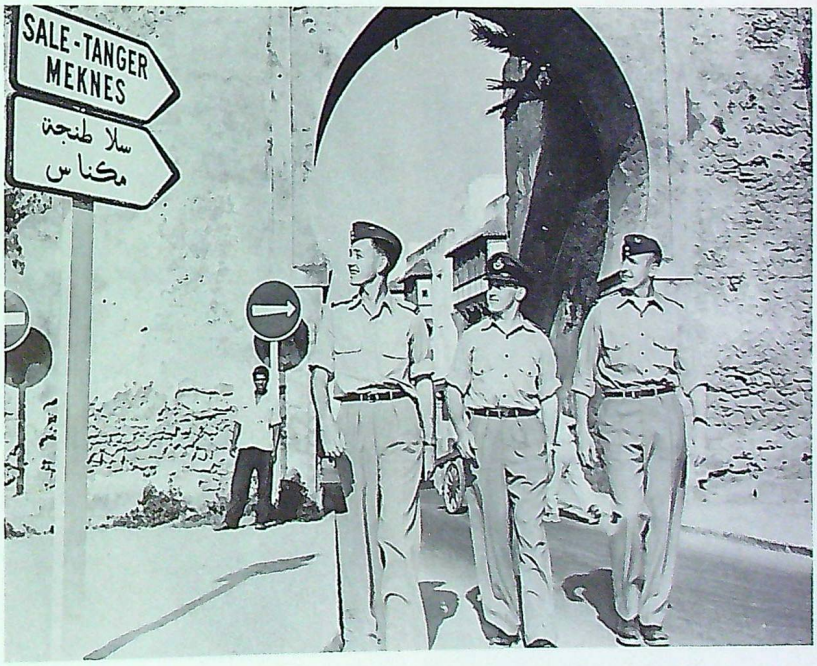
With a full schedule of work to be carried out in a comparatively brief period of time, the field at Rabat is a scene of constant activity. For the squadrons it offers a chance to act on their own, independently of their wing. Both the pilots and the armourers enjoy actually using their guns instead of merely going through the motions.

Recreational activities have not been neglected for personnel serving at Rabat. The R.C.A.F. has a bus which takes officers and airmen on sightseeing trips to Rabat, Fez, and Casablanca. Romantic souls who expect to be reminded of the Arabian Nights are invariably disappointed. No camels undulate across the burning sands, and the only oasis in the area is the local bar. There are, however, compensations. Beautiful Moroccan leathergoods, colourful tapestries, and rugs of Persian design can be obtained from the natives at reasonable rates. For the gourmet there is *kush-kush*, fried squid, and other exotic Arab food to be obtained in the various restaurants. The airfield and surrounding area, lying between the Atlas mountains and the sea, face the Atlantic ocean, and a beach only three miles from the airport makes it possible to take frequent off-duty dips.

Postscript

When No. 444 Squadron returned from its latest tour at Rabat, it left behind it, in a tiny grave, the squadron mascot. The friendly little mongrel pup had been adopted shortly after the squadron's arrival, and it had been christened "Elmo Gravi" — a nectar quite popular in Morocco.

Left to right: Flying Officers F. G. Hannah, W. V. Closs, and D. A. Vann, leaving the walled city of Rabat.



Elmo, an orphan found wandering around the airfield, soon won the hearts of everybody. He would romp about on the flight line, and he was treated as a full-fledged member of the squadron.

One sunny morning, however, shortly before the squadron returned to Germany, Elmo Gravi came to an unhappy end. While performing his daily antics for the crews, Elmo suddenly fell on his side, writhed in pain, and passed away after a few short moments of suffering. Examinations revealed that the little fellow had been bitten by a scorpion.

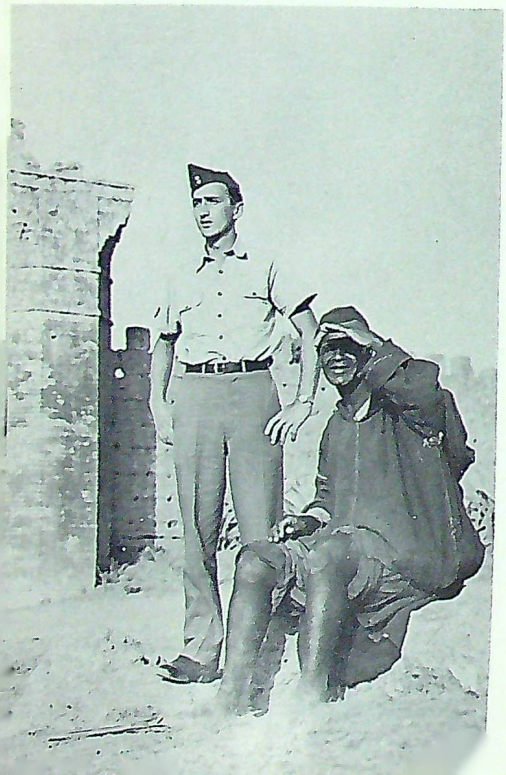
At a funeral held on the airfield, full military honors were paid to him. His small grave is marked by a ring of empty cannon-shells, with a wooden plaque at the head. The plaque is suitably inscribed with Elmo Gravi's name and a brief description of his service with No. 444. The last line reads:

"Dog Gone"

Cpl. N. J. Greentree enjoys a familiarization trip on a ship of the desert outside the city of Fez. The type on which he will later be checked out will be fitted with operational controls just forward of the hump.

