The ROUNDEL

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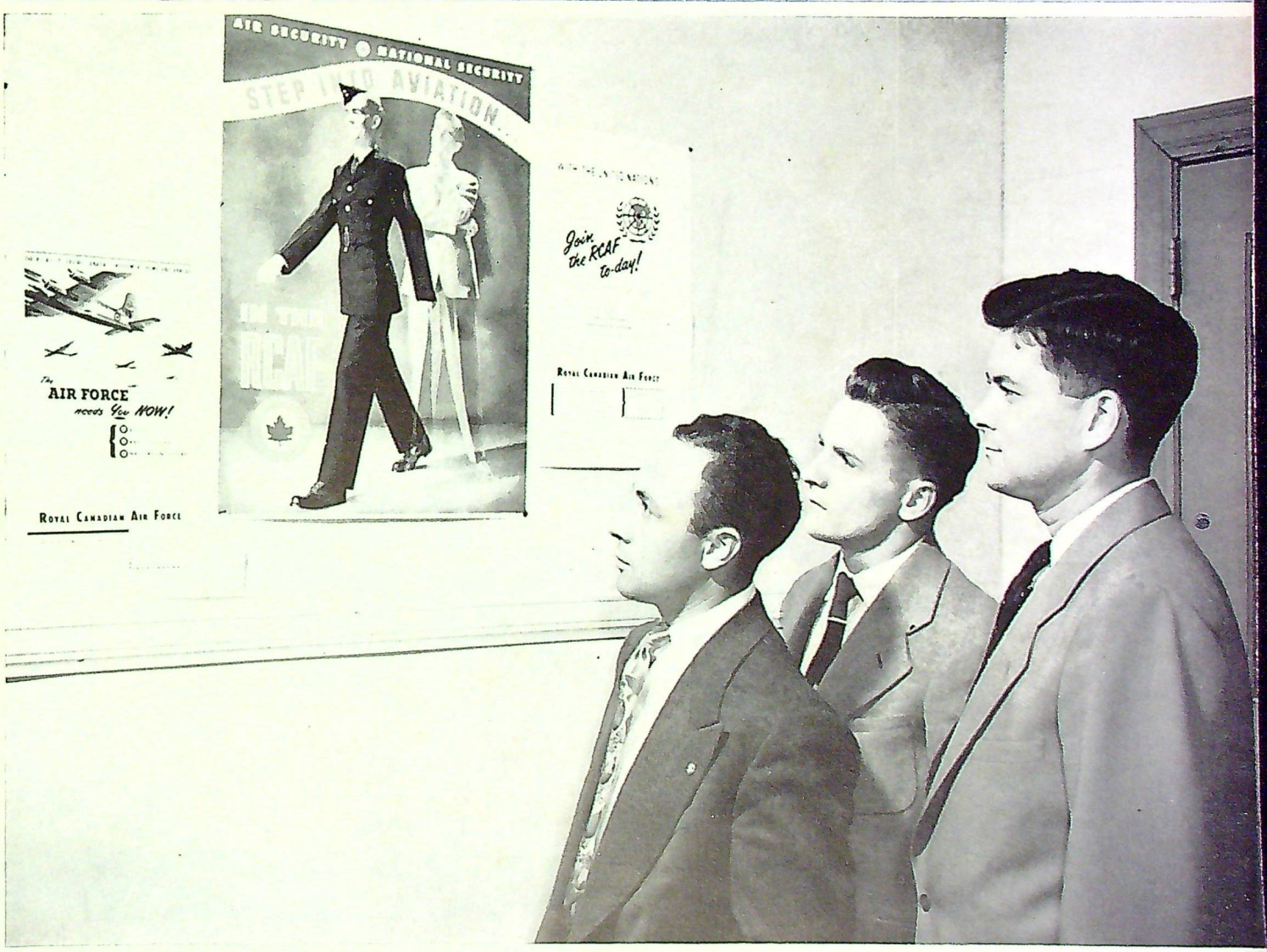
OCTOBER 1950



ROYAL CANADIAN AIR FORCE

The Roundel

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

VOL. 2, No. 11 OCTOBER 1950

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EDITORIAL

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MISCELLANY

This Month's Cover

The strength of the R.C.A.F. is now to be increased to 24,920. Until recently it was set at 17,000. At the outbreak of the Second World War it stood at only 4,061.

EDITORIAL OFFICES:
Room 2738, D.N.D. Bldg. "A,"
Ottawa, Ont.

Sgt. Shatterproof on Defence

Sir:

I understand that it is your intention to include in the October issue a brief account of the pipe-band of R.C.A.F. Station Edmonton. I am therefore enclosing herewith a few verses which will probably be of considerable interest, not only to the average reader, but also to Mr. Brooke Claxton, Air Marshal Curtis, Lieutenant-General Foulkes, and the Air Historian. I shall, of course, be happy to develop the details of my implied proposal further, should any of the first three of the above-named gentlemen wish me to. Such details include both the logistic and acoustic aspects of the plan — i.e. provision of ear-plugs for supporting troops, construction of sound-proof training-quarters, etc., etc. Even when readying ourselves for total defence, we must never lose sight of possible repercussions on our own forces.

The verses are said to have been written by Robert Bruce, while hiding in a cave from the English; and they have been handed down in the Scottish branch of my family for more than six hundred years. The Sporran Dhu McShatterproof mentioned in the fourth verse, besides being the most far-reaching piper of his day, for a long time held the record for caber-tossing and putting the haggis. He was also one of the roughest moss-troopers that ever cleaved a Sassenach from collar-bone to pelvis with a single stroke of his claymore. Legend has it that he died from a lung condition brought on by his efforts at the battle of Bannockburn. The verses themselves are usually sung to the ancient air of "Our Jamie's been sent to the madhoose."

'Tis muckle wae and mickle mirth
For Scots wha bled wi' Wallace!
There's nicht in a' the Heelands noo
Can gi' me puir heart solace.

The Sassenach is through our gates;
The situation's rusky —
But worst of a', the Sassenach
Is a'most through our whuskey.

The speeder[1] *climbs, the speeder fa's —*
But, though I've done as he does,
The thocht[2] *will nae disguise the fact*
I'M BLUIDY SICK O' SPEEDERS!

But whisht! What ghaistly screech is that
Comes driftin' o'er the heather? —
'Tis Sporran Dhu McShatterproof
A-squeezin' o' the leather!

An' see! Yon speeder's shudderin' . . .
This time he makes nae error:
He leaps, and through the creviced roof
He scoots awa' in terror.

So on, braw lads, to Bannockburn —
The speeder's lesson heedin':
When Scotland goes agin her foes
The peeps[3] *must aye be leadin'!*

[1]Scottish for "spider"
[2]Scottish for "thought"
[3]Scottish for "pipes"

R.C.A.F. Progress at Avro Canada

by Wing Cdr. H. R. Foottit

(The writer of this article was co-author of the early draft specification for the CF-100 while he was stationed at A.F.H.Q. in 1945. Near the end of the war he left the Service to resume his job as Chief Structures Engineer for the Ryan Aeronautical Co. in the United States, but returned in November 1946 to take over the Aircraft Development Branch of D.D.A. under the Air Member for Technical Services. In August 1948 he was sent to A. V. Roe Canada Ltd. as Resident Engineer Officer, a position which he filled until two months ago. He is now at R.C.A.F. Staff College, Toronto. — Editor).

WINSTON CHURCHILL, Dr. Vannevar Bush and other front page leaders have consistently hammered home the doctrine that military strength can only be built on a solid foundation of technical and industrial strength. As Dr. Bush states in his latest book, "Modern Arms and Free Men":

> "If war begins, then, and the opening settles into a slugging match, the ultimate advantage will lie with that nation which has scientific and technical ability widespread among its people, industrial capacity and versatility, and a determined will to prevail."

Following this sound advice, Canada has been steadily shoring up her industrial ramparts which were so painstakingly built during the last war. One of the many cornerstones in this fortification, and vital to the strength of the R.C.A.F., is the sprawling plant of A. V. Roe Canada Limited at Malton, Ontario. Here, on the border of Toronto's municipal airport, the steady drone of engines and the sharp throb of rivet guns announce to the world that aircraft and engines are flowing from the production lines.

Though the company is engaged in such commercial ventures as the design and production of the famed C-102 "Jetliner," the most significant progress in the last two years has been for the R.C.A.F. Lancaster and Mitchell aircraft conversions have been rolled out, two CF-100 "Canuck" jet fighters have taken to the air, powerful "Orenda" turbojet engines have logged numerous hours on the test stands and only recently have been airborne for the first time.

Behind these headline achievements stands an organization which arose from the ashes of two war-time Crown corporations, Victory Aircraft and Turbo Research. In the year following World War II, the British Hawker Siddley Group decided to settle a portion of their assets in Canada; so they purchased the two Canadian companies and welded them into A. V. Roe Canada Ltd. Since the Crown corporations were set up to produce aircraft and engines respectively, Avro Canada was split into two watertight divisions under one management, the Aircraft Division and the Gas Turbine Division.

For R.C.A.F. contracts the Aircraft Division is broken down further into the Conversion and Overhaul Section, and the CF-100 Fighter Section. The Gas Turbine Division also has two major branches, though they are separated geographically. At Malton, the main engineering and manufacturing section (including the engine test cells) is housed with the Aircraft Division. At Nobel, Ontario, a tar-papered war-time munitions plant harbours the engine compressor, turbine and combustion can test section.

Much to the confusion of civilian (as well as many Service) visitors, the R.C.A.F. also has two separate groups stationed at the company: A.F.H.Q.'s Resident Engineer Officer, with his assistant, and Air Materiel Command's Technical

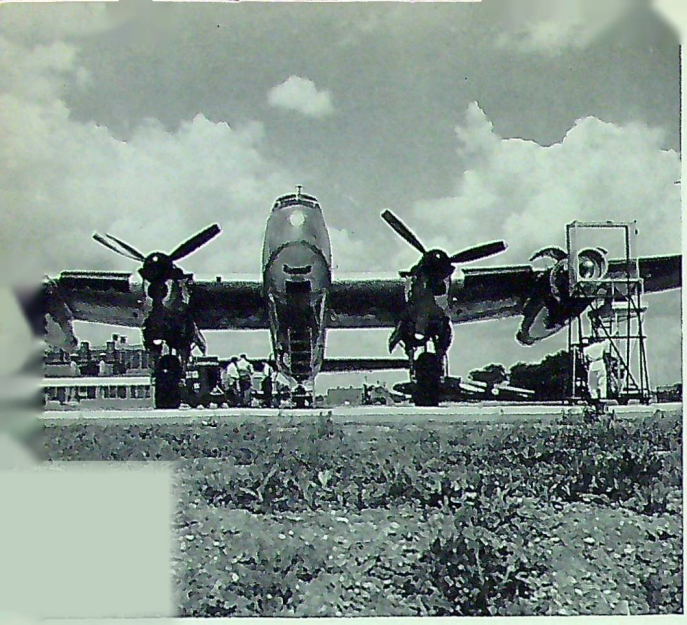
The CF-100 and the Jetliner

Services (Inspection) Detachment from No. 12 Technical Services Unit, Weston. These two sections work in close liaison with each other and with the company, charting and following the course of R.C.A.F. contracts through the plant. Since there are many tributaries to this productive flow, only some of the main streams can be followed in this review. One of these, and the most prolific in numbers of aircraft delivered, has been the Aircraft Division's hard-working Conversion Section.

In August 1948 this group was just driving the last rivets and installing the final equipment in the last three photographic Lancaster 10-P aircraft due shortly to be delivered to No. 408 Photographic Squadron at Rockcliffe. Starting from basic Canadian-built airframes with Rolls Royce engines, all of war-time vintage, the company had designed, built and installed all the parts required to convert the aeroplanes from bomber to photographic rôle, in accordance with R.C.A.F. specifications. Five of these conversions were already in service and all were soon to become the mainstay in all photographic mapping operations in the barren North.

Trailing the photo Lancasters on the production floor were four air-sea rescue Lancaster 10-ASR conversions — the last of twelve on contract. These aircraft were delivered in the early months of 1949, but not before it had been decided that they would be held back for incorporation of some later winterization modifications. Consequently they went on R.C.A.F. operations as the Lancaster 10-BR (Interim) aircraft.

However, as the fall of '48 approached, the Conversion Engineering group was punching-in two nights a week, rushing through with the preliminary layouts to meet the latest R.C.A.F. specification for a bomber reconnaissance Lancaster 10-BR. By November the design was sufficiently advanced so that a mock-up conference could be held at the plant to check and approve the location of dummy equipment mounted in the fuselage. A large number of A.F.H.Q. officers attended. With the mock-up checked, changed and finally approved, plant engineering and production swung



The "Flying Bedstead"

into high gear, and seven months later, in June 1949, the prototype FM-221 was delivered to Trenton by an R.C.A.F. ferry crew.

Before mid-1950, Avro's conversion shop saw nine of these BR's pass Experimental and Proving Establishment's flight tests, with most of the aircraft being ferried to Station Greenwood for operational use. Almost a hundred modifications had been designed and built into each of these aircraft by A. V. Roe under R.C.A.F. guidance. However, before the last aeroplane was delivered, the acid test of squadron operations plus a shift in squadron rôle necessitated some changes.

Consequently, April 1950 saw the successor to the BR — the maritime reconnaissance Lancaster 10-MR — begin to take shape on Avro drawing-boards. Specification requirements and mock-up conferences were hurriedly convened with A.F.H.Q.'s Operational Requirements and Air Operations staff, backed up by officers from the Greenwood squadrons with hours of recent flying experience on the BR's under their belts. By late August the requirements had been translated into Avro shop drawings, and early in '51 the prototype MR will be winging its way to Greenwood, with more conversions to follow as the winter passes.

Between these two major conversions and many minor jobs, Avro engineered, reconditioned and converted fifteen Mitchell 2-LB light bomber aircraft and one navigational trainer Lancaster 10-N. This latter aeroplane was essentially a replica of two previously manufactured and delivered to R.C.A.F. Station Summerside, where they became front page news after several long polar flights.

In the fall of '49 two additional photographic Lancaster 10-P's were also meshed into the production line. With the specification requirements shepherded along by representatives from A.M.C. and A.F.H.Q., these new conversions will follow the old pattern but will incorporate the latest modifications gleaned from photo operations during the last two summers. In addition a radar altimeter, originally designed in Canada by the National Research Council and produced by a Toronto firm, will be fitted — an up-to-the-minute innovation for precision photographic surveys.

While aircraft conversion contracts have provided the drone production at Avro, the queen bee of the industrial hive has always been the R.C.A.F.'s new two-seater, twin turbo-jet, all-weather fighter, the CF-100. Few who have worked on this aircraft know that the preliminary specification for the fighter (although quite different to its final design) was drafted by an A.F.H.Q. staff just before Germany and Japan stumbled to defeat. However, the confusion caused by the dawn of peace delayed finalization of the specification, and it wasn't until a large meeting was convened by Air Vice-Marshal A. L. James at Ottawa, in October 1946, that the requirements were firmly crystallized.

Armed with the minutes of this meeting — which, surprisingly enough, were essentially the same requirements as those of the sealed specification which was in effect more than three years later when the prototype first circled Malton — the company's engineering group commenced scheming the first three-view arrangement layouts of the fighter. As winter gave way to the spring of '47, stacks of drawings were opened and spread out in the offices of the Chief of the Air Staff and Air Council Members. Fighter design, engineering and operational policies were integrated, argued, and agreed. Air Vice-Marshal James was charged with co-ordinating the decisions with the company.

With these important preliminaries over, the main bout with the detail design began. By the

end of 1947, Avro had built one cockpit mock-up, revised it and built another. These mock-ups, along with other detailed operational requirements, were under continuous scrutiny by technical and flying personnel from A.F.H.Q.

Far-reaching technical decisions were also being made. At this critical design stage, and in the years to follow, almost every officer in every technical and operational directorate at A.F.H.Q. had a hand in framing at least a part of these important decisions.

In November 1948, the co-ordinating A.F.H.Q. Development Engineering Directorate had to face a new technical hurdle. Results arriving from the N.R.C. (Ottawa) wind tunnel model tests showed that it was aerodynamically essential to lengthen the fuselage and shorten the nacelles. All in all, the fighter had passed through four major changes such as this since its birth, though this was to be the last, as high-speed tunnel tests in the U.S. later proved.

With the decision made, the fighter shop personnel modified the parts, jigs and fixtures, and soon details blossomed into completed assemblies as engineering continued its steady release of drawings through 1949. Finally, in December, the prototype fighter, 18101, wearing R.C.A.F. call letters and displaying a special black and white paint job, was secretly conveyed from the production line to the flight test hangar. Four weeks later, on the cold afternoon of January 19th, 1950, the R.C.A.F. Inspection Detachment staff signed out the aircraft, and Avro's test pilot lost no time in taking off on the first 15-minute circuit.

On the ground a large Ottawa group, headed by the Minister of National Defence and the Chief of the Air Staff, watched tensely. The dream of 1946 had at last come true, though three years and three months had slipped away since the first requirements were put on paper.

By the summer of 1950, the prototype CF-100 had logged numerous hours in the air, steadily shaking out the design "bugs" that plague any new development. The second fighter, 18102, flew on 15 July. Behind it on the production line, components of other fighters began to appear, heralding a strong air defence for Canada in the restive years to come.

While the Aircraft Division was working overtime on the CF-100, the Avro Gas Turbine Division was deeply embroiled in engineering their two turbo-jet engine projects — the small and compact "Chinook" and the large and powerful "Orenda." This latter engine may well become North America's leading jet, as well as the powerplant for later CF-100 night fighters.

Avro had inherited the Chinook from the original Turbo Research Corporation and had pressed forward with its development as a test machine to screen the best mechanical ideas for later scaling up and incorporating in the Orenda. On March 17th, 1948, the first jet engine ever to be designed and built in Canada was rigged in the test cell, the starting button pressed, and the Chinook I roared to life.

By August 1948 this engine had logged almost 60 hours' running on the test stand, and had delivered a maximum static thrust of 2600 pounds. This same month a Chinook test compressor, heavily instrumented and driven by a massive steam turbine, began turning over for test at Nobel. In November, the second and last Chinook whined to a start in the test house at Malton.

All through 1949 these two prototype engines droned monotonously on the test stands, piling up running-hours with increased reliability, proving and disproving intricate modifications. Late in the year a maximum static thrust of 3000 pounds was recorded — a 15% increase over the initial thrust. In January 1950 it was decided that the Chinook had faithfully served its purpose as a test machine, and since several of the new Orendas were now lining up outside the test cells, the two engines were inhibited and retired to storage. So ended a successful and historical chapter in the annals of Canadian aviation, thanks to R.C.A.F. sponsorship.

However, long before the last days of the Chinook, a section of the Gas Turbine Engineering Division was steadily releasing drawings on the Orenda design, and towards the end of 1948 the first of these big turbo-jets was being assembled in the final assembly shop. Before this time the

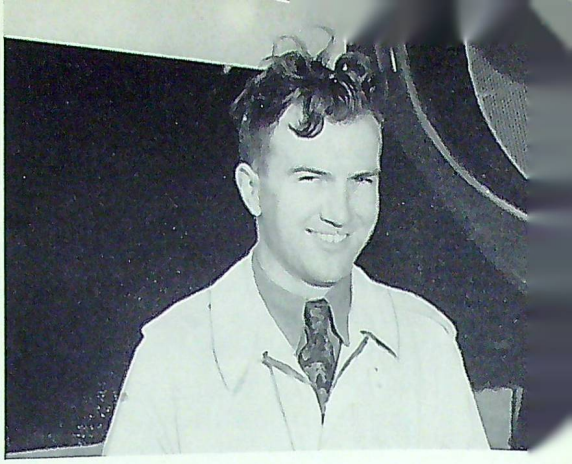
final issues of R.C.A.F. engine specifications had been drawn up at A.F.H.Q.

On February 10th, 1949, this first Orenda was safely mounted in the test cell, having already cleared R.C.A.F. inspection. As a compact group of Service and company personnel watched, the test crew engaged the starting motor and the Orenda I, with a flash of flame, sprang to life. Undoubtedly this was one of the most successful prototypes ever built anywhere. Its performance and reliability exceeded all hopes — a remarkable achievement for a relatively green design and production team. Only a few months after its first run, it completed 784 test stand hours with only minor replacements.

As the year passed, other Orendas were wheeled from the assembly shop to the test cells and unofficial type tests were completed to R.C.A.F., British and American specifications. During these tests minor development problems continually arose, odd parts failed prematurely, a pump seized; but each problem yielded to solution and the test runs ground steadily on.

Before the third Orenda was turning over in the test cell, however, the power and remarkable development reliability of this engine were receiving international acclaim. High-ranking Service and civilian personnel from the U.S. and U.K. began dropping in to visit the Orenda test bed to see for themselves. The upshot of one of these visits came in mid-'49, when arrangements were concluded with the U.S. to have North American Aviation Inc., in Los Angeles, California, install and test an Orenda in one of their F-86 fighters. The primary target of this programme was to produce valuable, high-speed, airborne engine test data, but the aircraft performance results would also be of interest to both the U.S. and Canada, since the F-86 was then in production in both countries.

At about the same time, Avro received a go-ahead from the R.C.A.F. to install two Orendas in the outboard nacelles of a wartime Lancaster to serve as a flying engine test bed. With this arrangement, the aircraft is capable of safe sustained flight with or without the jet engines operating. According to the formal R.C.A.F. specification, this conversion was to be the Lancaster 10-0, but throughout Avro's shop it is known as the "Flying Bedstead." The modification design and construction were undertaken by the Aircraft Division, under the watchful eye of the Gas Turbine Division, the latter being charged with supplying the Orendas and the test instrumentation.



Flt. Lt. Bruce Warren, D.F.C., who has been granted two years' leave by the R.C.A.F. to assist in the flight test programme of the CF-100.

By the end of June 1950, two Orenda engines had been selected, endurance-tested in the test cells to stringent R.C.A.F. pre-flight requirements, and installed in the Lancaster. After preliminary taxi trials early in July, the inspection staffs cleared the aircraft for flight; and on July 13th it took off with company test pilot, Don Rogers, at the controls.

With blue summer skies, the remainder of the month saw log book hours accumulate side by side with engine test hours, with their resulting graphs and test data on the air performance of the Orenda. In the near future this information, backed up by over a year and a half of ground running, will serve to release the engine for safe high-speed flight in the F-86 and CF-100 fighters.

So another milestone will be passed in the long twisting road of aircraft and engine development. While the past two years have seen trouble and toil, now, at last, just over the horizon lies the goal — the production of Canadian-designed and -built CF-100 fighters with Orenda engines. It is an achievement of which Canadians may well be proud, and Avro Canada can rightly take its place as one of the keystones in the industrial foundation which supports an R.C.A.F. rapidly equipping itself to face war-clouded world skies with confidence.

The Shades Talk Shop

by Sqn. Ldr. J. Gellner, D.F.C.

In their mess in the Other World (though which Other World is a matter for conjecture), three famous soldiers meet. They are Gustavus Adolphus, sometime King of Sweden and star performer of the Thirty Years' War; the Duke of Wellington, who needs no introduction; and Field Marshal Erwin Rommel, who did not do too badly in the Second World War. As in the case of any group of old sweats in this (or the Other) world, the social hour finds them re-fighting their old campaigns . . .

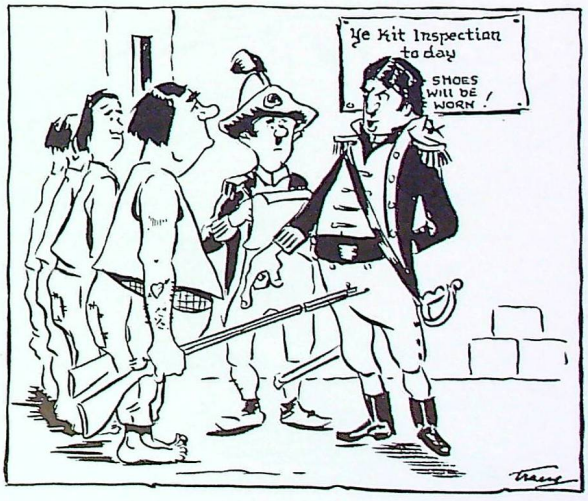
Wellington: Field Marshal Rommel, you're of the younger generation: perhaps you can enlighten me on a point which has long puzzled me. Why the devil do you modern generals cart around such unwieldy headquarters in the field? And that's not all, damme! All down the line, in your corps and divisions and brigades and battalions — and even in your newfangled air force — you've got so many headquarters that there are more hangers-on and loafers than there are fighting troops. Why don't you get rid of 'em? Give 'em muskets and make 'em do men's jobs!

Rommel: Ach, you do not understand, Your Grace. They *are* doing men's jobs. Without them we could not operate. They bring the troops where I want them to be. They procure the materials of war. They distribute the equipment, maintain and repair it. They salvage the broken bits and pieces, and they look after the broken men. You cannot wage modern war without materiel, supply, and transportation.

Wellington: True. But I'm still not convinced that you need *all* those men. I had my troubles with supply too. When I was in the Peninsula —

Gustavus: Oh Lord, here we go!

Wellington: — I used to get mad at those gentlemen in London — generals, politicians, scribes, and armchair strategists — who demanded battles and victories all the time. They never seemed to realize that I was less worried about French Marshals than about shoes for my soldiers and hay for my mules. Much as I dislike the writing tribe, though, there's one of them who made a rather shrewd guess about what went on in my mind. You may remember the fellow — Philip Guedalla. I had a chat with him the other day on cloud 83-15 — incidentally, he was hinting about an honorary membership here. Anyway, he wrote about me something like this: 'Camp kettles and brushes haunted him; his dreams were full of army biscuit; supply was still the burden of his severely humdrum song . . .' Not bad, eh?



Rommel: Sehr gut für einen Schriftsteller — t bad for a writer. But compare your problem with ours. In the Peninsula you were advancing through friendly countries. Your supply line — the Atlantic — was never threatened. Now take Germany's position in the last war. At one time we were stretched out from the North Cape to the Bay of Biscay, to the Nile Delta, to the Caucasus. We did all our fighting in enemy territory and most of our supply lines had to be defended against determined attacks. Then again, take my own position in North Africa at the time of the Battle of Alamein. You may have heard the saying that 'the Desert is the tactician's paradise and the quartermaster's hell'. It is. A can of aviation fuel had to come from a German refinery which was being frequently bombed. Then it had to be hauled over a railway-system which, in addition to being bombed, was overloaded. In Naples or some other Italian port it was put on a ship which had to run the gauntlet of attacks by aircraft from Malta and by enemy surface ships and submarines. If the can of fuel arrived in Benghazi, it still had to be transported by road to the front. This road was under constant attack from the air and was being shelled from the sea. To get this fuel forward was as great a battle as I ever fought. I could have taken Cairo and the Suez Canal, if in June 1942 it had only been a question of fighting enemy troops. It was because I lost the battle of supplies that I was stopped when victory seemed within reach.

Gustavus: Ahem! I do not want to seem immodest, gentlemen, but I tackled all those problems 320 years ago, and without a supply organization to speak of. I fought my way through Northern Russia, the Baltic States, and Poland, and at one time I was master of Germany. These were all enemy countries. But without bothering to keep open my communications with Sweden, I still kept my army supplied and armed.

Rommel: That was as great a piece of generalship as history has to show, Sire. But your problems cannot be compared with those of today. Your forces were small — I believe you conquered Germany with 30,000 men — and they were able to live off the land. You could cast the bullets for your muskets and the balls for your cannon, you could manufacture swords and pikes in the field. While you were in winter quarters you may even have been able to make your own gun barrels. Thus you had an independence from your sources of supply which a military leader of our times simply does not have.

Gustavus: Ja, indeed.

Rommel: Let me give you a few facts and figures. Four weeks after the invasion of Normandy in 1944 the Allies were ready to break out of the bridgehead they occupied, and to start their offensive through France. By that time they had landed about 1,000,000 men, 566,648 tons of supplies, and 171,532 vehicles. But what was their fighting strength? Twenty-five divisions: that is, about 250,000 combatant troops, only half of which are infantry. Thus at least seven men were needed to help one infantryman to advance, and out of these seven men six were non-combatants.

Wellington: Bah! Give 'em muskets!

Rommel: But this is not all. Behind these six men there had to be others who took delivery of the war materiel at the factories, tested it, stored

it, shipped it to England, unloaded it, sorted it, brought it across the Channel. Now, what seems to be a staggering disproportion between supporting troops and combatants in a modern army is as nothing compared to the air force. In a fighter squadron of the last war there were just 24 men who did the fighting. At least ten times that number worked for the 24 pilots in the squadron itself, and several times that number backed the squadron in the form of base organizations. Yet still we often felt — and so did the Allies — that even then we did not have enough supporting strength to keep our fighting units in the field.

Wellington: Zounds, man! You talk of supplies, maintenance, transportation, and God knows what else. Haven't you got one word which covers it all, includes everything that's done so that the fighting man can fight?

Rommel: In German, Your Grace, no. In your language, the word is 'logistics'.

Wellington: Good Gad, sir! You mean we call all that muddled, inefficient, and utterly illogical stuff 'logistics'!

Rommel: Yes. But it's not so muddled as it used to be in your times, Your Grace. You Anglo-Saxons handled your logistics well in the last war. We Germans found out by bitter experience that nowadays logistics win battles.

Gustavus: 'Tis great pity.

Rommel: It is, Sire. But the fact remains that

the good old days are gone — the days when a commander did not have to worry about delivery dates and loading-charts and time-tables. Now, as somebody has remarked, it's all a matter of getting 'the right things, in the right quality and quantity, at the right time, at the right place, to the right people'. War, I'm afraid, is no longer an art: it is a science.

Wellington: Then thank God I'm dead!

Gustavus: Ja! Another schnapps, gentlemen?

HISTORY AND THE OFFICER

"The officer must possess a thorough appreciation of technical science, but this must not mislead him into neglecting the study of men. Knowledge of men is a fundamental condition of successful leadership. Hence the study of History — above all of Military History — is of the highest value."

Baron von Freytag Loringhoven

"Deductions from the World War,"

published in London, 1918.

(*"Air Clues"*)

Quite An Operation

by Wing Cdr. F. F. Lambert, D.S.O., D.F.C.

(Wing Cdr. Lambert, one of the many Canadians who joined the R.A.F. in pre-war days and later transferred to the R.C.A.F., here gives us an amusing glimpse of the sort of thing that sometimes happened to R.A.F. Flying Officers in the Far East. Wing Cdr. Lambert served as Director of Air Intelligence in A.F.H.Q. after the war, and is now Senior Air Staff Officer at No. 12 Group Headquarters, Vancouver. — Editor).

On 4 January 1940 I left Kohat, in the North-West Frontier Provinces, bound for A.F.H.Q. at Delhi. There, my orders were handed to me. They read:

"Due to the . . . fact that Japan may attack British possessions in the Far East, it has been decided to form a flight of the Indian Air Force Volunteer Reserve at Cochin.

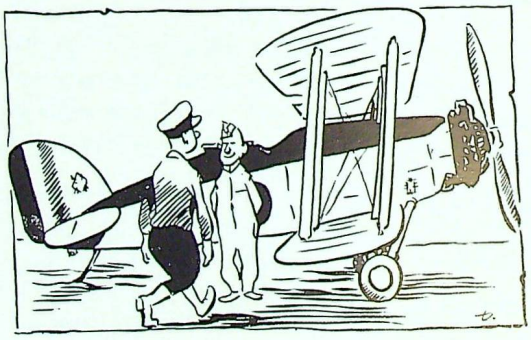
"The flight . . . is to carry out normal liaison duties and to perform such other operations as may be required by A.F.H.Q. India. On arrival you are to contact the local Naval, Army and Port authorities regarding an airfield at Cochin, the contract for which has already been let.

"You are to act as Air Force Adviser in all matters and . . . you are forthwith to proceed to Cochin on appointment to command No. 5 Flight Indian Air Force Volunteer Reserve. Your establishment is 0-9248-2-1 . . . "

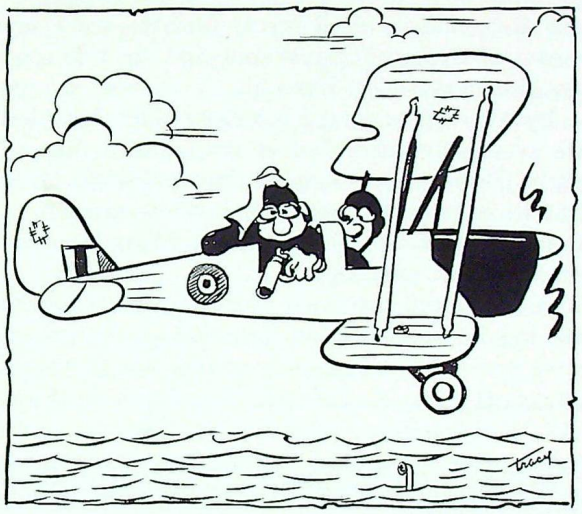
The establishment showed that I was the proud commander of one Flight Sergeant, nine Aircraftmen of various trades, and one Moth Major aircraft, to which would be added one Wapiti, completely equipped for war, when we were ready to engage the enemy. Cochin, I must explain, was a native state in subsidiary alliance with the British Government and politically connected with the Madras Presidency. According to the Gazetteer of India, the most striking physical feature of the country was a series of backwaters extending from North to South for 120 miles. In certain parts they had been known to rise 16 feet in 24 hours and to remain swollen for many months.

On arrival at Ernakulam, the capital of Cochin, I proceeded to Willingdon Island and took up residence at the lovely Malabar Hotel. After an evening with the officers of the 27th Inniskillings and H.M.I.S. "Prabavati" (which was employed on mine-sweeping operations at the port), I went to pay my respects to the Diwan, or chief Magistrate of the State, and to the local Port Authorities. The Chief Port Commissioner had been responsible, among other things, for an increase in the area of Willingdon Island. He had reclaimed land from the sea by the dumping of silt dredged from the harbour. It was on a corner of this island that, against my advice, the authorities in Cochin decided the Air Force should have its airfield.

The thick vegetation was cut down for a space of 2,000,000 square feet, and excellent approaches were made. The ground was rolled, and hundreds of coolies gave it the finishing touch by pounding in shells and small stones. Corners and obstructions were marked in accordance with regulations. A wind-sock was erected in the appropriate fashion.



When the field was handed over, I was informed that the R.A.F. should not expect too much for 275,000 rupees. (Personally, I thought this amount — almost $44,000 — preposterous for so small a field.) I was also anything but delighted with the surface, for in places cars used to sink up to the wheels' rims. However, the most vigorous assurances were given me that the sun would bake the surface to a marble hardness capable of sustaining the heaviest aircraft. Since I felt I could not dispute the best engineering knowledge, A.F.H.Q. was informed that the airfield was ready, the Moth was collected from



Karachi, and we began to make anti-submarine patrols out to sea to a depth of 80 miles — with no armament but a solitary Verey pistol.

One rainy February morning the Diwan-peshkar (chief assistant to the Diwan) visited our H.Q. and asked if a flight could be made to a small field near Pallipuram, about 50 miles north, to bring back a relative of his who was too ill to travel by road to the Ernakulam hospital.

Within the hour the aircraft was waiting in the field at Pallipuram, but my horror must have been very evident when it turned out that the passenger had elephantiasis in a most advanced state. Feeling that a refusal was out of the question at this stage, however, we pried him in and finally landed back at Cochin without mishap. That evening the Army doctor who had attended the patient whispered to me that, in his opinion, the man was suffering from *elephantiasis graecorum,* which was really leprosy. Much to my relief, he later corrected his first diagnosis; but it remained quite impossible to induce an airman to get into the back seat of that aircraft. Incidentally, the Diwan-peshkar was so grateful that he gave me a permanent pass to the local Indian cinema which he owned.

As promised by the local experts, the airfield had hardened beautifully. Indeed, it continued to serve the war-time requirements of the flight so well that I went to Karachi to pick up our Wapiti.

Circling the airfield on my return, I noticed my crew frantically waving white streamers, which, in my haste to land, I interpreted as some sort of welcome. But, as I taxied in after the landing, the ground literally opened up beneath me and the Wapiti came to rest gently on her lower mainplane, minus half her propeller. My intuition regarding this 275,000-rupee contribution to the war effort had been correct. The hot sun had dried the outer crust, thus forming a temporary hard surface capable of sustaining light weights only. It had also dried up the soil below, and great cracks had appeared to depths of four and five feet. These cracks were only noticed some ten minutes before my arrival, as the crew had not had any occasion to visit the field itself during my absence of over three weeks.