Sqn. Ldr. E. Herbertson holds the Lloyd Chadburn Trophy, which depicts two eagles in combat over the globe of the earth.

Cpl. V. O. Campbell visits the Roman ruins at Chellah, near Rabat.



What's the Score?

("Do not imagine", writes Sgt. Shatterproof, "that I send you the enclosed in protest against the administrative training given to our personnel. My questionnaire is intended merely to supplement the regular Service courses, and is designed to lend a little additional sparkle to the conversation of such graduates as may, at some time in their careers, find themselves in the salons of the cognoscenti." We have checked the more technical questions with Mr. John Macoun, Assistant Chief of the Customs and Excise Laboratory, who has helped us on several similar occasions in the past. As it turned out, it was fortunate that we did. The old wardog's general knowledge of metallurgy seems to have suffered from his long preoccupation with Brass, and his original answer to question 9 might well have led to some unpleasantness with the manufacturers of a much-advertised toothpaste. The correct answers appear on page 32.—Editor.)

1. "Red tape" is a phrase applied by the intelligent to needlessly complex bureaucratic procedures, and by the unintelligent to any form of systematic procedure whatsoever. It had its origin in the red tape which was formerly in general use for tying up official documents. The word "bureaucratic" is derived from the Greek "kratos", meaning "rule", and:

   (*a*) The Old Latin "burrus", "red".
   (*b*) The Spanish "burro", "ass".
   (*c*) The Old French "burel", "coarse cloth".
   (*d*) The English "bur", in its sense of "something hard to shake off".

2. About eighteen months ago the Supply Branch, in defiance of all the finer traditions of calligraphy, began to issue ball-point pens throughout the Service. The fluid contained in these pens is made of:

   (*a*) A coal-tar dye in an organic solvent.
   (*b*) A mixture of oak-galls and marking-ink.
   (*c*) Glycerine and methylene blue.
   (*d*) A vegetable dye and deodorized turpentine.

3. Typewriters were first developed in 1870. A minimum of 35 words per minute is required of those dedicated women who aspire to serve their Queen as typists. The world's record for typing is:

   (*a*) 159 words per minute, maintained for 1 hour without error (in 1918).
   (*b*) 280 words per minute for two minutes (1955).
   (*c*) 95 words per minute for 30 minutes, without error (1939).
   (*d*) 63 words per minute, without error, for 23 hours 46 minutes (1942).

4. Followed in parentheses by the name of its author is the quotation—

   (*a*) Skewered through and through with office-pens, and bound hand and foot with red tape. (Karl Marx, in "Das Kapital".)
   (*b*) A cold world, Curtis, in every office but thine. (The Hon. Brooke Claxton, former Minister of National Defence, to the then C.A.S.)
   (*c*) The pen is mightier than the sword. (Bulwer Lytton, in "Richelieu".)
   (*d*) Friendship is constant . . . save in the office and affairs of love. (Dale Carnegie, in "How to Win Friends and Influence People".)

5. On those very rare occasions when the airwoman typist makes an error, she usually uses a pencil-type eraser made of:

   (*a*) Rubber, carborundun, and bleach.
   (*b*) Polyethylene and sand.
   (*c*) Vulcanized vegetable oils.
   (*d*) Rubber, chalk, and clay.

6. Prominent among the men who developed shorthand in England was the poet:

   (*a*) Alexander Pope.
   (*b*) Percy Bysshe Shelley.
   (*c*) John Keats.
   (*d*) John Byron.

7. A Chicago screw is:

   (*a*) A guard in the Illinois State Penitentiary.
   (*b*) A type of screw used in the R.C.A.F. with loose-leaf binders.
   (*c*) A burglar-proof fastening used on filing-cabinets.
   (*d*) The local term for a stockyard executive whose mind has become unhinged by the smell of blood.

8. A highly toxic form of alcohol is contained in the:

   (*a*) Thermometers used in R.C.A.F. offices.
   (*b*) Liquid ink-eraser found on many desks.
   (*c*) Fluid with which the typist cleans her type.
   (*d*) Oil with which she oils her machine.

9. The gold nib of the fountain-pen used by the adjutant who stands firm against the ball-point is tipped with:

   (*a*) Irium.
   (*b*) Iridium.
   (*c*) Vanadium.
   (*d*) Vitriol.

10. Sawdust makes its contribution to the efficient administration of the R.C.A.F. by serving as:

    (*a*) Stuffing for the chairs issued to officers of air rank.

(b) A floor-covering in the C.O.'s office at very isolated detachments.
(c) The insulating-material used in walls.
(d) The polishing agent for the pins supplied to the Government.

11. Sympathetic ink:

(a) Is an ink made from the calcined bark of the weeping-willow.
(b) Changes its colour with the temperature.
(c) Is the correct name for "invisible" ink, the marks of which become visible after treatment with chemicals.
(d) Does not expand under reduced atmospheric pressure, and is therefore carried on the R.C.A.F.'s C-5 for the use of V.I.P. passengers.