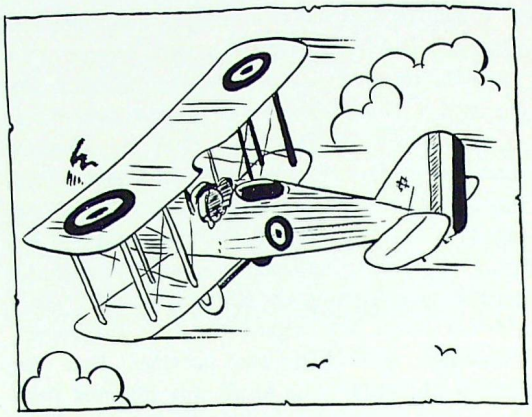
Delhi was informed, and a new propeller was installed. Hundreds of Indian labourers immediately began the task of tamping and rolling great quantities of shells, stone and sand into the cracks — which none the less still appeared to be opening up faster than they could be repaired. To make matters worse, a coolie accidentally set fire to the tent hangar, thereby destroying a fair amount of our equipment. The final blow to my hopes of promotion came when H.M.I.S. Prabavati reported that she had sighted a Japanese submarine about ninety miles out, and A.F.H.Q. sent an immediate signal asking when we could be ready for operations! I was most unhappy.

Then, on May 6th, the monsoon struck. Inspection of the airfield on the first morning

confirmed my worst fears. The Wapiti was resting gently on one wing, with one wheel completely out of sight in the quagmire that had been our airfield. The Moth had been picked up and was lying on its back, a complete wreck. Even walking was a hazardous business.

The deluge continued uninterrupted for the next six days, and more and more of the airfield disappeared. It seemed as if the downpour was washing the soil back to its rightful owner, the sea. On the morning of May 8th we made a determined effort to rescue the Wapiti, and with the aid of a bulldozer and a tractor we managed to get it to the higher road running near the Malabar Hotel. The Moth was dismantled and packed into a crate for rail transportation to Karachi.

As I looked over the airfield on the morning of May 12th, all that I could see was the wind-sock supported by three visible feet of staunch bamboo pole. The airfield had completely disappeared under water. The local experts informed me that these conditions might last for months. The airfield, they said, would not be seen again until the end of the monsoon at the earliest. I notified



A.F.H.Q. and received instructions to try every means of flying off the Wapiti and then to send the airmen by rail to Karachi.

By removing telegraph poles and other obstacles, we eventually succeeded in preparing a take-off path. It was none too good, but it worked. The Wapiti became air-borne, and what was left of Establishment 0-9248-2-1 started on its sweating journey back to Karachi . . .

It had, I reflected as I roared up the coast at 100 m.p.h., been quite an operation.

The Cockney's Prayer

"It ain't as I 'opes 'E'll keep me safe
While the other blokes go down,
It ain't as I wants to leave this world
And wear an 'ero's crown.
It ain't for that as I says my prayers
When I goes to the attack,
But I pray that, whatever comes my way,
I may never turn me back.
I leaves the matter o' life and death
To the Father who knows what's best,
And I prays that I still may play the man
Whether I turns east or west."

(From an article by the Rt. Rev. R. J. Renison in "The Globe and Mail")

ROYAL CANADIAN AIR FORCE Association

A FEW WORDS FROM THE PRESIDENT

At the time of writing members will have just received the July-August issue of "The Roundel," containing a special report on the First National Convention of the Association prepared by Flt. Lt. W. M. Lee, A.F.H.Q. Public Relations Officer. Flt. Lt. Lee concluded his report with the remark, "The R.C.A.F. Association had come of age."

We, too, feel that we have come of age. We have reached our majority. At this time last year twenty-nine Wings of the Association had been formed. To-day, primarily through the efforts of members themselves, the Association has 63 Wings extending from coast to coast. But this does not justify complacency. At the First National Convention Air Chief Marshal Breadner, who tirelessly guided the organization of the Association through its period of growing-pains, left us two challenges.

The first was to double the number of Wings and double our membership. To double the number of Wings we look to the thirty-five hundred members-at-large of the Association, scattered in small groups throughout communities in Canada. A small group of from three to five can be instrumental in the forming of a Wing. Form such a committee and write to Dominion Headquarters for our organization kit.

As regards the doubling of our membership, "Every individual member," the Air Chief Marshal emphasized, "is a salesman, and without too much effort should be able to enroll one new member." That sounds reasonable enough. Let us accept the challenge. An application form is enclosed with this issue of "The Roundel." Pass along a few of your back issues of the magazine to ex-Air Force friends who have not had the opportunity of seeing it. "The Roundel" speaks for itself, you speak for the Association. Enroll a friend, and send us along a completed application form.

Coming of age, for the individual, invariably involves accepting increased responsibilities — an obligation to devote more time, effort and thought to the needs of his or her community, province, country — an obligation, in short, to become a better citizen.

So it is with our Association. We have reached the point where a greater part of our thinking, our activities, and our influence might be directed along more serious lines. This is not to suggest that we should lessen our social activities. The first aim of the Association was stated as being "To . . . preserve and foster the spirit of fellowship among all who have served in the Royal Canadian Air Force," and only by maintaining that spirit of fellowship through a regular and varied programme of social activities within our Wings will the individual members get the most enjoyment out of their membership.

None the less, however, the most important purpose of the Association remains that of being of service to our country and our communities. Hence our former Chief's second challenge: to get behind and support everything dealing with Air. "By selling the necessity of air power to the public," he said, ". . . (we are) ensuring that Air is kept in proper perspective in relation to the defence needs of our country, and that the defence dollar is properly allotted." He has often reminded us that "public support is as essential to effective air power as industries, aeroplanes and airmen."

To "public support" we might add "public understanding." Undoubtedly we have all heard the remark made, in reference to the last two defence budgets, "the Air Force is doing all right for itself." Our Minister of National Defence, in addressing the nation over the C.B.C. a week ago (August 15th) reminded the public: "To-day Canada can no longer be considered as immune from attack from the air. For this reason we are pressing on with the strengthening of our air defences. We are spending a larger proportion of the defence dollar on the air than on the other two services, almost as much as on the Navy and Army put together, and more in proportion than is being spent in any other country. I feel most Canadians recognize that this is the right course for us to follow." But we suggest that, through lack of understanding on the part of the public, the great deal of publicity which has been given by the press to the comparative defence appropriations of the Services has led the public to expect a greater degree of progress in the build-up of our Air Force than appropriations have permitted.

We must remind the public that in no other arm of the Services have there been such revolutionary and costly changes in requirements within the past decade — changes involving tremendous expenditures from Air Force appropriations against which financial commitments of the other arms of the Services cannot be compared. For the air defence of Canada, our Air Force is faced with a complete re-equipment programme in jet aircraft. It is faced with the tremendous costs of establishing early warning radar stations. It is faced with tremendous costs in the reconstruction of aerodromes for the operation of modern jet aircraft. It is faced with an almost complete lack of accommodation of a permanent nature (under the B.C.A.T.P. all buildings were of temporary construction, built to last five years). It is faced with an almost complete lack of urban Reserve training accommodation as against long-established armouries and shore stations for the Army and Navy. Hence, from a business point of view, a very large part of present Air Force appropriations are "capital expenditures" on a practically new branch of the firm, and are not to be compared in totals alone with appropriations set aside for the repair and maintenance of our older established branches.

The Chief of the Air Staff, in addressing us at our Convention, emphasized that "while we appear to be getting a lot of money, we have a terrific amount of work to do with it — construction to carry out, aircraft to buy, and so on — and I can tell you that we are not able to go ahead as we should . . . We simply have not the funds."

We must nevertheless acknowledge a fact which the Minister of National Defence pointed out nearly a year ago in his White Paper on Defence. "There are few problems of public administration more difficult," he said, "than that of allocating between the different Services the money appropriated for defence. How much should be spent on what is a matter of opinion. In Canada as in every other country, estimates for defence are built up by striking a balance between what is

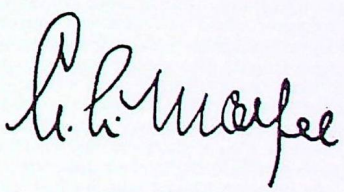
desirable and what is possible. We cannot do everything at once and the question we have to answer is which of these (programmes) do we do first. In Canada, as elsewhere, the Chiefs of Staff never get as much as they want."

Let us therefore strive for a better understanding of the overall defence picture in order that we may use sound judgment in fulfilling, in addition to our rôle of public relations, a no less important rôle in another direction — a responsibility to place before the Department our considered recommendations for the improvement of the efficiency and effectiveness of our fighting forces. Delegates to the National Convention could have been left in no doubt that our recommendations are welcomed. In an address to the Convention, the Honourable Brooke Claxton said, "There is a rôle (for the Association) which is rather more difficult to work out but which you can see developing, and that is, through your officers, to meet us at Defence Headquarters once or twice a year in Ottawa to exchange views, often on a confidential basis, which will enable you to see the picture better, and enable us to see how better to meet the needs of Active, Reserve, and Cadets throughout the country." In concluding his address to the Convention, the Minister said, "I would like you to feel in all (your) work that we will do everything possible to help. We regard this very much as a two-way operation. If we can gain from you the knowledge of what should be done, I hope that you gain from us at Headquarters the knowledge of what we are trying to do; and in that sense of teamwork which has been so characteristic of everything that your great President, Air Chief Marshal Breadner, has done, we will go forward with this Association and the Air Force and the defence forces together."

The Association at its Convention placed the first of its recommendations before the Department — a recommendation for the establishment of Ground Training Reserve Units, and the provision of Air Force centres for the use of the R.C.A.F., the Reserve, the Air Cadets, and the Association. There is another contentious point on which many have had feelings of misgivings, but on which we have made no recommendations, and that is the balance between our Regular squadrons and our Reserve squadrons. At the present time the Air Force has only two Regular fighter squadrons. We have seen jet fighter aircraft allotted to Reserve squadrons. It has been argued that, however creditable the efforts of our Reserve squadrons are, no part-time squadrons can possibly be at immediate readiness for the air defence of Canada, and that until our aircraft supply position has been greatly improved, less accent should have been placed on the Reserve squadrons and greater efforts directed ere this to the formation of additional Regular fighter squadrons — or, alternatively, that the two should go hand in hand, with a Regular squadron, in its peace-time rôle, being responsible for the training of Reserve flights.

However, Korea has changed the picture, and exponents of these arguments will have been heartened by the Chief of the Air Staff's announcement last week that, "As quickly as the F-86 and CF-100 aircraft are available, we will re-equip our present Regular Force fighter squadrons and proceed with the formation of others considerably beyond the total of the five which were originally approved. Although these squadrons will have as their primary rôle the defence of Canada, they will be trained and available to any theatre of operations that the Government may require."

Let us watch developments closely and be ready to assist in this "new programme to accelerate and expand the build-up of the Royal Canadian Air Force" in whatever way we can.



ATTENTION EX-NAVIGATORS

London, Eng. — By the Canadian Press. — Busy signals blocked incoming calls to-day at London's Pathfinder Club.

The telephone lines worked overtime handling calls from ex-R.A.F. men about a United States plan to recruit British aircrew for an airlift ferrying war supplies to Korea.

The Pathfinder Club is an "informal" headquarters established by John Chislett of Port Hope, Ontario, and Montreal, a war-time squadron leader with the R.A.F. Pathfinder force.

Chislett flew to Montreal last night, making his last flight with Trans-Canada Air Lines before joining the airlift service operated by American charter companies from bases in California and Alaska.

Chislett told the Canadian Press here yesterday that the airlift needs skilled navigators and that he hopes to round up some of the men he flew with during the war.

"British crews are held in high regard in the United States," the Canadian navigator said.

The salary for the airlift fliers is £250 ($775) a month, plus expenses, probably the highest yet offered civilian aircrew.

("Ottawa Journal:" 1 Aug. 1950)

Dominion Command Headquarters, on August 3rd, wrote to certain charter companies in the United States. The general gist of the letters is given below:

Dear Sirs,

The enclosed copy of a Canadian Press news item which appeared in daily newspapers in Canada on August 1st, has given rise to a number of enquiries . . . by war-time aircrew of the R.C.A.F. . . .

We appreciate that the mention of a "recruiting plan" being undertaken in Great Britain suggests a greater need for aircrew by your Company than may actually be the case, but we would appreciate full information of your requirements by categories of aircrew, qualification, experience required, age limits, etc . . .

This Association would be pleased to make your requirements known, and in consequence of the number of enquiries being received, we would appreciate a reply at your earliest convenience . . .

Yours sincerely,
(R. S. McCartney),
Gen. Sec'y, R.C.A.F. Association

At the time of going to press, the following reply has been received from Alaska Airlines Inc.:

Dear Mr. McCartney:

. . . As you are aware, many of the scheduled and non-scheduled airlines of the United States are participants in the airlift to Tokyo that you mentioned in your letter . . . Many of the airlines have followed our example and have set up refresher schools to train ex-Service navigators for the C.A.A. examinations. The United States C.A.A. requires that each navigator used on overseas operations possess a C.A.A. Flight Navigator's Certificate and that he meet the physical requirements of a second-class airman. In order to be eligible to take the written portion of the examination, an applicant must have had 200 hours of long-distance navigation and pass other requirements which are listed in C.A.R. part 34 . . . There is also a practical examination to be passed, which is given during a flight of at least 900 miles over water.

At present Alaska Airlines has its full quota of navigators, but we do expect a further demand in the future. Should you have any men in your contact who are interested in taking the C.A.A. exam in New York, please let me know their names. We can give the practical exam. here should we need more navigators. I suggest you write Seaboard and Western Airlines and The Flying Tiger Line, both in New York, concerning their requirements . . .

Yours very truly
Daniels W. McLean,
Chief Navigator,
Alaska Airlines Inc.

Requirements for certificate, as laid down in U. S. Civil Air Regulations, Part 34, are: —

Age: Applicant shall be at least 21 years of age.

Citizenship: Applicant shall be a citizen of the United States or of a foreign government which grants reciprocal flight navigator privileges to citizens of the United States on equal terms and conditions with citizens of such foreign government.

Education: Applicant shall be able to read, write, speak, and understand the English language.

Physical standards: Applicant shall meet the physical standards of the second class prescribed in Part 29 of this sub-chapter.

Experience: (a) Applicant shall:

(i) Have at least 200 hours of satisfactory flight navigation, including celestial and radio navigation and dead reckoning: Provided, that a pilot who has logged 500 hours of cross-country flight, of which 100 hours shall have been at night, may be credited with not more than 100 hours toward this experience; and

(ii) Have satisfactorily determined his position in flight not less than 25 times by night by celestial observations and not less than 25 times by day by celestial observation in conjunction with other aids; or

(b) Applicant shall be a graduate of a flight navigator course approved by the Administrator.

Knowledge: Applicant shall pass a written examination on the following subjects:

(a) Those provisions of the regulations in this sub-chapter pertinent to the duties of a navigator in the navigation of aircraft;

(b) The fundamentals of flight navigation, including flight planning and cruise control;

(c) Practical meteorology, including the analysis of weather maps, weather reports, and weather forecasts; weather sequence abbreviations, symbols, and nomenclature;

(d) Types of air navigation facilities and procedures in general use;

(e) The calibration and use of instruments used in air navigation;

(f) Navigation by dead reckoning;

(g) Navigation by celestial means;

(h) Navigation by means of radio aids;

(i) Pilotage and map reading;

(j) Interpretation of navigational aid identification signals.

Skill: (a) Applicant shall pass a practical examination in the operation of flight navigational equipment.

(b) Applicant shall accomplish practical tests in aircraft navigation by:

(i) Dead reckoning

(ii) Celestial means; and

(iii) Radio aids to navigation.

Navigators interested are advised to write direct to Mr. Daniels W. McLean, of Alaska Airlines Inc., Paine Field, Everett, Washington, U.S.A., with an outline of experience. Upon request, Dominion Command Headquarters will be pleased to supply any additional information received since our press deadline (August 25th).

Executive of No. 415 (Prince Edward) Wing. Standing (left to right): Mr. Harry Raby; Mr. E. Bateson; Flying Officer Ted Folds, Treasurer; Sqn. Ldr. Harry Hince. Seated (left to right): Mr. Harry Beaumont, Sec'y; Mr. D. Macdonald, President; Wing Cdr. Bob Byres, Vice-President. (Photo by Pat Hodgson Studio, Picton).

GENERAL NEWS

During the summer months we have been preparing for the fall activities, with an Executive Council meeting dated for September, and possibly a visit to Western Canada in October by our President.

Our President is currently attending (August) the United States Air Force Association convention in Boston, and it is hoped he will pick up a few pointers which can be used to our advantage.

NEW WINGS

We take pleasure in announcing the formation of the following new Wings:

No. 106 (Kentville) Wing

On May 18th, under the chairmanship of Mr. W. L. Chisholm, No. 106 (Kentville) Wing was organized.

Executive:

President:	W. L. Chisholm
1st Vice-President:	R. W. Farnsworth
2nd Vice-President:	L. Ells
Secretary:	L. H. Huffman
Executive Members:	D. Waterbury
	H. M. Day
	M. R. McGill

No. 107 (Morfee) Wing

We do not know the Executive, but we do know that a Wing has been formed in the Annapolis Royal area, and will be known as No. 107 (Morfee) Wing. We hope to have further details for the next issue of "The Roundel."

No. 307 (Eagle) Wing

We must express our thanks to Mr. Eric Tutching for the excellent organizational work done by him in forming No. 307 (Eagle) Wing, Montreal East.

The Wing is composed mainly of former R.C.A.F. personnel now employed by Imperial

Oil, McColl-Frontenac, British American and Shell Oil, and has shown itself to be exceptionally active and aggressive.

They held their Charter meeting on July 5th. The presentation was made by Air Commodore R. C. Ripley, O.B.E., of A.F.H.Q.

Executive consists of:

President:	Eric Tutching
1st Vice-President:	G. Stewart
2nd Vice-President:	Paul Richard
Secretary:	J. J. Leroux
Treasurer:	T. Pinfold

No. 703 (Central Alberta) Wing

Although their initial organizational meeting was held in March, the application for this Wing was only received in the latter part of July.

Much credit for the formation of this Wing goes to Mr. J. J. Stewart, who did the initial organization work, and it is a pleasure to see him carrying on in the capacity of President. While the Wing Headquarters is situated at Red Deer, it has adopted the name "Central Alberta" to define its scope more clearly.

Executive:

President:	J. J. Stewart
Secretary:	D. A. Prescott
Treasurer:	S. E. L. Pollock
Executive Members:	T. R. Heywood
	B. E. Crane
	M. Holender

CHRISTMAS CARDS

Association Christmas Cards are again being sold to our members at $1.25 per dozen and 65c. per half dozen.

These cards carry the Association Crest, are embossed in one colour and printed in three colours on good quality stock, and are supplied with envelopes.

They are available for immediate delivery, and orders should be submitted to:

General Secretary,
R.C.A.F. Association,
424 Metcalfe Street,
Ottawa, Ontario.

★

Laurier House, Ottawa,
August 8, 1950.

Dear Air Vice-Marshal Morfee:

Mrs. H. M. Lay and the other members of the family of the late Mr. Mackenzie King have asked me to let you know how deeply they appreciated the beautiful flowers which were sent on behalf of the Members of the Royal Canadian Air Force Association, as an expression of sympathy.

It is a source of comfort to the members of the family to realize that their sense of loss is shared by so many friends and fellow-citizens.

May I ask you to convey to the Members of the Royal Canadian Air Force Association this brief but sincere acknowledgment of their thoughtfulness.

Yours sincerely,

(F. A. McGregor)

Gas Turbine Testing at N.R.C.

by M. S. Kuhring

(This article is condensed from a longer one that appeared in the "Quarterly Bulletin" of the Aeronautical Laboratories of the National Research Council of Canada. — Editor).

The Engine Laboratory

THE ENGINE LABORATORY of the National Research Council has been in operation for nearly twenty years. In that time it has grown from a single test bed in a modified mill building to a modern reinforced concrete building especially designed for engine research. The staff has increased from one scientific and one technical to fourteen scientific and twenty-five technical, shop, and clerical personnel. In addition, the laboratory has built and operates an outstation at Fort Churchill, Manitoba.

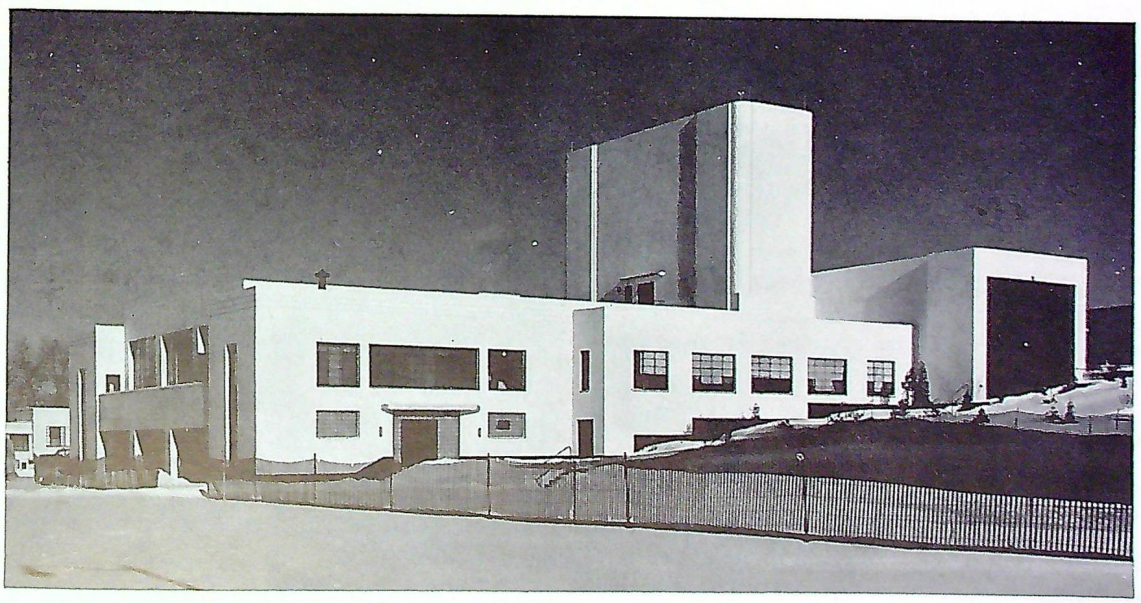
The present main laboratory was built in 1941 and comprised a single-cylinder engine room with provision for three small engines, two main engine dynamometer rooms, a hanger stand for operating engines with propeller loading, a workshop and office space. Three additional office units were added in 1945 to accommodate the increase in staff.

In 1942 participation in the development of jet propulsion began, and the testing of gas turbines at low temperatures was undertaken. A team was sent to England to study jet engines, and upon its return a cold-weather laboratory was designed and built at Winnipeg in 1943.

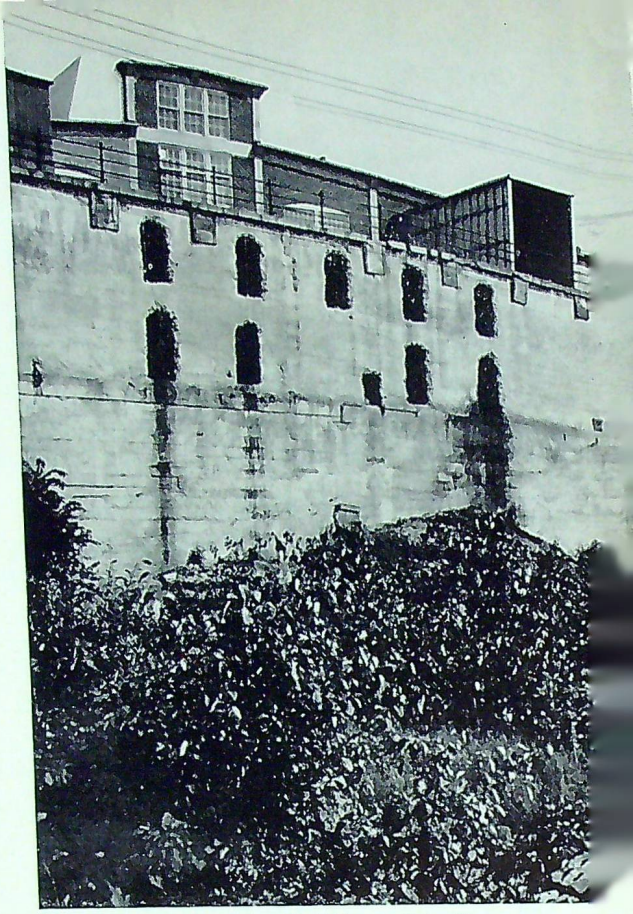
Shortly after this laboratory was put in operation, it was transferred from the National Research Council to a Crown Corporation known as Turbo Research Limited, set up to undertake research and development of gas turbines.

Thereafter all work on aircraft turbine engines was directed to Turbo Research Limited while the

Present building — Montreal Road



Fort Churchill outstation



Original building — John St.

National Research Council continued to work on urgent problems associated with conventional reciprocating engines.

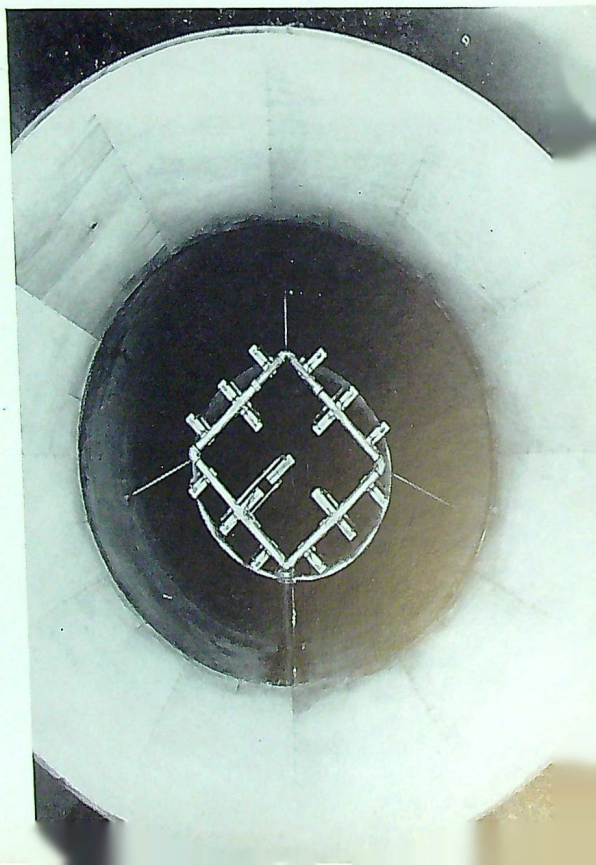
After the war, Turbo Research Limited was dissolved and A. V. Roe Canada Limited took over the design and development of aircraft turbine engines, the research function of Turbo Research Limited reverting to the National Research Council. This required the setting up of full-scale jet engine testing facilities, and the recently completed fifteen-foot test bed in Ottawa was modified for this purpose.

During the late spring of 1947, icing studies were made, using German Jumo jet engines as "guinea pigs."

The outstation at Fort Churchill, for work on jet engines at low atmospheric temperatures, was designed in August 1947. The station consists of a single test bed, shop, observation room, and crew quarters for four persons. The test bed was first operated in December of the same year.

Work of the laboratory, in the gas turbine field, has included low temperature operation, icing and de-icing, and fuels for jet engines. In this work some nine different engine models or types, including the latest engines of Canadian and United Kingdom manufacture, have been used.

Seventeen-nozzle water spray installed in test cell



Water Spray Apparatus

For the study of ice formation in jet engines, it is necessary to reproduce as accurately as possible

in the laboratory natural atmospheric icing conditions.

To provide the necessary low temperatures in the air supply, advantage was taken of the normal outside winter temperatures, since provision of the refrigeration equipment which would be required to cool the vast quantities of air swallowed by such engines could not be contemplated.

The provision of small water droplets in adequate quantities is quite another matter.

Many types of devices were tried, and a nozzle developed in the United States was finally adopted. This nozzle consists of a number of fine holes which discharge water at right angles to a stream of air moving at sonic velocity. By controlling the rate of water flow and air pressure, the droplet size and water concentration can be controlled within limits. Further refinements were made to this nozzle at the laboratory to improve its performance.

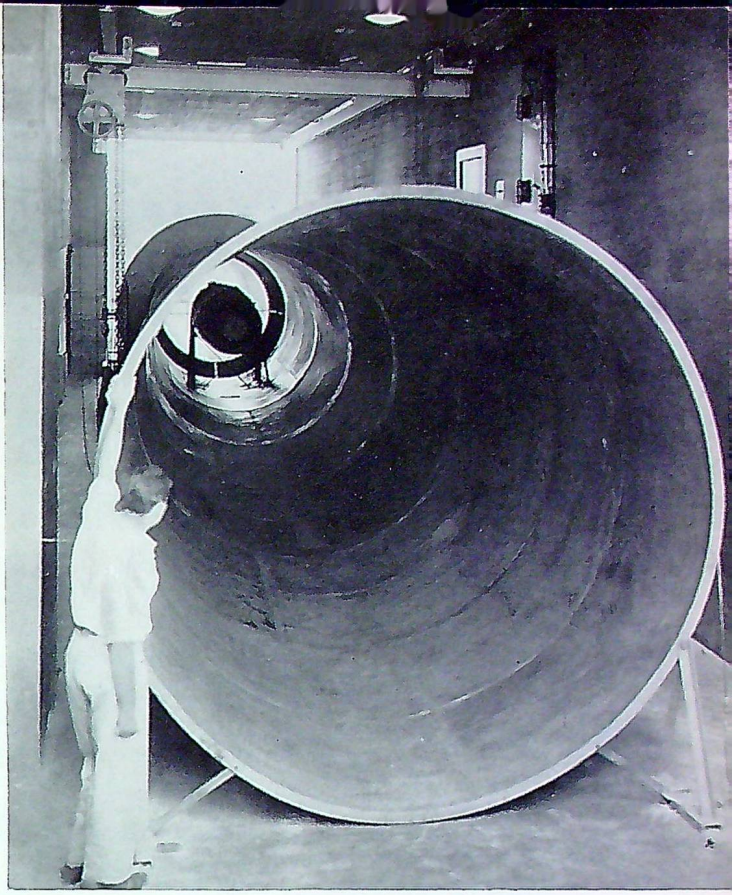
The quantity of air entering the engine being known, the amount of water spray required to give the desired free water concentration is introduced.

Water-flows of up to 350 gallons per hour are delivered and broken up into droplets averaging 20 microns (20 thousandths of a mm.) in diameter.

Ejector Tunnel

When studying ice formation in jet engines, it is essential that the airflow entering the intake of the engine should be simulated as accurately as possible to ensure that the droplets carried along in the air stream are deposited as ice in the proper places. Since, in flight, air flows into the intake and also flows over the outside of the nacelle or cowling, it is desirable to simulate this internal and external flow in the laboratory. This has been accomplished by means of an ejector tunnel.

The engine, mounted on the test cradle in the normal manner, is enclosed within a 6 foot diameter duct or tunnel into which the usual inlet duct leads. Behind the engine the tunnel expands to 9 feet in a distance of 37 feet, and the engine jet, discharging into this expanding section or diffuser, induces an air flow through the annulus surrounding the engine, the air speed in the annulus being as high as 150 miles per hour.

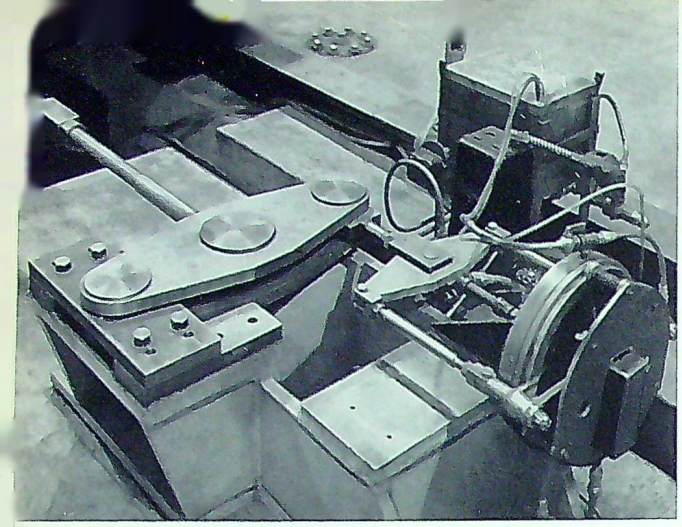


Exit end of ejector tunnel

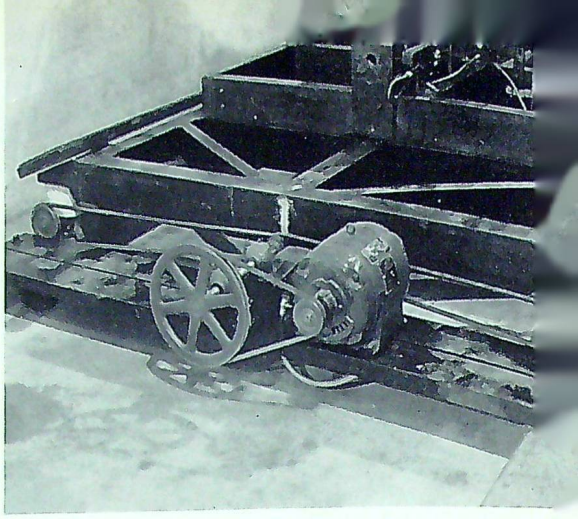
Thrust Measurement

The engine test cradle is provided with a journal bearing at each of the four corners. The bearings rest on, and are free to move along, two rotating shafts parallel to the thrust axis and carried on bearings on the rails on the laboratory floor. Tests have shown that if the shafts are properly aligned when the installation is made, the cradle, complete with a large engine, may be moved along the thrust line by a force of less than one-half pound.

The actual thrust reaction is measured by means of a precimeter. This is a null type instrument in which the thrust of the jet engine is balanced by oil pressure acting on a diaphragm. When the engine thrust increases, the engine and the precimeter valve which is linked to it move forward from the null position. This admits more oil, under pressure, to the diaphragm, restoring the engine to its former position. If the thrust is reduced, the resultant change in position causes the valve to discharge oil from the diaphragm



Precimeter and 2:1 linkage



Rotating shaft type cradle support

chamber until the instrument is again returned to the null position. The oil pressure acting on the diaphragm at any time is then indicative of the thrust being developed by the engine. The precimeter is calibrated by means of dead weights.

The precimeters in use are nominally designed for a thrust of 3000 lb. and to increase the range 2:1 and 3:1 linkages have been built to increase the capacity of the test beds to 6000 and 9000 lb. thrust.

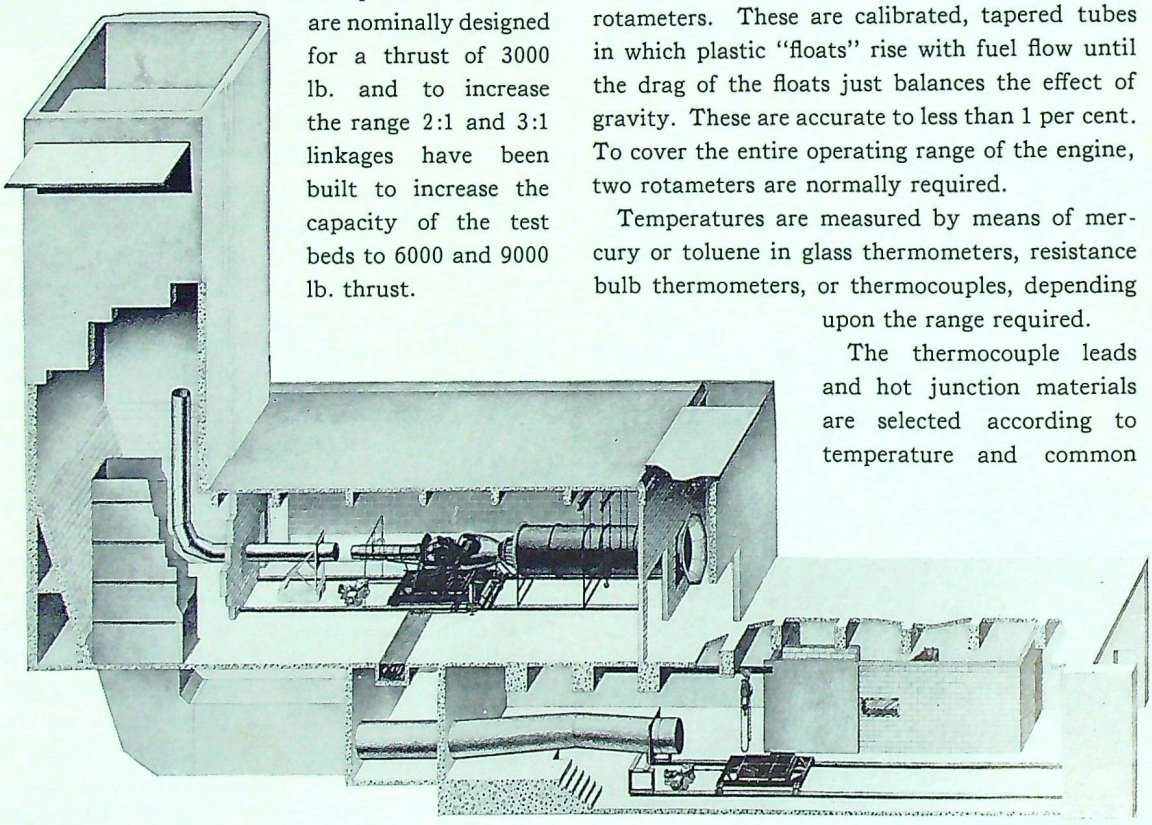
Instrumentation

Instrumentation is as straightforward as possible under the circumstances. Each engine installation requires a certain number of special instruments, depending upon the investigation under way.