12. The adjutant in Caesar's day, if he wrote any D.R.O.s at all, wrote them:

(a) With a stylus on waxed tablets.
(b) With a quill pen on parchment.
(c) With a brush on papyrus.
(d) With a piece of lead on a clay tablet.

13. The sealing-wax which helps to protect the R.C.A.F.'s secrets from the ubiquitous eyes of subversion, contains:

(a) 10% beeswax.
(b) 39% paraffin wax.
(c) .14% spermaceti (whale wax).
(d) No wax at all.

14. *Not* a trade-name is:

(a) Dictaphone.
(b) Linguaphone.
(c) Audiphone.
(d) Teletype.

15. In no country can the word "clerk" be correctly applied to a:

(a) Shop assistant.
(b) Doctor.
(c) Member of the armed services.
(d) Master mariner.

16. General Wolfe blotted his signature with sand. The R.C.A.F. uses:

(a) Cotton rags.
(b) Pure cellulose.
(c) Ground wood-pulp.
(d) A mixture of rags and wood-pulp.

17. Should the polished adjutant find himself at a loss for an antonym, his best course would be to look for one in:

(a) The Station Hospital.
(b) Roget's Thesaurus".
(c) The Station Fire-hall.
(d) C.A.P. 460, "Manual of Service Writing".

18. If the Air Commodore applies an impetuous tongue to the glued flap of the small brown envelopes (G. 76) provided by the Supply Branch, he is taking into his august system a certain amount of:

(a) Dextrin, a derivative of starch.
(b) Horse-hide.
(c) Fish-heads.
(d) Ricin, an albumen of the castor seed.

19. The busy typist who is overheard muttering something about a "tree", is most likely:

(a) Referring to some regrettable impasse reached by the adjutant.
(b) Reminding herself that she must type her letter in triplicate.
(c) Typing a memorandum to all Branches.
(d) Annoyed by the crinkling of the paper in her machine.

20. In many well-run offices, nitroglycerine is frequently used:

(a) For blowing up safes.
(b) By sufferers from cardiac trouble.
(c) In the liquid of the thermostat's thermometer.
(d) By diabetic members of the staff, instead of sugar.

TROPHIES FOR 6 R.D.

The volunteer trumpet band of No. 6 Repair Depot, Trenton, won the two first prizes at the Waterloo Musical Festival during the past summer. It was awarded first place in the Senior Novice Class and led all the Senior bands in the evening street-parade competitions. It also obtained the second highest aggregate score of the fifty bands competing in all classes. Our photograph shows the two trophies being examined by Group Capt. T. A. Spruston, M.B.E., C.O. of No. 6 R.D., and Sgt. H. G Kelly, the Bandmaster.

No. 432 SQUADRON

PART TWO

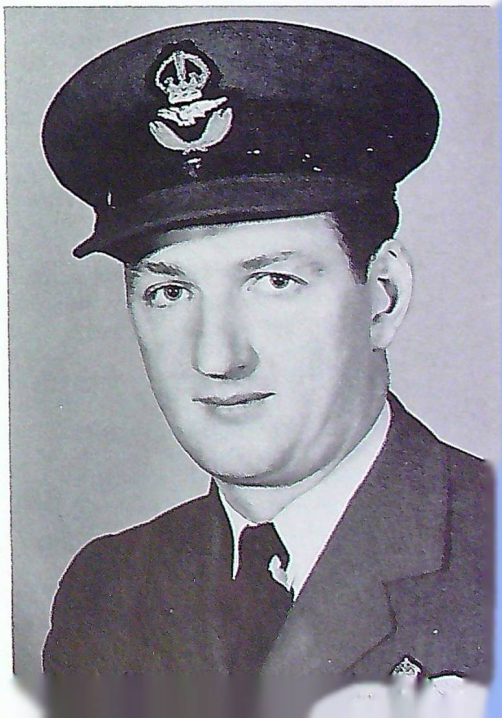
BY FLIGHT LIEUTENANT A. P. HEATHCOTE
Air Historical Branch.

APRIL 1944, and showers of high explosives came the way of more rail centres in France and Belgium. Marshalling-yards at Villeneuve-St. Georges and Noisy-le-Sec, in the Paris area, and also Ghent and Lens, were targets for the Leasides. Over Noisy-le-Sec, on the 18th, the bomber concentration was uncomfortably tight. A collision occurred above the target area, and No. 432 Squadron's "E"-Easy fell in a spin on to the marshalling-yard it had come to bomb. Only one member of the crew managed to bail out. A second, Sgt. G. J. Shaughnessy (mid-under gunner),* became overexcited and pulled his 'chute ring inside the aircraft. As the only spare 'chute had become hopelessly jammed in its rack during the collision, he could now do nothing but crouch near the door and brace himself for the crash. He next remembered being dragged along the tracks by two German soldiers, who quickly dropped him and ran when a stick of bombs fell nearby. Shaughnessy ran in the opposite direction to a more peaceful corner of the yard, where he stumbled on to a workers' shed. There he donned a pair of overalls. In an adjacent underground shelter he found first-aid equipment, with which he patched himself up. After removing his rank and trade insignia, he went outside, scaled a wall, and dropped upon a sidewalk. He approached the first civilian he saw, an elderly lady, and explained who he was. She directed him out of the area. Presently he fell in with a party of fire-fighters, who gave him food, dressed his cuts and bruises, and hid him in their truck. Some time later he was taken to a house, where he was sheltered for several weeks. The Organization then took over and arranged for his escape to Gibraltar, whence he was flown to England in July. He was 432's first evader.