Fuel consumption is measured by means of rotameters. These are calibrated, tapered tubes in which plastic "floats" rise with fuel flow until the drag of the floats just balances the effect of gravity. These are accurate to less than 1 per cent. To cover the entire operating range of the engine, two rotameters are normally required.

Temperatures are measured by means of mercury or toluene in glass thermometers, resistance bulb thermometers, or thermocouples, depending upon the range required.

The thermocouple leads and hot junction materials are selected according to temperature and common



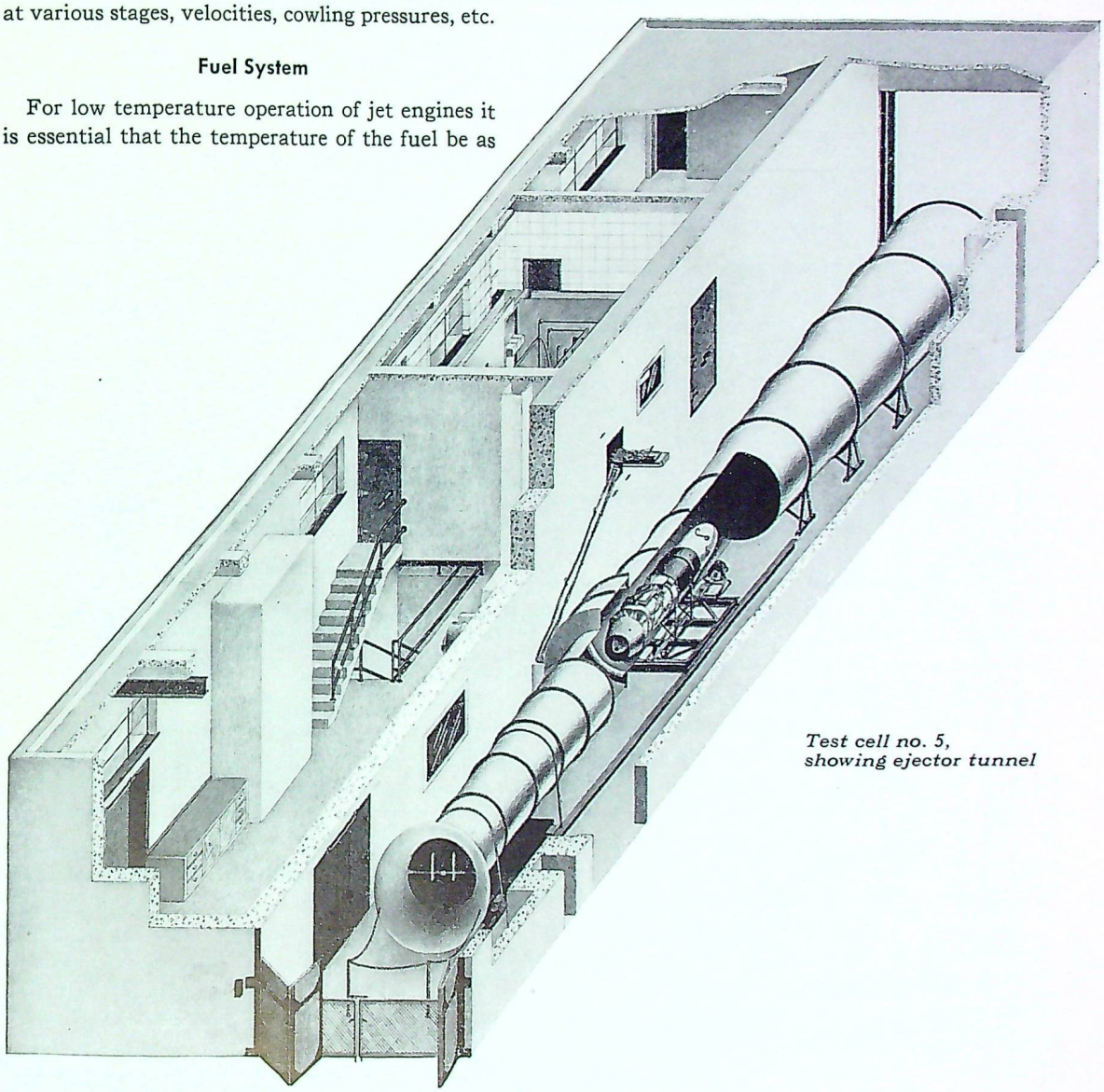
Test cells no. 2 and 3

usage. For this purpose, copper-constantan, iron-constantan, chromelalumel, or platinum-rhodium are used.

In reciprocating engines, pressures are usually measured with Bourdon type gauges. In turbine engine work, apart from fuel and oil pressures, the pressures are considerably lower and manometers are commonly used. These are employed to indicate intake pressures, compressor pressures at various stages, velocities, cowling pressures, etc.

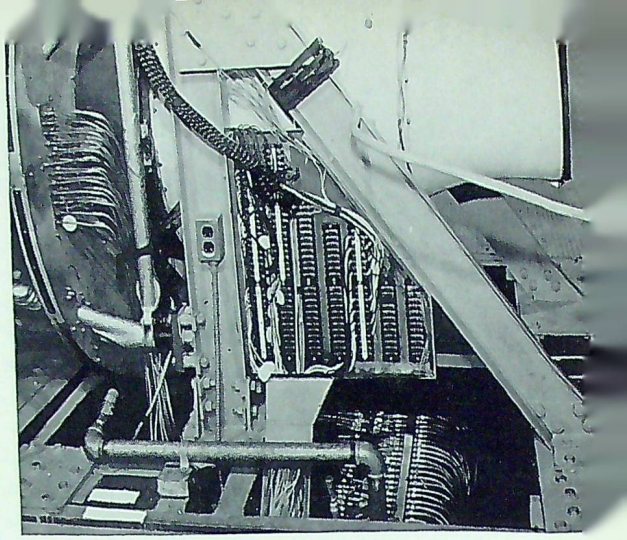
Fuel System

For low temperature operation of jet engines it is essential that the temperature of the fuel be as close to ambient air temperature as possible, if normal operating conditions are to be duplicated. The temperature of the fuel influences combustion. In addition, as the temperature of the fuel is reduced, the water solubility of the fuel is also reduced. Water tends to precipitate out in the form of small ice crystals which clog strainers and filters.



Test cell no. 5, showing ejector tunnel

In the laboratory, three of the bulk storage tanks, each having a capacity of 10,000 gallons, are set above ground outdoors and thus soon reach outside air temperature. Lines are run to the engine in such a way that the temperature of the fuel is not raised appreciably.



Themocouple and pressure junctions for turbo-propeller engine

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October Transfers

Officers

S/L G. H. Avent, D.F.C. (G.L.) — A.F.H.Q. to Training Command H.Q., Trenton

S/L A. R. B. Bellis, D.F.C. (G.L.) — No. 2 (Maritime) Operational Training Unit, Greenwood, to Air Materiel Command H.Q., Ottawa

S/L J. M. Enstone, M.B.E. (Adm.) — No. 9420 R.C.A.F. Unit, London, to School of Service Management, Trenton

S/L H. J. Reeves, D.F.C. (G.L.) — Flying Training School, Centralia, to No. 411 (Fighter) Sqn. (Reserve), Toronto

S/L K. B. Turner (Acc.) — R.C.A.F. Stn. Winnipeg to No. 5 Supply Depot, Moncton

Warrant Officers

W.O.2 A. A. Davis (M. Rdr. Tech.) — R.C.A.F. Stn. Clinton to No. 1 Radar and Communications Unit (Reserve), St. Hubert

W.O.2 J. A. McCartney (Sup. Tech.) — R.C.A.F. Stn. Camp Borden to Training Command H.Q.

W.O.2 D. R. McLean (M. Com. Tech.) — No. 1 Radar and Communications School, Clinton, to Air Materiel Command H.Q.

Key to Trade Designations

Acc.	— Accounts
Adm.	— Administrative
G. L.	— General List
M. Com. Tech.	— Master Communications Technician
M. Rdr. Tech.	— Master Radar Technician
Sup. Tech.	— Supply Technician

NOTES ON LECTURING

by C. H. Gibbs-Smith

(Reprinted from the "Inter-Services Aircraft Recognition Journal" by permission of the Controller of H.M. Stationery Office.)

A GOOD LECTURE ought both to instruct and inspire. There is nothing sentimental or unpractical about that combination, and unless there is that combination it is a bad lecture.

To instruct is to hand over facts or theories — to give information. It is here that the lecture has its limitations for some listeners; because there are those who can learn easily and quickly from the spoken word, and others (myself amongst them) who can best learn by quietly struggling with words and pictures, and struggling in decent solitude at that. But for the first group, the lecture can explain difficulties, point to solutions and drive home facts. It can perform this with all the advantages of the lively spoken word against the sometimes lifeless appeal of print; the personal "rapport" between human beings against the muffled voice of the author heard indistinctly through a mask of black marks on white paper.

Inspiration

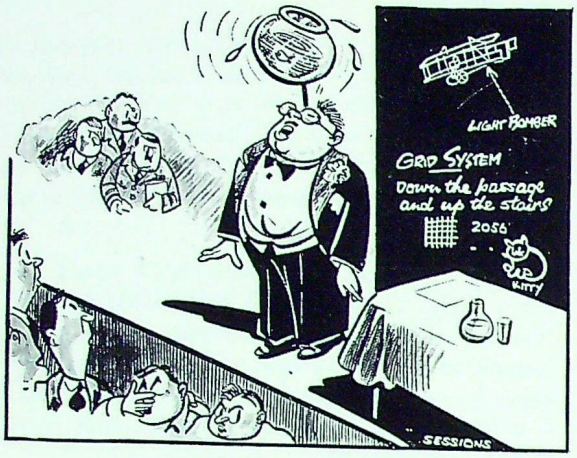
The word means, apart from its more exalted significance, "to affect so as to enliven or animate" (from the Latin *inspirare*, to breathe). In other words a lecture should so excite the interest of its listeners that they are persuaded to go out and learn for themselves. A good lecturer can make almost any subject on earth so interesting that its pursuit becomes a pleasure. Once interest is aroused, even a slow brain becomes energised, whilst a quick one is instantly supercharged. Sometimes, if the lecturer himself is exceptional, it will be not only a question of arousing enthusiasm but of suggesting new lines of thought, new angles of approach.

Naturally, a lecture can do some good if it succeeds in only one of these directions. We may learn without inspiration, or be inspired without learning. If I had to sacrifice one, I would unhesitatingly throw learning overboard, because it is the easier to come by elsewhere. Get rid of inspiration and you might just as well give up going to, or giving lectures. But, unfortunately, it is inspiration, meant quite simply, that most lecturers fall short on.

Getting across

The problems facing the lecturer are chiefly psychological, or more simply, emotional. He must understand himself and his audience. In passing, one ought to glance at that curious but essential French word "rapport," which the dictionary translates as "relation of harmony or affinity." It is one of the great secrets of lecturing, and one which, I think, can never be learnt without some natural aptitude. Watch a popular lecturer enter the room, or even a man who has never been seen by the particular audience before. It is apparent at once that he can "get over" to the audience. His personality seems to come out and meet the "collective" personality of the audience, and audiences definitely have collective personalities apart from their individuals. If one falls foul of that personality the game is up. One then becomes just a speaker to them, nothing more. Rapport must, I think, depend mostly on the character of the lecturer, and upon his attitude to life in general and the audience in particular. A beneficent and positive person will get across when a negative, aggressive, one will not. That is for anyone to see and note.

Looking inwards at oneself it is easier to see what the lecturer must and must not possess. Speaking broadly, there are two opposites which can both ruin a lecture — conceit and nervousness. Pomposity, conceit and arrogance; they are all



. . . to affect so as to enliven . .

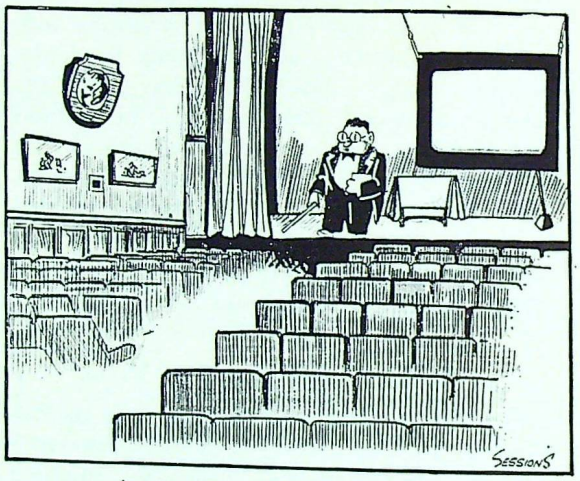
related. "Conceit," wrote Bruce Barton, "is God's gift to little men." He might also have said that it is sometimes the armour of the man who is not sure of himself. So, by all means, let us take confidence into the lecture theatre, but not a swelled head. There is nothing that an audience recognizes so fast and so surely; in fact it is the one form of recognition in which they need no training.

Fear the worst

On the other hand, you must do your best to overcome shyness and nervousness. Conceit sets up sales resistance in an audience, but nervousness just demoralises it. One of the best home-made remedies is to remember that what goes on in the heads of an audience, however destructive it may seem, is not going to injure you physically; at least I hope not. Imagine the worst thing happening at a lecture (whatever *you* feel is the worst) and it will not turn out to be lethal. You will survive it. Don't bother unduly about what the audience is thinking. You know your subject; you know what you want to say; you have confidence that you can put it over. That is enough. It is absolutely certain that some of your hearers will think you an idiot, or worse: it is equally certain that the majority will not think anything of the kind. Let your mind speak to the latter. The former are a "constant" the world over; there is a percentage of "haters" in every group, club, school, city and country in the world. You cannot convert them; so ignore them. Once anxiety is at rest, the way is open to an easy flexibility of manner, the ideal at which we should aim.

Mannerisms

Now for technique. Lecturers often move about too much, or fidget with their hands. (I belong to the former group.) Both are very bad faults and derive mainly from nervousness. They both distract the attention of the audience away from what you are saying towards what you are doing — a fatal transposition. And the cure? Do what the



. . . imagine the worst that can happen . .

political speakers are taught; give a few talks by yourself to yourself, and in front of a mirror — preferably a long one. Or another dodge. During the next lecture you yourself listen to, imagine all the time that you are in the lecturer's shoes so that you both see him from the outside and "feel" him from the inside.

Watch your voice. It is much better to speak too slowly than too fast. Again, practise by talking to yourself, but first warn your wife or family what you are doing. In the lecture room keep your head fairly high and try to throw your

voice over the audience as it were, like a blanket. That does not mean shouting. It is chiefly a matter of good articulation, and sensible pausing. It is one of the most valuable lessons one learns when broadcasting; that what seems to you a long pause between sentences or clauses, does not seem long to the audience. It also helps, when actually turning towards the audience, to look approximately at the back rows. One friend of mine adopts the ingenious method of choosing an intelligent or sympathetic face in one of the back rows and talking to it, or near it. This leads naturally to the tone of the talk. Personally I feel it is always best to be conversational rather than declamatory. In talking informally to an audience one automatically achieves yet another valuable asset, range of pitch and tone. There is nothing more tiring to an audience than the monotone in which you hear some academic lecturers hold forth.

Frame-up

The question of the content of your talk depends, of course, a great deal upon your subject matter. In general it is best to keep to the time-honoured progression from the general to the particular. At the outset of the lecture the audience should, I feel, be given a clear and concise idea of what the lecture is about and what ground it will cover. Some people, however, start off with a good anecdote, and then get down to the job. To some lecturers it comes naturally to organize their talks, to plan them to show general principles, followed by clearly described examples, and proceed at all times on the assumption that the minds of the audience must be given a framework into which the details can be fitted. Other lecturers, on the contrary, find it very difficult to organize their information, keep to, or drive home their point. Only a really big effort and willingness to criticize themselves will be of any help in these cases.

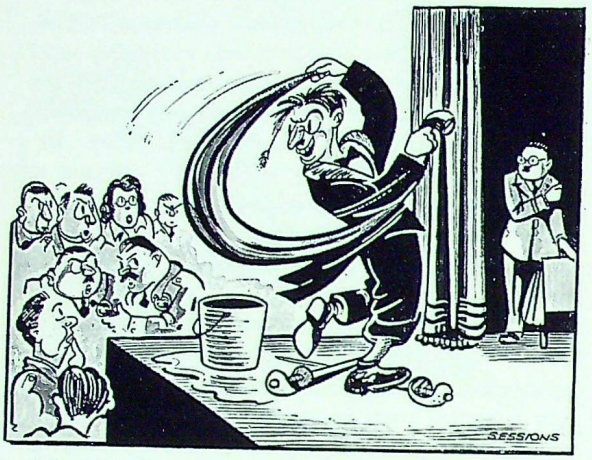
. . . give yourself a talk . . .

As for style, one could write reams, all of it simply one's personal opinion. For what it is worth I would suggest the following. Use short, vivid words; bring in as many telling images and examples as possible to explain your meaning; be funny if you can, but quit being funny if your audience doesn't laugh the first time* — it means that your nonsense is not their nonsense; by funny I don't mean vulgar — vulgarity can be very funny at a bar or over a table, but the only large audience that should be asked to bear it is in a music-hall; don't be ashamed to show enthusiasm — the only people who won't like it were your enemies before you started. Never imply, however slightly, that your audience is ignorant or inferior; make them feel they are your equals — they probably are anyway — and they will be correspondingly gratified and attentive; if you want bouquets, start giving them first and you may get some back; if you have to disagree, either with a questioner or with some doctrine arising out of your talk, disagree diffidently — aggressive dissentions are not good, and may reveal a pathetic side of one's character; and finally, never baulk at admitting you don't know something — an audience will always appreciate honest ignorance, but they will never forgive a faker.

Questions

Finally, in this highly personal statement of opinion, we might think of the question period at the end of the lecture. It is, I feel, one of the most valuable parts of a lecture. When I am listening

* On second thought, you might risk a second try; but no more.



. . it is certain that some of your hearers will think you an idiot . . .

to a lecture there are always points which I am hoping the speaker will make, and which have often to be left to question time to be cleared up. If you intend to allow questions after the lecture, it is generally best to say at the start. Question time is also a first rate way of really getting to know an audience. It also shows up gaps in one's treatment of the subject, and (to me at least) often points directly to one's failure to define terms and say what is really meant. In informal discussion with your audience it becomes possible to straighten out all kinds of difficulties, and so many of these difficulties bring home to the lecturer how essential it is to be clear and definitive in speech and content. And lastly, try to get to *like* lecturing. Try to take pleasure in saying clearly and smoothly what you wish to say, and have the satisfaction of seing that the audience appreciates it. Lecturing is, perhaps, a hard craft to learn but a most worth-while one when it is mastered.

Tally-Ho, Ladies!

(Marked "For Immediate Release," the following desperate item was sent to us not long ago by the Director of Public Relations. — Editor).

A STATISTICAL BREAKDOWN of the marital status of R.C.A.F. personnel shows that Canadian girls might just as well let very senior officers pass by without a glance. There's no hope at all among the air marshals, air vice-marshals and air commodores, every one of whom is married. The situation is almost as bad as regards group captains, wing commanders and squadron leaders, 95 per cent of them being married already. Flight lieutenants are practically in the same boat, a bare 10 per cent remaining free for competition.

Nor is it much use looking at sergeants, flight sergeants and warrant officers, for they're 93.4 per cent grabbed already. There are still a few corporals waiting to be picked off, but 85 per cent are family men.

Girls can find more husband-material amongst the R.C.A.F.'s flying officers or leading aircraftmen, only about 65 per cent of each group being married. The best hunting, however, is among pilot officers and flight cadets (only 13 per cent of whom are married) and among aircraftmen, a bare 3 per cent of the latter being family men.

The reason for these happy hunting conditions is that regulations prevent new entries without war service from marrying and drawing marriage allowances until they have finished initial training and reached a prescribed age. For officers, the regulations call for completion of initial training and the age of 25. For airmen, the age is 23.

But once basic training is over and the required ages have been reached, it's a free field!

"Can Such Things Be"? ★ ★ ★

(The late Ambrose Bierce, great American weaver of tales of the incredible, would have liked this amendment which was recently circulated at A.F.H.Q. — Editor).

Date of Issue: 11 July 50

AFHQ
OTTAWA ONT

ROYAL CANADIAN AIR FORCE

AUTHORIZED AMENDMENT No. A/328

FILE: 895-1/1
EFFECTIVE DATE: 15 July 50
REF. YOUR:
AUTHORITY: (Withheld)

ADD—DEDUCT	GL—NFL		1	2	3	4	5	6	7	8	9
		1		A.C.	G.C.	W.C.	S.L.	F.L.		F.O.	
		2	W.O.I	W.O.II	F.S.	SGT.	CPL.			A.C.	
		3		A.CT.	G.O.	W.G.O	SO.O.	FT.O.		S.O.	
		4	W.O.I	W.O.II	F.S.	SGT.	CPL.			A.W.	
		5	GR.H	GR.G	GR.F	GR.E	GR.D	GR.C	GR.B	GR.A	
			EQUIP.	6.A/C	7.MT&WM	8. MC&OM	9. MISC.				TOTAL

SECTION	ENTRY	DETAIL
		1950-51 WORKING
		AIR FORCE HEADQUARTERS OTTAWA ONT
		IIII AFHQ d/l Apr 50 (A8)
		(A2) (which has not been issued) to the subject Establishment, is cancelled.

ACTION COPY: (Withheld)
Amendment is effective on date shown above

(Withheld)
For Chief of the Air Staff

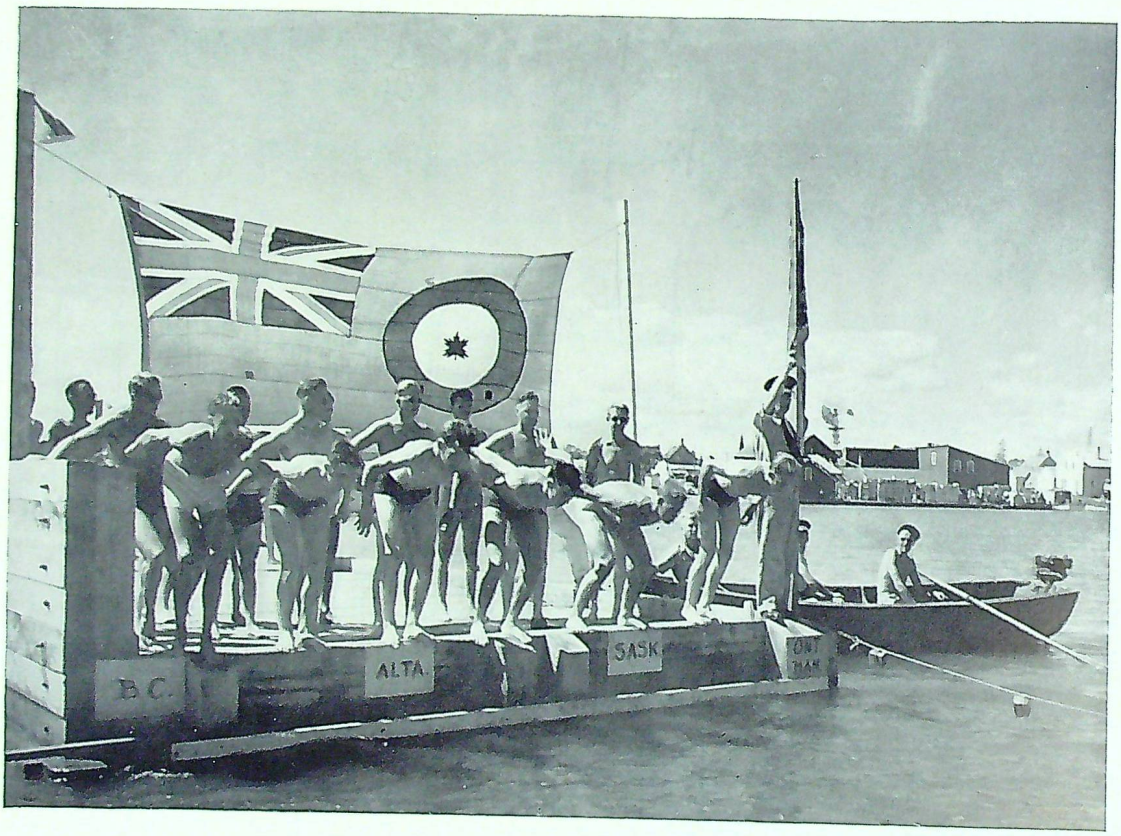
Estab. Amended by.....

Statistics.....

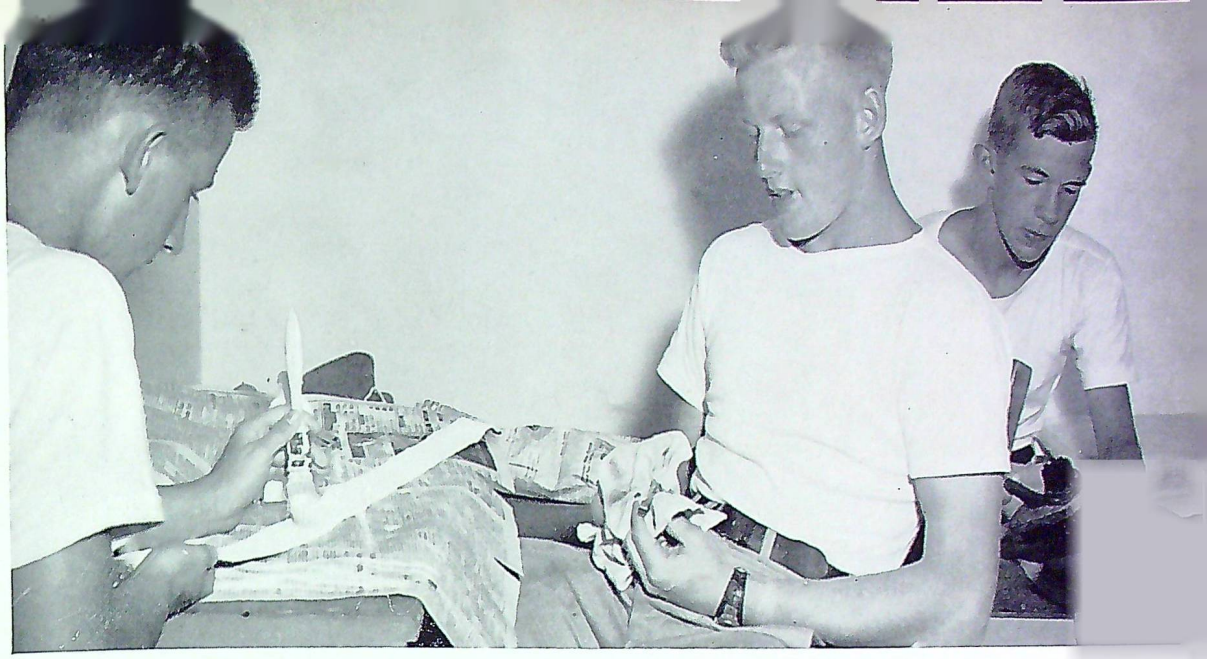
The ROYAL CANADIAN AIR CADETS

★

Summer Shots



Over 4,000 cadets attended the R.C.A.F. Summer Camps located at Summerside, Aylmer and Gimli. This photograph shows the start of a swimming race between representatives of the western provinces. The summer camps are of two weeks' duration and offer cadets a complete programme of organized sports in addition to special lectures on subjects included in their syllabus of training. Familiarization flights in R.C.A.F. aircraft are a popular feature of the annual outing.



Air Cadets H. Boyd, B. Crooks and R. Berkenstock polishing up the special white webbing they wore as members of the 1950 International Drill team. Selected from squadrons in western Canada, the team underwent three weeks of concentrated training at Gimli and Edmonton in preparation for the contest at Des Moines, Iowa. Their opponents were 40 U.S. cadets representing the Utah Wing of the Civil Air Patrol.

A special guest of the Air Cadet League this year was Cadet Lennart Persson of Stockholm, Sweden. Persson spent three weeks in Canada, during which he made a detailed study of the Air Cadet movement on behalf of interested Swedish air authorities. A highlight of his trip was a luncheon in Ottawa, where he met Air Marshal W. A. Curtis, Chief of the Air Staff. In this picture the Swedish Cadet discusses his Air Force insignia with the C.A.S. and Mr. J. S. de Lilliehöök, Chargé-d'Affaires at the Royal Swedish Legation, Ottawa.

Pictured on arrival at Northolt Airport, London, are 25 Royal Canadian Air Cadets who made a three weeks tour of the U.K. this summer. Travelling as guests of the R.A.F. and the Air Training Corps of Great Britain, the cadets visited England, Scotland, Northern Ireland and Wales. Pictured in the front rank are, left to right: Mr. John F. Ayre (St. John's, Newfoundland), representing the Air Cadet League; Sqn. Ldr. S. C. Tugwell, A.F.C., R.C.A.F. Escorting Officer; Sqn. Ldr. R. G. Smith of No. 2 Air Cadet Wing, Hamilton; and Sqn. Ldr. S. C. Hovey, D.F.C., R.C.A.F. Press Liaison Officer. While the Canadian party were overseas, a group of British Cadets was entertained by the League and R.C.A.F. in Ontario and Quebec.

Phase two of the Air Cadet exchange visits programme saw 26 young Canadians make an air tour of the U.S. while their counterparts from the U.S. Civil Air Patrol visited western Canada. The Canadians are shown on their arrival at Hawthorne Field, California. Accompanying officials pictured on the left are: Sqn. Ldr. L. Spruston, D.F.C., R.C.A.F.; Sqn. Ldr. M. S. Taylor of No. 1 Air Cadet Wing, Vancouver; and Mr. Denys H. Back, League representative from Vancouver. States visited by the Canadians included Oregon, California, Arizona, Texas, and Colorado.

Distribution of "The Roundel"

It has become necessary to cut down slightly in our present distribution to various units of the R.C.A.F. and the other Armed Services in order to take care of essential new requirements. Air Cadet Squadrons are therefore now receiving only three copies per month. The Editorial Committee regrets the necessity of such a reduction and it asks the co-operation of all Cadet Commanding Officers in attempting to ensure that all members of their squadrons are still enabled to read "The Roundel."

WHAT'S THE SCORE

Readers who are able to answer (without guessing) twelve of the following twenty questions on to-day's foremost topic of conversation have every right to feel pretty pleased with themselves. None of the Editorial Committee could. Correct answers will be found on page 48.

1. The Koreans originally came from:
   (*a*) China
   (*b*) Japan
   (*c*) Siberia
   (*d*) Heaven only knows where

2. The official cult of Korea is:
   (*a*) Confucianism
   (*b*) Buddhism
   (*c*) Shintoism
   (*d*) Christianity

3. Not met with in Korea is the:
   (*a*) Tiger
   (*b*) Leopard
   (*c*) Marten
   (*d*) Mouse-deer

4. The earliest European source of information on Korea is:
   (*a*) Hakluyt's Voyages
   (*b*) The narrative of a Dutchman who was shipwrecked in 1654 and held in captivity by the Koreans
   (*c*) The Olafssaga, which describes how Olaf Blue-Tooth sailed through the North-West Passage and down the Siberian coast as far as the Strait of Korea
   (*d*) The travels of Baron Münchausen

5. The first American troops in Korea were landed there in 1871:
   (*a*) To pay the President's respects to the newly-crowned King
   (*b*) In retaliation for shots fired at an American ship
   (*c*) At the request of the King, to halt Russian encroachment
   (*d*) To provide help in a cholera epidemic

6. Ch'ao Hsien, the native name of Korea, means:
   (*a*) Heavenly Trousers
   (*b*) Divine Tusk
   (*c*) Morning Calm
   (*d*) Sunlit Dragon

7. The capital of South Korea, captured by Reds on June 28th, is called:
   (*a*) Kumchon
   (*b*) Seoul
   (*c*) Pusan
   (*d*) Taegu

8. All British troops in Korea are under the command of:
   (*a*) General Omar Bradley
   (*b*) Brigadier Basil A. Coad
   (*c*) General J. Lawton Collins
   (*d*) Sir Gladwyn Jebb

9. The capital of North Korea is:
   (*a*) Pyongyang
   (*b*) Konan
   (*c*) Pukchong
   (*d*) Hamhung

10. In command of all U.N. forces defending South Korea, is:
    (*a*) General Omar Bradley
    (*b*) General Douglas MacArthur
    (*c*) General J. Lawton Collins
    (*d*) Lt.-Gen. Walton H. Walker

11. The United States have been accused by Red China of aggression against:
    (a) Indo-China
    (b) Russia
    (c) Formosa
    (d) Thailand

12. The reason for the invasion, as announced by North Korean radio, was that:
    (a) South Korean forces were attempting to invade the North
    (b) The United Nations were fortifying South Korea with the obvious intention of using it as a military base
    (c) The United States was using South Korean agents to sabotage Northern industrial development
    (d) South Korean planes had been repeatedly carrying out extensive photographic espionage

13. The area of South Korea is 36,600 square miles. Its population is:
    (a) 7,000,000
    (b) 14,000,000
    (c) 21,000,000
    (d) 28,000,000

14. The area of North Korea is 50,000 square miles. Its population is:
    (a) 9,000,000
    (b) 18,000,000
    (c) 27,000,000
    (d) 36,000,000

15. At the outbreak of hostilities, the armed forces of South and North Korea totalled, respectively, to:
    (a) 50,000 — 50,000
    (b) 100,000 — 75,000
    (c) 75,000 — 100,000
    (d) 100,000 — 200,000

16. The original agreement, made in December 1945, was that Russia, Britain and the U.S. would govern Korea as joint trustees for a period not exceeding 5 years, then grant the country independence. The South Korean Republic was formed in August 1948, its elected President being:
    (a) Chiang Kai-shek
    (b) Syngman Rhee
    (c) Tingfu Tsiang
    (d) Mao Tse-tung

17. Korea was annexed to Japan in:
    (a) 1871
    (b) 1890
    (c) 1905
    (d) 1910

18. The Premier of North Korea is:
    (a) Kim Il Sung
    (b) Pak Hen Nen
    (c) Ch'oe Yong Gun
    (d) Pak Hon Yong

19. Considerable offence is said to have been taken by the Koreans to the generic name given them by U.S. troops. This name is:
    (a) "Goons"
    (b) "Gooks"
    (c) "Dooks"
    (d) "Stooks"

20. The Soviet Deputy Foreign Minister who assumed chairmanship of the U.N. Security Council for August was:
    (a) Mr. Gromyko
    (b) Mr. Molotov
    (c) Mr. Voroshilov
    (d) Mr. Malik

FLYING SAUCERS

A survey of the man in the street in various American cities showed that 66 per cent deny the existence of flying saucers, eight per cent don't know, and 26 per cent are sure there are such things.

("*Contact*")

Moving Target Indication

(This is the second article by Lt. Col. Stairs which the "Canadian Army Journal" has kindly permitted us to reprint in "The Roundel." The first. "The Big Explosion," appeared in our July-August issue. The author, who is a man of varied interests, has a singular facility for dealing with technical subjects in a way that is readily understandable by the layman. — Editor).

by
Lt. Col. J. A. Stairs, M.B.E.
Directorate of Armament Development, Army Headquarters, Ottawa

A SHORT ARTICLE on radar was published in the September 1949 issue of this Journal. This explained how a pulse of radio energy lasting about a millionth of a second (a microsecond) was transmitted by the set and how, during the next few hundred microseconds, the receiving half of the set "listened" for returning echoes from targets. The pulse travels at the speed of light, 186,000 miles a second, or roughly 1,000 feet per microsecond. The time taken for an echo to return indicates the range of the target. The maximum range of the set determines how long it must listen between pulses and the listening time fixes the pulse recurrence frequency, i.e. number of pulses per second. Long range radars may have a p.r.f. of a few hundred, where short range sets run well over a thousand.