After toting mixed loads of high explosives and incendiaries to Dusseldorf, Karlsruhe, and Essen, in four days, the Leasides began a long string of 38 missions on objectives in France and Belgium, broken only by two attacks on the Ruhr. Fourteen targets were railway centres, twelve were "military installations", and one was bombed (twice) in direct support of the British Second Army. About the other ten, more later.

The first raid of this series, on Montzen, was, for this squadron, particularly ill-fated, in that it produced the unit's first triple-loss. Fortunately, thirteen of the twenty-two missing aircrew became either evaders or prisoners-of-war. A commendably high proportion of two of these crews effected evasion; in one case, four out of five survivors evaded, in the other, five out of six. While records indicate that the evasions of seven of the above were fairly routine, the same cannot be said of the other two. Pilot Officer D. A. McCoy, mid-upper gunner of one crew, stayed briefly with a family in Comblain Fairon, then, becoming restless, went to Liége, contacted the White Army, and inquired about his chances of escaping to Switzerland. Informed that the escape line thereto was broken, he abandoned the idea and returned to Comblain Fairon. Realizing that he was going to stick around awhile, he set out to learn French, and by mid-June "was speaking well enough to get by". Meanwhile, as escape routes seemed blocked at the time, he had accepted an invitation by the White Army to become one of them. (Actually he had no choice in the matter, for the Underground, which

Wing Cdr. J. K. F. Macdonald, D.F.C.



*Some *Halifax III's* were fitted with mid-under turrets in lieu of H_2S radar equipment.

had accused him of being a spy, insisted on keeping him in custody at least until satisfied that he was a *bona fide* evader.) So began a three-month career as an official of the Resistance movement. Having served his apprenticeship as a "contact man" (and in the interim having proven his identity), McCoy advanced to the position of section adjutant, and began to busy himself with organizational and administrative work which consisted mainly of securing recruits, arms, and motorized equipment. He engaged actively in typical resistance activities, creating havoc among the Germans by means of ambushes, road-blocks, other "slow-downs", and miscellaneous hellery contrived to harass the enemy in his withdrawal. One expedition in which he took part resulted in the elimination of some twenty Germans and the overnight hold-up of an entire *panzer* unit. He was even, for a short time, chief of his section while it awaited a replacement for its old commander, then in the hands of the Gestapo.

Learning of the approach of Allied troops, he contacted an American recce unit and gave them useful information on enemy dispositions in the line of their advance. His last bit of action as a Resistance member entailed the encirclement and capture of a number of the *Wehrmacht* who were trapped in a wood. On 15 September he was back in England. France recognized the value of his services and eventually awarded him the Croix de Guerre with Silver Star.

Appearing in an overseas Service publication in November 1944, was the evasion story of Flying Officer Peter Holmes, navigator of the other crew referred to above. He parachuted into enemy territory with 48 shrapnel wounds in his legs. Contacting the Underground almost immediately, he was treated by a doctor who removed all but three of the fragments. Eventually he drifted to a town heavily garrisoned by Germans. Of necessity he posed as an apprentice photographer, having to exercise his linguistic ability considerably in order to pull off the piece of deception. (He could speak French, German, Spanish, and Portuguese.) Few evasions were as bold and unorthodox as Holmes'. His chosen place of work was situated next door to nothing less than a Gestapo headquarters! His female superior, who was proprietress of the photographic studio, was regarded by the Germans as a *"collaboratrice"*, and was therefore given more than the usual latitude. She frequently entertained German officers at parties, which her young assistant invariably attended. "The night before Paris fell we had a party that lasted until four or five o'clock in the morning", chuckled Holmes at interrogation. "Every now and then a member of the Gestapo would open a window, pop his head out, and curse the noise."

* * *

Besides leading up to the excellent evasion efforts just mentioned, the Montzen operation was the background for an exemplary performance by Leaside skipper Pilot Officer J. L. Webb, flying on his first mission as captain. He described the eventful part of the trip thus:

"On our bombing run we picked up an Me. 110 which came out of the smoke and haze. Our guns and his fired. Simultaneously the bomb-aimer said 'Bombs gone' and we went into our evasive action. The fighter closed to about 100 yards, then his fire ceased. He stayed dead astern for a couple of seconds, then fell away to port, our gunners still firing and causing damage to his starboard engine.

"As we were leaving the target we were intercepted again. This time we saw the enemy first and were able to corkscrew. While our gunners scored hits, his shots were passing by our tail. A little farther on, another fighter took a pass at us, but there were no shots fired and we were able to shake it off.

"Twenty-three minutes after the first attack, we encountered still another fighter. This attack came from the starboard bow, and its first indication was a cannon-shell hitting our starboard outer engine, knocking off the oil-filter. The engine was feathered and we continued home on the remaining three.