Pulses are transmitted down a beam, of which there are two types, depending on the purpose of the set. One is pencil-shaped for tracking a particular target and the other is broad and narrow like the blade of a canoe paddle and is used for search. This broad beam stands on edge and is swept rapidly around the horizon looking for the enemy. Though narrow, it is wide enough to allow about 20 pulses to strike a target each time it passes. During these 20 "strikes" the strength of the echo rises to a maximum and then falls away again. Where the pencil beam gives range, bearing and angle of sight, the broad beam sacrifices the latter to enable a large volume of sky to be covered rapidly.

One method of presenting the data of the search radar is the Plan Position Indicator (PPI). This uses a tube with a large circular face similar to that used in television. The top of the circle is North, the bottom South, the sides East and West. As the antenna sweeps the horizon in, for example, three seconds at a thousand pulses a second, a faint point of light starts from the centre of the tube 3,000 times, one for each pulse, and travels toward the edge of the tube in the direction that the antenna is pointing. If the range of the set is 100,000 yards the most distant echoes take 600 microseconds, and if the spot travels 6 inches from centre to edge it would do this at the rate of one inch per 100 microseconds. If any echoes are received by the set this faint point flashes bright. The inside of the tube is coated so that although the echo flash only lasts a microsecond it continues to glow for several seconds and is reinforced as the antenna passes it again three seconds later. Thus the face of the tube shows us the range and bearing of all targets within 100,000 yards of the set.

But here a topographical fly appears in the electronic ointment. Our broad beam scanning the horizon not only picks up enemy aeroplanes, it also collects echoes from trees, buildings, waves, hills, mountains and any other object in its path. If we are forced to place the radar in a poor locality, these echoes can blot out much of the presentation. A peacetime example occurs at any airport which is near a large city. Echoes from buildings leave

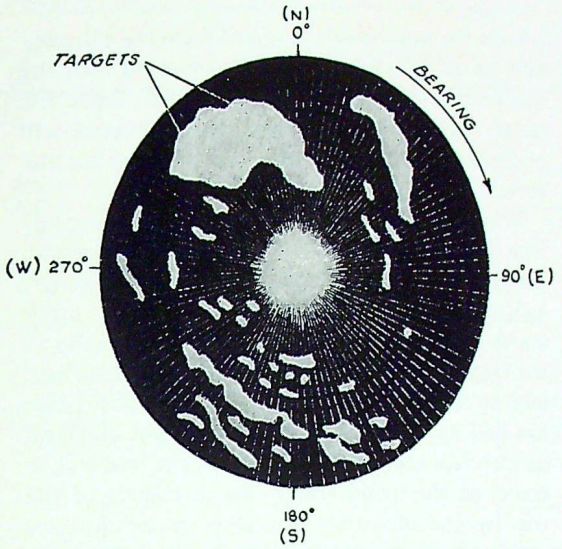


Fig. 1: PPI screen with targets and clutter

a lot of blobs and solid white areas on the tube through which it is difficult or impossible to pick up a plane. An obvious way to avoid this so-called "clutter" (see Fig. 1) is to raise the beam so that it misses local obstacles. But this has one great disadvantage, for it allows the fast low-flying enemy to creep in close before being discovered. One remembers perhaps the German raiders approaching England at wave-top level. The problem, therefore, is to eliminate clutter without creating a blind spot. How this can be done electronically is now explained.

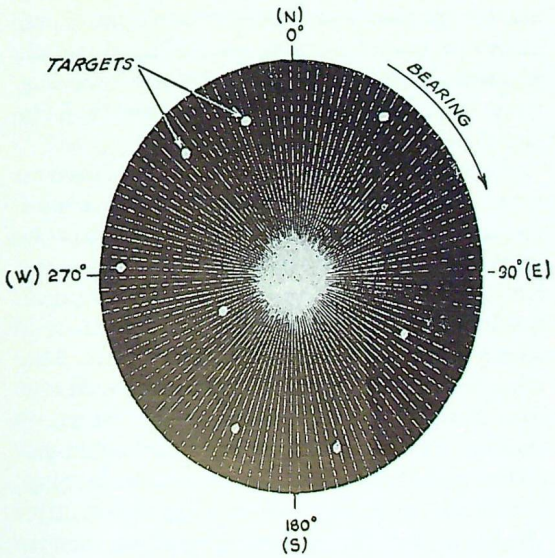


Fig. 2: PPI screen with clutter removed

The device is called Moving Target Indication (MTI) because it cancels all echoes from non-moving clutter while retaining echoes from objects whose range is changing relative to the set (see Fig. 2).

The principle is simple. The echoes received from one pulse are compared with those received from the following pulse. The non-moving targets send back identical echoes which cancel, while the moving targets send different echoes which do not cancel. It sounds easy until one recalls that the time between pulses is only about a thousandth of a second. Even if the enemy is making a direct approach at 600 m.p.h. the range will alter less than one foot in a thousandth of a second. And to be of value the instrument must be sensitive to much smaller changes than this. How, then, to detect clearly from pulse to pulse a movement of the order of an inch or less in a target that is many miles away?

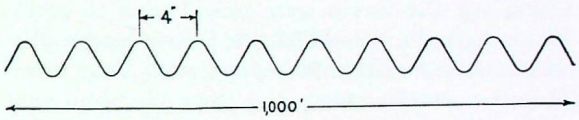


Fig. 3: A radar pulse

If a typical radar pulse lasts a millionth of a second it will at the velocity of light have a length of about a thousand feet. The pulse itself consists of a "train of waves." A typical radar wave might be 4 inches long, so in a thousand-foot pulse there would be 3,000 4-inch waves (see Fig. 3). It is these short waves that are the key to detecting the minute changes in range necessary for solving our problem.

As we send our microsecond pulse out into the sky we also start a device called an oscillator. All this does is vibrate back and forth producing waves inside the set similar to those going out into the sky. But where the sky pulse only lasts a millionth of a second, the oscillator vibrates continuously in the period between pulses. As each pulse goes out the oscillator is started anew

and, when it starts, the ups and downs of its waves are "locked" to the ups and downs of the outgoing pulse waves.* Outgoing pulse and oscillator are said to be "in phase" with one another (see Fig. 4).

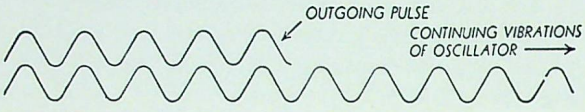


Fig. 4: Pulse and oscillator locked in phase

The next step is to compare the ups and downs of returning echoes with the continuing up and down vibrations of the oscillator. Where the two were "locked" on the outgoing pulse they will be quite haphazard on the return. Example: If the exact range is 5,000 yds. plus one inch, the distance to and from the target is 30,000 feet plus two inches or 90,000½ four-inch wave lengths. Going out the waves were locked peak to peak. While the pulse travels 90,000½ wave lengths the oscillator will vibrate 90,000½ times. That extra ½ wave on the end means that the returning peak of the echo will no longer hit a peak of the vibrator but will come in ½ a wave further on opposite a trough. If the range had been exactly 2 inches over 5,000 yards the peaks would again coincide, and also for 4, 6, 8 and so on. But anything in between will put them "out of phase." As any practical target like an aeroplane has a great number of reflecting surfaces, wings, nascelles, fuselage, etc., there are certain to be many echoes from it that will be "out of phase."

Bearing this in mind let us consider two examples of what happens from pulse to pulse, first with a fixed target and second with one that is moving.

Consider a factory chimney. The first pulse starts out. Its ups and downs correspond with the ups and downs of the oscillator. The pulse travels to the chimney and returns. As it re-enters the set its ups and downs are compared with those of the oscillator. They no longer coincide. The difference is measured electronically. Again the process is repeated; the oscillator is locked in phase with the next outgoing pulse. The pulse travels the same distance to and from the chimney and, as before, on re-entry it is compared with the oscillator and the difference measured. Since the range has remained the same, this difference will be the same for the second echo as it was for the first.

What about a target whose range is changing? The first pulse is like the first for the chimney. Locked to the oscillator it goes out to the target and returns and is compared. The next pulse starts off the same way but by the time it gets to the target it finds that this has moved, let us say, half an inch nearer to the radar set. This pulse has half an inch less to travel going out and half an inch less coming back, so it has one inch less to travel on the round trip. This shortening of the trip by one inch may not seem much until we compare the echo waves with those of the oscillator. Let us suppose that while the first pulse was going and coming this oscillator generated 700,000 4-inch waves. Due to the one inch difference in the trip of the second pulse it will now only have time to generate 699,999¾ waves. Altering the range by one inch shows up at once, for it has altered the comparison by a quarter wave length. Since this comparison is the same each time for stationary targets and differs each time for moving targets, it provides a means of distinguishing between the two. By comparing the output of one pulse with that of the next we can cancel out all echoes from stationary "clutter" while retaining those from aircraft and other moving objects (see Fig. 5).

It only remains to explain how cancellation is done. The train of comparison measurements (voltages) received from the phase detector is made to do two jobs. One of these is to compare it with the same train from the previous pulse which has been "stored" for a thousandth of a second (the pulse interval in my example). The other is to store it in turn for comparison with the next incoming pulse. Storing — or better — delaying a train of voltages for one whole thousandth of a second without distortion or weakening is difficult. It is done by changing the electric voltages into vibrations passing relatively slowly down a column of mercury. At the end of the

* For technical readers this takes place in the I-f rather than the R-f stage, a refinement not dealt with here.—Author.

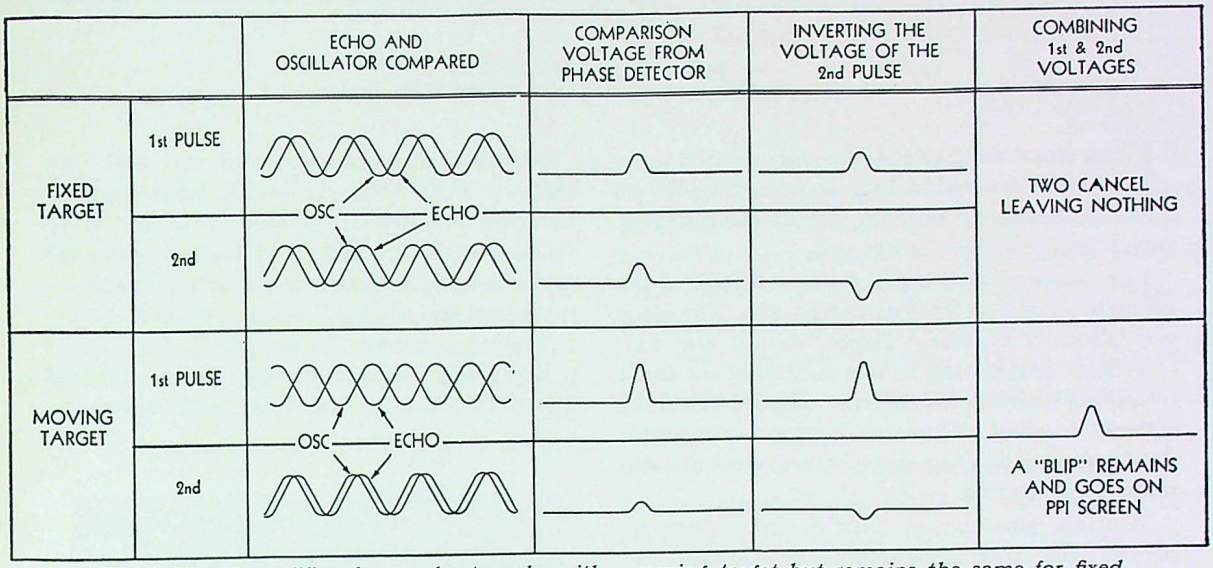


Fig. 5: The phase differs from pulse to pulse with a moving target but remains the same for fixed target (i.e. clutter).

column these are changed back again to voltages. The column is called a mercury delay line and its length will depend on the time between pulses on the set being used. The instant at which the voltages come out of the delay line is made to coincide with the receipt of the equivalent voltages from the sky (via the phase detector). By a simple device one set of these is made positive and the other negative. All similar voltages from stationary clutter will cancel while the dissimilar voltages from moving objects will pass through and be shown on the circular face of the PPI tube.

The system is not perfect. Objects like water waves and leaves also move. But where ordinary radar is bound to give an echo on the screen from such objects, MTI will only give one from movement, a difference which seems unimportant in the above examples but which may be sufficient to make the impossible, possible. Another drawback is that when the target moves an exact number of half wave lengths between pulses, the phase difference will be the same each time and this makes the target appear stationary and it fades out on the screen. Fortunately, this does not often occur and when it does it is not likely to last, for, as soon as the target velocity or direction changes, an uncancelled echo reappears on the screen.

In the picture of war MTI is, perhaps, a small detail among the giants. But the fact that it is only a detail serves to emphasize the technical complexity of warfare in the 20th Century. To perfect such a detail takes many months. There are calculations, designs, prototypes, trials, "bugs," redesign, more trials, more "bugs," more changes. After the first satisfactory model has been built there come the changes of design to assist large-scale production and many more decisions on which of these are acceptable and which are not. While all this goes on new techniques are being evolved and there is the continual question of whether to go ahead on what already exists or delay for something better at the risk of ending up with nothing. And this process is repeated for thousands of items with varying degrees of priority.

In a dictatorship the public mind is conditioned by a controlled press. In a democracy this process is the responsibility of the individual. Each must understand for himself the time and effort required by science and industry to arm his country for modern war. Not to do so is to end up like the statesman in 1940 who called for "clouds of aeroplanes" to save by a miracle a battle that had been lost in the preceding decade.

Something on Accounts

by Cpl. J. A. M. Labonté

THE HOLY WRIT of the accounts section is its acquittance roll, a long document made out in 20 copies and including the name of every person on the station except you.

I encountered this striking characteristic of the acquittance roll on my first pay parade. The scene was Toronto Manning Depot, during the war. Our flight was sitting in one section of an arena trembling with the roar of five thousand flat-broke airmen drooling in unison. Below us a Flight Sergeant was bawling instructions over an asthmatic P. A. System.

"Initials gloomph to phtt inclusive line up behind the zoomgableimph," he boomed. I turned to an airman beside me, "What did he say?"

"He said 'Initials gloomph to phtt inclusive line up behind the zoomgableimph," replied the fellow coolly.

"Thanks," I said, noting his face in case I should ever have an opportunity to put my feet in it.

Counting my beads at full throttle, I fell in with the mob jostling in the general direction of the zoomgableimph. There, a sergeant called off a list of names. (Mine wasn't included).

I went up to him and tugged his sleeve gently. "My name wasn't on the list," I confided.

"Oh, a new man, eh? How long have you been at Manning? Fall in at the end of the line. I'll put your name on the list."

I started out for the end of the line, reaching it shortly before dark. From my vantage point, I could see two Service Policemen standing behind the paymaster, and I could easily see why. The guy looked like a crook, even from where I was standing, roughly a quarter of a mile away.

I didn't have to shave more than a couple of times before I found myself nearing the pay desk.

"Give your name and number," bellowed the sergeant, who was noticeably older than the last time that I'd seen him.

Suddenly, two men short of my goal, my memory went AWL; I couldn't remember my name or number. Panic swept over me, to be replaced by abject despair. I stepped up to the table, saluted, and then started to cry quietly.

"Name and number," snapped the officer.

"I don't remember," I mumbled.

Everybody stared at me suspiciously. I tensed myself for a blast of lead from the SP's revolver.

"There's only one name left here, sir," whispered the paymaster's aide. "It must be this guy. Twenty-five cents."

The officer put out a quarter. I fumbled for it eagerly, bobbling it into his lap, crawling after it between the legs of his chair, and finally running sobbing from the scene, with it clutched in a hot, trembling hand.

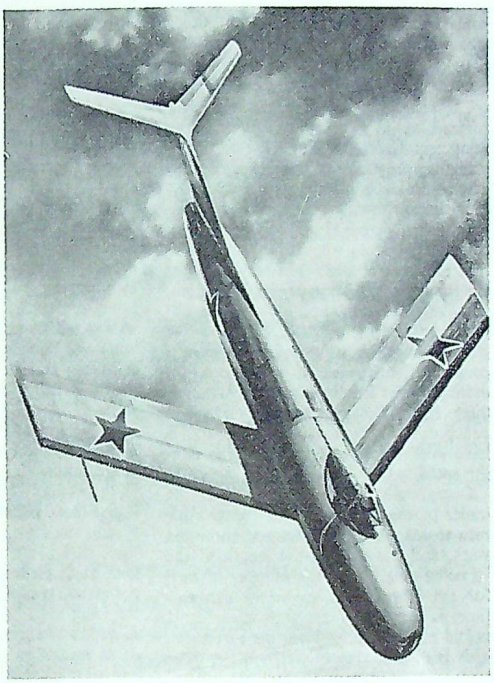
I was stopped by the sergeant. "Wanna buy five copies of 'WINGS', bub?", he asked twisting my arm with his eyes. "Just twenty-five cents . . "

("Wings Over Greenwood")

Soviet's Sonic Fighter

(Courtesy of the "Air Reserve Gazette")

ONE of the latest Russian jet fighters to enter service is illustrated on this page by drawings based on photographs from Polish sources. This new fighter illustrates the advances made by the Russians in fighter design since the "stop-gap" jet fighters, the MIG-9 and YAK-15. Basically a low-wing monoplane powered by a single jet engine, the new fighter has been in service for some months and Polish reports suggest



that it is designated YAK-21. It is known that another fighter of similar design is also in service, differing from that shown on this page in having a mid-wing, lower tailplane, and an armament blister under the fuselage. This may be the LA-15, which it is known was being tested in 1948.

The fighter has a number of interesting design features. It is thought to be powered by a Rolls-Royce Nene, or a development of this engine. The fuselage shape, characteristic of modern jet fighters of this size, bears this out, since a centrifugal compressor type engine seems to be used. All known Russian gas turbines (based on German designs) are of axial-flow type. The fuselage is of good aero-dynamic form with an orthodox straight-through arrangement of the jet ducts. The nose ram entry is lipped above to maintain adequate airflow in nose-up position, and the intake ducts bifurcate round the pilot to the plenum chamber aft. The pilot is seated well forward beneath an all-round vision cockpit canopy.

The "T-type" cantilever tailplane mounted on a large-area swept-back fin and rudder is interesting.It is probably intended to avoid broken air-flow from the canopy. The tail-sweep angle is about 40 deg. and should provide adequate longitudinal control at high Mach numbers.