"We got a W/T fix at the enemy coast and set course for Woodbridge. On the way we were trailed by another fighter who left us only when we went into cloud cover at 6000 feet. Using the Woodbridge beam, we broke cloud over the lighthouse and signalled that we were coming in. Fifty feet off the deck and well down the runway, our starboard inner engine quit, causing our starboard wing to drop, and putting us into a violent turn to starboard. The only alternative was an overshoot. We experienced quite a bit of difficulty in regaining sufficient height, but at 600 feet we finally got our starboard wing up and made another approach. This time everything went well and

Sgt. W. J. Ziomko, D.F.M. (left), and Sgt. D. H. Wright, D.F.M., being interrogated after a raid on Bourg Leopold.

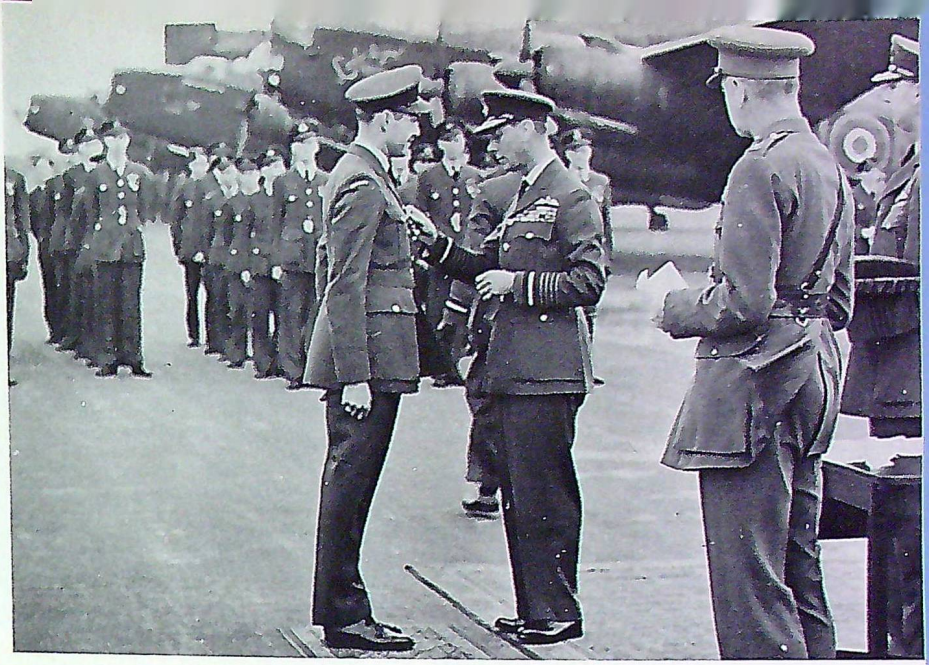
we landed safe and sound. We were all glad to be back."

For a display of skill and devotion to duty of the highest order, Leroy Webb received the first award of the Distinguished Service Order made to a member of this squadron. His rear and mid-upper gunner, Sgts. D. H. Wright and W. J. Ziomko, were awarded D.F.M.'s for their part in the show.

* * *

Even though the next month-and-a-half saw only one penetration of Germany by No. 432, its losses were rather heavy — nine crews. Providentially, thirty-one members of those crews survived, and, of that number, thirteen were evaders and two were escapers. Among the more eventful evasions was that of Flying Officer J. Gouinlock, a navigator whose aircraft went down over Bourg Leopold on 28 May. Landing near Rudel, in Holland, Gouinlock was helped by several Dutch civilians, one of whom gave him a bicycle. He cycled to Bourg Leopold, remained there for three days, and then went by train to Liége. One of his companions in the house where he stayed here was another evader, a Sgt. J. Cook, flight engineer of a *Flying Fortress* which had recently been shot down. (They helped to keep up each other's spirits by arguing about the respective merits of the *Fort* and the *Hallybag*.) Early in September a German search party entered the house looking for a "terrorist". Gouinlock was taken as a hostage, but minutes later was permitted to go free. The rest of that day he was put to work digging fox-holes for the Germans. Less than twenty-four hours later he was liberated by the British Second Army.

Even a serious situation sometimes has its lighter side, and it did in the case of Flying Officer D. E. Rutherford, bomb-aimer in the same crew as Gouinlock. Here he was, down in enemy-occupied country (Holland), fully aware that the Germans (perhaps the Gestapo) would be hot on his trail. It was when he approached what he thought was a house to ask for a drink and a helping hand that the ludicrous — and ironical — element appeared. The "house" proved to be a branch of the Immigration and Customs Department. Now at least no one could accuse him of illegal entry. As it turned out, however, the customs officials were more human than usual. They sheltered him until late in July, then, one dark night, spirited him into Belgium. With the aid of a Belgian woman he soon reached Liége, where he remained until liberated.



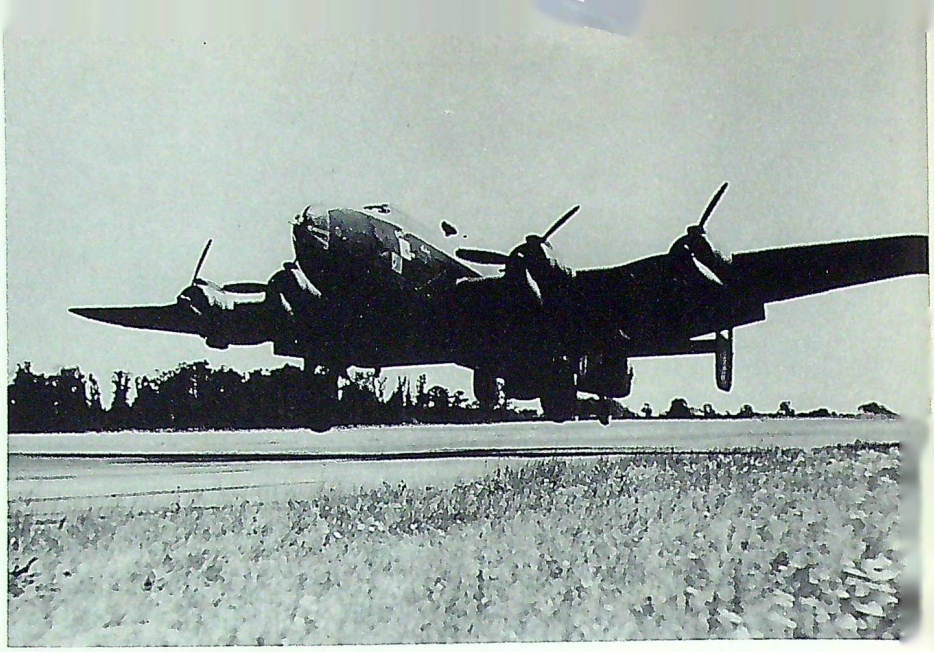
Pilot Officer J. L. Webb receiving the D.S.O. from His Majesty King George VI.

Another instance of Leaside evasion illustrates the smooth-working system employed by that escape-evasion body known as "the Organization". Shot down near Serifontaine while on a mission to Acheres, Flying Officer W. K. Vickerman (captain) joined forces with his mid-upper gunner, Sgt. N. E. J. Beauchesne, to form one of two evasion teams from the same crew. They made first contact with a farmer, who took them in, fed them, and then transferred them to the care of a nearby townsman. The latter took them to Neuville, then Argenteuil, where they picked up their next travelling-companion, who proved to be a Belgian woman. The three travelled by train to Paris, stayed there overnight, then left on a south-bound train, accompanied by another (female) guide who had bought their tickets and put them aboard a special coach. Everything was incredibly well arranged. Disembarking at Etampes, they walked to Augerville, there to be handed over to two Frenchmen. They were then guided by stages to Voyes, Châteaudun, and finally to a Maquis camp in the Forest of Freteval.

Occasionally something went awry somewhere along the evasion line, and would-be evaders fell victim to deception. Assisted by the Underground, Flying Officer C. R. Hoffman, of Vickerman's crew, managed to avoid capture for almost two months. Then, while he was in hiding with a group of R.A.F. evaders in a Paris apartment, treachery took a hand. Believing themselves in friendly hands, all were taken one morning to a farm just outside the city. There they were packed into a truck and driven straight to Gestapo headquarters. Then came a 12-day in-

terrogation at Fresnes Prison. The next phase in the tale of Hoffman was Buchenwald, then Stalag Luft III.

Later in June another Leaside pilot-gunner combination earned recognition by virtue of excellent airmanship and deportment while on operations. When, just after bombing a marshalling-yard at Cambrai, his aircraft, "R"-Roger, was badly crippled by flak, Pilot Officer L. R. Lauzon ordered a bail-out. Thinking all the crew had left, he was himself about to go when Sgt. C. Christoff (mid-upper gunner) came forward out of the blazing fuselage, carrying a 'chute that was obviously riddled beyond the point of safe use. Lauzon gave the gunner his own chest pack and told him to bail out, indicating that he himself would try to crash-land. Christoff refused, preferring to ride down with his skipper. Meanwhile there was a fire to be fought. Christoff picked his way through the flames to the rear of the fuselage. By his plucky efforts he kept the fire sufficiently in check to allow his captain to remain at the controls and effect a crash-landing. Lauzon was faced with a very sticky problem. It was pitch dark, and he had to make an emergency touch-down without landing lights or other aids. Barely able to make out ground detail, he flew "Roger" on to terra firma almost by instruments alone. The still-blazing *Hally* remained on an even keel and the pair walked, or rather ran, away from it, unharmed except for slight burns. Seconds later, what remained of the kite was blown to smithereens. Captured in August, Lauzon eventually received the D.F.C. Christoff, who managed to evade, won a Mention-in-Despatches.



Halifax Q-Queen settles down at East Moor.

It was after being shot down during a mid-June assault on Sterkrade-Holten that a pair of Leasides qualified for membership in the R.A.F. Escaping Society. Warrant Officer L. K. McElroy and Sgt. R. Gelfand evaded in several Dutch towns for more than five months before they were apprehended. On 18 November, while attempting to cross the river Rhine, they were taken by a *Wehrmacht* unit. For three days they were imprisoned in a p.o.w. camp at Amersfoort. On the fourth day they were, with 38 other prisoners, crammed into a box-car on a freight-train bound for Nuremberg. At midnight the train began to move out of the yard; at 0200 hours five prisoners began to move out of the box car. Using an escape file, they had severed the wire on the car's only window. Crew-mates McElroy and Gelfand stuck together, hiding in a cave for five weeks and in a village church for another six. Then followed a month at Essen (Holland), near Arnhem, after which they returned to Amerongen. There they remained until VE-Day.

* * *

On 30 May, Wing Cdr. Bill McKay, D.F.C., Leaside guiding hand for ten months, was posted from the unit for repatriation. The two-tour veteran was succeeded by Wing Cdr. J. K. F. MacDonald.

No. 432 Squadron contributed to the success of D-Day by joining attacks on a radio station at Mont Couple and on gun positions at Neufchatel and Houlgate. The R.D.F. station was made completely unserviceable, and the battery at

Flying Officer Peter Holmes recounts his experiences to his father, Flt. Lt. A. C. Holmes.

Houlgate, attacked less than four hours before the first waves of Canadian infantry were hitting the Normandy beaches, was practically demolished. After D-Day the unit hammered at seven successive tactical objectives in indirect support of ground troops. The most spectacular of these attacks was a low-level (1,500 feet) smash in moonlight at a railway bridge near Coutances.

On the night of 12/13 June, the first flying bombs were launched against England. For some 2½ months thereafter, the bombing of V-1 supply and launching sites in the Pas de Calais area ("Operation Crossbow") was a high-priority (though not a top-priority) commitment for Bomber Command. From a standpoint of bombing accuracy required, never had a greater challenge been thrown at the heavies than by the tiny, well-concealed launching ramps. Between 17 June and 29 August the Leasides operated against forty-one targets, twenty-three of which were "Crossbow" objectives. The entire campaign of doodlebug extermination cost them not a single life or missing crew.

Direct support of the Army in the field was undertaken by the unit for the first time on 7 July. The Allies' time-table was being thrown out of kilter by a stubborn enemy force at Caen, an unexpectedly rusty hinge on which was to swing the door of the Allied advance. At the request of the Second Army, Bomber Command sent a strong force to oil the hinge. There followed 45 minutes of the most highly concentrated bombing ever carried out. The Second Army was so impressed that it issued Command an invitation to assist at a similar function on the 18th. Command accepted, and nearly 1000 heavies again dropped calling-cards at various points in the town area. This time one of 432's sixteen attacking aircraft fell to flak. Seven of the eight-man crew bailed out, however, one managing to evade completely and another to escape after being captured.

After Caen there was Wesseling, then two French targets, then Stuttgart. The latter mission, to the Leasides' first major German target in three months, cost them two crews, one led by their Commanding Officer. The case of Wing Cdr. MacDonald's crew was unusual in that all six surviving crew members avoided capture. The Wing Commander strained his back upon landing, and for three hours was unable to move. He finally managed to crawl to a cornfield, where he lay until midday. Able then to regain his feet, he approached a farmer and disclosed his identity. The latter gave him food and drink, then turned him over to another farmer who took him by buggy first to his farm and thence to Villamblain. There he met his mid-upper gunner, Flt. Sgt. B. R. Justason, in whose immediate past history there were, likewise, two friendly farmers and a horse-and-buggy. Now wearing civilian clothes, the two evaders were taken to Orgeres, there to find another crew member, Flying Officer W. Calderwood,* R.A.F., the wireless operator. The trio stayed there with a family for several days. Then, on to Chartres, and finally Villebon, where they remained until American troops took over on 14 August. The other crew members reached England safely in mid-August. Wing Cdr. MacDonald was one of comparatively few bomber squadron commanders who "went for a Burton" and came back home within a month. (Three and a half weeks after being listed as missing, Mac had returned to England.) Meanwhile, elevated from Flight to Squadron Commander was Wing Cdr. A. D. R. Lowe.

*This officer, having twice bailed out during 432's Wellington days, was now a thrice-qualified member of the Caterpillar Club.

On the night of 28/29 July came a raid on Hamburg which, for No. 6 Group, was the costliest of all. Twenty-three of Command's bombers were lost, all but one of those being from R.C.A.F. bases. One belonged to East Moor and the Leaside Squadron. Atoning somewhat for 6 Group's heavy losses were Command's claims of 27 fighters destroyed and 6 probably destroyed, a new high for one night. No. 432 claimed a Ju.88 destroyed, the marksmen being Pilot Officer R. G. Bullivant and Flt. Sgt. D. B. Penny, both of whom were to be gonged in September. Less than two months later, their skipper, Sqn. Ldr. M. W. Pettit, D.F.C., put up the only Bar-to-the-D.F.C. awarded to the Leasides. With subsequent awards to three more crew members, the number of decorated individuals in Maurice Pettit's team reached six.

In August, besides attacking more buzz-bomb sites than they cared to remember, Leaside crews twice lent the Army a hand in the Falaise area, waxed strategical again on Brunswick, Kiel, and, Bremen, seared three oil dumps and three harbours in France, maltreated an airfield in Belgium, and roughed up a German garrison on a hold-out island. It was a record month for the unit in three departments—number of targets visited (21), sorties despatched (268), and bomb tonnage dropped (935). Standing out above all these statistics, however, was the statement that read "Operational casualties — nil". Another highly pleasing aspect of August was the reappearance of several "missing" personnel, some of whom visited East Moor to haunt their old mates. Chief among these was Wing Cdr. MacDonald, who, like the others, was enjoying "evasion leave" before returning to duty.

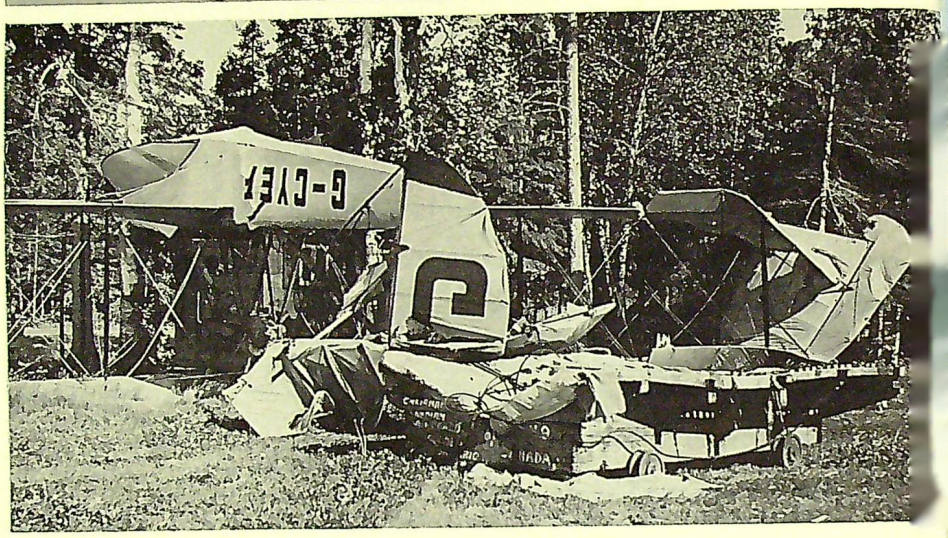
(To be continued)

PIN-POINTS IN THE PAST

Our photographs this month both go back to the days of the Canadian Air Force in 1923, nearly a year before the official birthday of the R.C.A.F. on 1 April 1924.

In October of that year a building on Maryland St., Winnipeg, was rented for use as a Repair Depot for the overhaul of aircraft and equipment during the winter months. The only air stations then in operation were Dartmouth, Camp Borden, High River (Alta.), Ottawa (Rockcliffe and Victoria Island), Winnipeg, and Vancouver. The Repair Depot shown in our photograph serviced Winnipeg's three sub-bases at Victoria Beach, Norway House, and The Pas.

Our other photograph was taken at Victoria Beach, in June 1923, after a cyclone which destroyed one of the sub-base's aircraft, an HS2L.



BOMBER COMMAND MEMORIAL BOOKS

The Memorial books to the fallen of Nos. 2, 3, 8, and 100 Groups of R.A.F. Bomber Command in the Second World War, which were laid in Ely Cathedral on 6 November 1955, have been reproduced in booklet form giving details of the service in the Cathedral and Rolls of Honour of the Groups.

There is a booklet for each Group, and copies may be obtained from the Bomber Command Memorial Committee, Headquarters, Bomber Command, R.A.F. High Wycombe, Bucks., England. Applicants should state the full name, rank, and number of the relative or friend commemorated and the Group in which he served. Price: 3 shillings per book.

In a foreword to the four Memorial Books, Air Marshal Sir George H. Mills, the Air Officer Commanding-in-Chief, Bomber Command, at the time of the service, states that these forms of memorial were thought the most fitting "as they so closely link the memory of those gallant and devoted men with the countryside which saw the birth of so many of the ideals for which they died and their growth into great forces acting throughout the world for the good of mankind."

The books in Ely Cathedral contain the names of 19,000 aircrew lost on operational missions. The Memorial Window, unveiled on 6 November by Air Vice-Marshal A. McKee, comprises four panels. The left-hand light shows an airman in flying clothing over the Badge of No. 2 Group. The left-centre light shows the Archangel Michael above the Badge of No. 3 Group, and the right-centre portrays St. George and the Dragon above the Badge of No. 8 Group, with the Lion of St. Mark and the Patron Saint of the Royal New Zealand Air Force in the design. The right-hand light shows an airman above the Badge of No. 100 Group. At the bottom of each light are scenes depicting *Wellington* bombers on operations, and in the tracery at the top of the window are the badges of the R.A.F., Royal New Zealand Air Force, and Bomber Command, as well as emblems of the Allied forces who fought with Bomber Command.

EXPERIENCE

No man can draw out of things, books included, more than he already knows. A man has no ears for that to which experience has given him no access. (*Nietzsche.*)

Answers to "What's the Score?"

1: (c)	2: (a)	3: (a)	4: (c)
5: (d)	6: (d)	7: (b)	8: (c)
9: (b)	10: (d)	11: (c)	12: (a)
13: (d)	14: (c)	15: (d)	16: (b)
17: (b)	18: (a)	19: (d)	20: (b)

THE R.C.A.F. BENEVOLENT FUND

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

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

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

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