The laminar-flow section wing has a 40 deg. sweepback also — some 5 deg. more than on latest U.S. aeroplanes — and appears to have a slight anhedral, which may have been adopted to reduce "Dutch-roll" — a form of lateral oscillation. An unusual feature of the wing is its near-constant chord plan — neither leading nor trailing edges have much taper. Automatic slots are presumably fitted in the leading edge to overcome the poor low-speed lift characteristics of the sharply swept-back wing. The wing loading would appear to be reasonable and it is possible that internal equipment and armour have been kept down to a minimum, thus reducing the aeroplane's weight and making for good handling characteristics in high "G" turns and pull-outs. The fighter apparently has a high critical Mach number and, with a Nene, may be capable of speeds in the 650-700 m.p.h. region.

Cloud and Collision

(Reprinted by courtesy of "Shell Aviation News")

CUMULO-NIMBUS CLOUDS, or more accurately the thunderstorms they carry in their hearts, are the greatest meteorological hazard to flying. The modern commercial aircraft is largely independent of other weather hazards, but the thunderstorm must still be treated with the greatest respect and flights through cumulo-nimbus clouds are to be avoided at all costs.

The four hazards in cumulo-nimbus cloud, in order of their importance, are severe turbulence, hail, ice and lightning. The turbulence consists of high velocity gusts and violent vertical draughts. The gusts are the greatest danger from the point of view of structural shock and possible structural failure. Vertical draughts in cumulo-nimbus cloud have been recorded up to velocities of 6,000 feet per minute, and while the up-draughts are generally of greater velocity than the down-draughts there is an obvious danger when flying over land, even at the accepted safety height of 2,000 ft. above the highest ground.

Hailstones up to 3 in. in diameter have been encountered in cumulo-nimbus cloud and although this has never been reported as resulting in more than superficial damage, it must be, to say the least, an unpleasant experience. The icing hazard is largely minimized by the de-icing equipment on the modern airliner and the potential danger is largely confined to carburettor icing. It has also been established that lightning is more of a psychological than a physical hazard and, with few exceptions, any damage which has resulted from lightning has been superficial.

The desirable action with cumulo-nimbus clouds is to fly round them but never through them. It is not always possible, however, to recognize cumulo-nimbus visually and when already flying in cloud or at night, visual recognition is impossible. Experiments being carried out by British Overseas Airways with airborne search radar have now demonstrated that with this equipment it is possible to detect the cores of cumulo-nimbus 40 miles away.

These trials are being carried out by B.O.A.C.'s Operational Development Unit at the request of the British Ministry of Civil Aviation and are designed to test the usefulness of the equipment for a number of purposes. The first series of trials were intended to test the efficiency of the equipment in detecting, identifying and avoiding cumulo-nimbus cloud; tests on its use for navigation purposes are now in hand.

The information which follows has been extracted from an interim report written by Capt. H. J. Field, of B.O.A.C.'s Operational Development Unit. This report deals with the results obtained with Ekco equipment installed in a Hythe-class flying-boat in the Singapore area, and B.O.A.C. wish to emphasize that it is an interim report only.

The detection of cumulo-nimbus cloud cores by means of an airborne centimetre radar installation began in 1946, when an experimental model was used by Telecommunication Research Establishment for the study of cumulo-nimbus clouds. As a result of these experiments an airborne unit was designed by T.R.E. and a series of trials carried out by the R.A.F. Transport Command Development Unit.

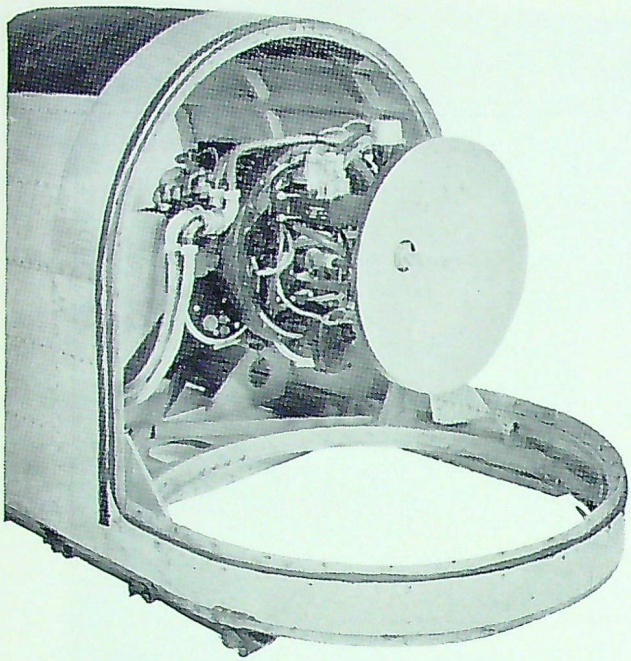
These trials showed that cumulo-nimbus cloud cores could be detected at ranges of up to 40 miles or more. The photographs which accompany this article show the remarkable power of the radar beam to penetrate dense storm clouds and reveal

A typical example of a gap between two cumulo-nimbus clouds. This gap was observed on the cathode-ray tube before it was seen visually. The aircraft was directed through the gap from cathode-ray tube observations which are reproduced above. The semi-circular lines seen on the cathode-ray tube face are electronic range-markers spaced at five-mile intervals. The radial lines are relative bearing indications.

their hard "cores," which in certain circumstances might be dangerous to an aircraft, or, at the least, give the passengers an uncomfortable ride in turbulence.

The dense clouds shown in our photograph indicated no break at all to the eye; the tube revealed the gap shown in the photograph below it, through which gap the pilot directed the aircraft.

Development and production of the T.R.E. model was subsequently undertaken by E. K. Cole Ltd., and this equipment, with which these trials were made, employed gyro stabilization of the scanner in the rolling and pitching aircraft. The cloud trials were carried out in the Singapore area as this was considered to be the most satis-



Scanner with transmitter-receiver unit. The gyro-stabilized mounting with scanner and transmitter-receiver unit developed and produced by E. K. Cole Ltd. as installed in the retracting nose-section of the Hythe.

factory region for a high incidence of thunder-storm activity.

The cloud and collision-warning radar equipment illustrated in this article is an airborne X-Band radar unit, designed for the detection of cumulo-nimbus clouds. The operation of the equipment follows familiar radar technique. The aerial system of scanner sweeps through an angle of ± 75 deg. in azimuth at the rate of one sweep per second, and searches a sector of space ahead of the aircraft. The reflected energy is presented on the Indicator Unit, in which a time-base signal traces across the cathode-ray tube in synchronism with the scanner movement. This results in a picture being built up showing any clouds or other objects in a wedge-shaped sector of space ahead of the aircraft.

The transmitter-receiver unit was installed in the retracting nose of the Hythe. The equipment provided for viewing two indicator units. No. 1 indicator unit was mounted in the cockpit roof forward of the captain's seat, and arranged so that it could be lowered when required for viewing. A visor was provided for daylight observation. No. 2 indicator unit was mounted horizontally on the navigator's table, in conjunction with an F24 camera for making photographic records of the cathode-ray tube display. The camera and cathode-ray tube were connected by a tunnel.

Various types of cumuliform clouds with vertical depths ranging from 15,000 to 41,000 feet were detected. Most clouds with vertical depths of 25,000 feet or more were detected at a range of 40 miles. The avoidance of responsive cloud was found to be extremely simple, and safe operation through areas of packed cumuliform cloud did not present any difficulty. Avoiding action was made always in a lateral direction rather than by changes in altitude. It was found that the safest way of avoiding turbulence was to skirt all response areas by at least half a mile.

Using the radar equipment at most of the alighting areas between Southampton, Singapore and Hong Kong, it was possible to make an instrument approach and let-down over the area. At several of the larger areas such as Augusta, Alexandria and Bahrein, height could be reduced to 100 ft. over the edges of the alighting area with sufficient accuracy to effect a landing.

Areas involving rivers were found to be troublesome at times owing to the presence of shipping. This caused sections of the river trace to disappear and raised some doubt in the mind of the operator as to whether the aircraft was over the river. A good example of this was the Irrawaddy River at Rangoon, where the presence of a large number of vessels in mid-stream completely eliminated all trace of the river. On the other hand, Southampton Water could be distinguished easily, although a large amount of shipping was involved. Both rivers are approximately the same width, but the banks of the Irrawaddy are very flat.

The equipment was also used for map-painting with some success, depending largely on the type of terrain, altitude of the aircraft and tilt angle of the scanner. The most satisfactory results were obtained when the area scanned included such bold features as coastlines, large rivers, lakes and isolated regions of high ground. These points are being investigated more closely.

The Pipers of Edmonton

(In the October 1949 issue of "The Roundel" we published an article dealing with the pipe band at R.C.A.F. Station Rockcliffe. Little did we realize that, even while it was being printed, the autumnal peace of the prairies was being similarly disturbed by a group of zealots at R.C.A.F. Station Edmonton. This brief account of the latter's pipe band, which reached us only recently, was prepared by Flying Officer T. E. W. Robson, P.R.O. of R.C.A.F. Station Edmonton, and LAC J. Watt, Secretary-Treasurer of the band. We are inclined to think that Nos. 400 and 401 Squadrons of the R.C.A.F. Reserve may have something to say about the final sentence. — Editor).

IT WAS THE HOUR of lunch-time, and all was quietude around R.C.A.F. Station Edmonton — quietude, that is, of the bustling sort that prevails when men have nothing on their minds but thoughts of food.

But suddenly that peace was shattered. Men stopped dead in their tracks, and the more sensitive of them blanched and shuddered. It had happened at last. That thin keening sound drifting on the wind could come from nothing on earth but a chanter.

This, they whispered to each other, was IT . . . In the weeks that followed, however, they grew hardened to the feeble pipings from No. 3 hangar. They learned to face the inevitable. And when one day the noon atmosphere was set a-quiver by the full-throated wailing of Scotland's oldest weapon, it is said that not a man screamed. Such is self-discipline.

For many a week the wailing continued, and eventually the faces of even the most dour Scots on the Station softened, lost their rocky expression, and finally broke into full smiles as they actually recognized known melodies in the skirlings.

The band was formed in September 1949 by Wing Cdr. Wesley Hodgson, D.F.C., who is a confirmed Scotsman, if not by birth, at least by tradition and descent. His present appointment is that of Officer Commanding, Winter Experimental Establishment, Edmonton.

The man we have to thank for the excellence of the music is Pipe Major Lunan, who tutored the boys through their childhood and adolescence and assured their arrival at manhood in the piping world. Ample evidence of their arrival is given by the fact that they walked away from the Highland Games in Edmonton with fourth prize in the piping contests. A good piper always walks away — a moving target is harder to hit.

Left to right: LAC Lewis, Cpl. Waller, Sgt. McMullin, LAC Horvath, Cpl. MacIntyre, LAC Croxford, LAC Tymchuk, LAC Watt, Flt. Lt. Halcrow, LAC Simpson, LAC Wiltzen, LAC Vroom

When the band started, the only thing they had was plenty of enthusiasm and latent talent. Since pipe bands are not authorized by A.F.H.Q., many months were spent in dickering and scrounging to procure uniforms and equipment for the ten pipers and seven drummers.

The band made its debut at the A.O.C.'s Annual Inspection of the Station in June. Everyone survived. Since then the band has played for numerous C.O.'s parades, church parades, and a pararescue graduation. In August the band is off to Vancouver for the Highland Games in that city, and the Station expects big things of it.

After all, it's the best pipe band in the Air Force.

From the Suggestion Box

IN AIR FORCE ROUTINE ORDERS of 28 July 1950, the Chief of the Air Staff expressed his thanks to the undermentioned personnel for suggestions which have been officially adopted throughout the R.C.A.F.

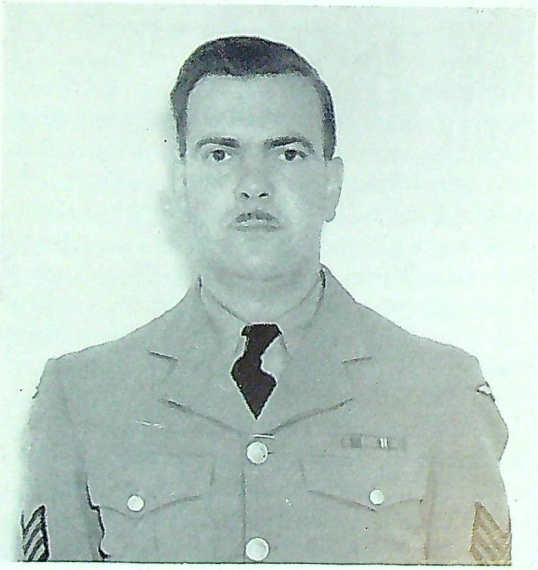
Aware, from long experience, of the difficulty of whitening blue web equipment for use in ceremonial parades, W.O.I. J. A. Silver, of R.C.A.F. Station Trenton, at last discovered a method of treating it which was tested by Inter-Service Development personnel and found to be completely satisfactory. After removing all brass fittings, webbing is scrubbed with strong soap, rinsed well, and bleached with Javex according to instructions on bottle. When bleached to natural colour, it is rinsed and dried, then treated with a light coat of Armor Coat, A-19 White Tire Paint. This is allowed to dry thoroughly before application of second coat. Finally, webbing is dried in the open air — preferably in the sun.

W.O.I. J. A. Silver

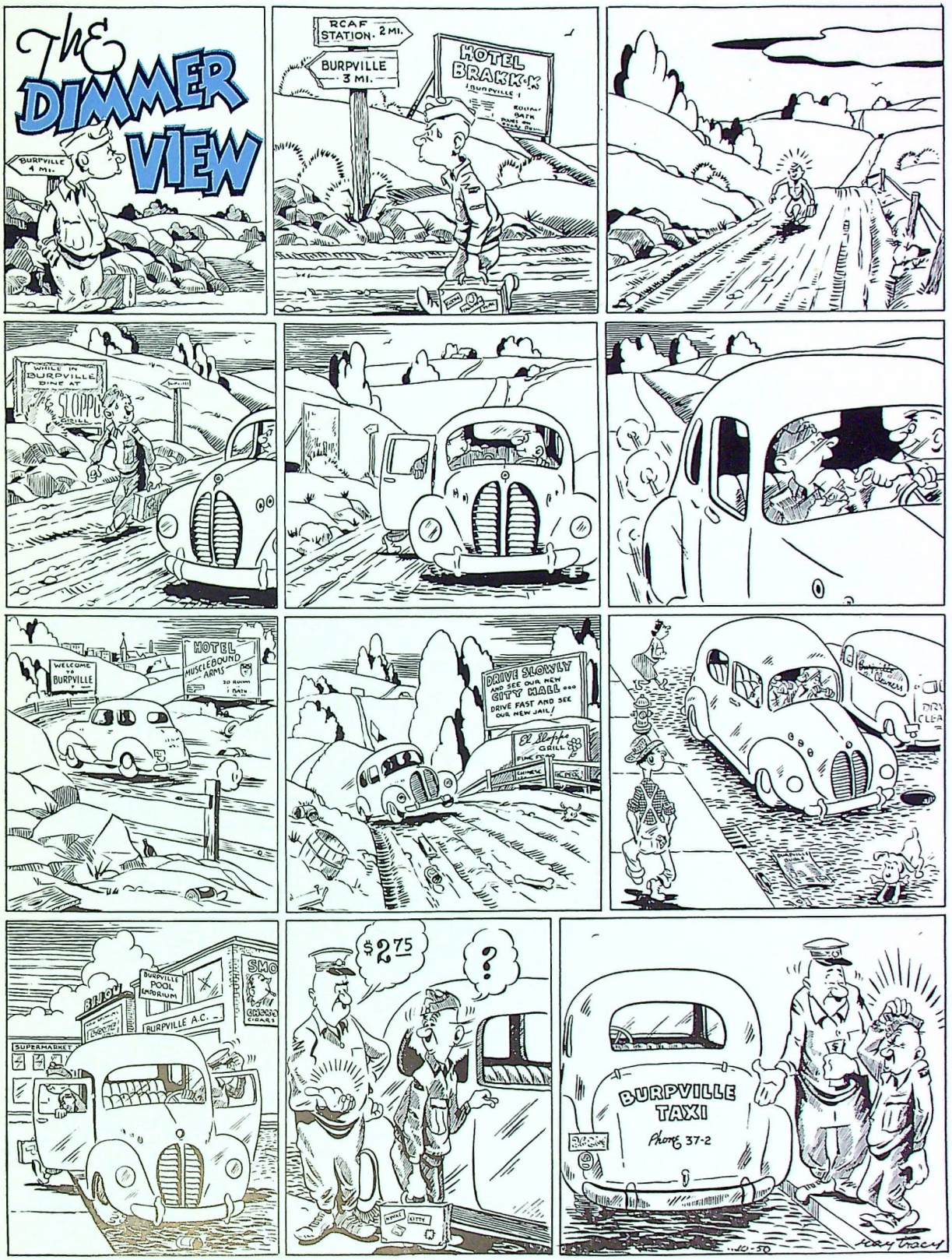
Sgt. R. C. Atherton, of No. 5 S.D., Moncton, drew official attention to the fact that the belts on airmen's gabardine raincoats showed undue wear after comparatively short use. Further, he pointed out, either one or two of the three buttons could be exposed, and the arrangement was asymmetric. The sealed pattern of airmen's raincoats is therefore being modified to eliminate the buttons on the back belt and to anchor the four corners of the belt extension by stitching.

Sgt. F. A. Barber

Resilatex is a rubberized hair used in the prepacking of instruments and other fragile equipment. It is very expensive, but hitherto only a small quantity has been recovered by Sections for packing purposes. Since it does not become "dead" even after several usings and can be washed out or cleaned with a vacuum cleaner, Sgt. F. A. Barber, of No. 1 S.D., Weston, put forward the suggestion that all Resilatex be systematically salvaged.



Sgt. R. C. Atherton


The DIMMER VIEW
BURPVILLE 4 MI.
RCAF STATION 2 MI.
BURPVILLE 3 MI.
HOTEL BRAKK-EM
WHILE IN BURPVILLE DINE AT SLOPPE GRILL
HOTEL MUSCLEBOUND ARMS
WELCOME TO BURPVILLE
DRIVE SLOWLY AND SEE OUR NEW CITY HALL ... DRIVE FAST AND SEE OUR NEW JAIL!
BURPVILLE POOL EMPORIUM
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RAY TRACY

Letters to the Editor ★ ★ ★

CORRECTION

Dear Sir:

I have just received my issue of the July-August "Roundel" and your staff are to be congratulated on a very good job on the Convention. However, in the "Convention Directory" I was wrongly listed. I noticed it while at the Convention and passed the information along, but guess it was side-tracked in the rush. The listing in "The Roundel" should have read:

No. 304 Wing (Montreal), Sergeant M. T. Jamieson,
48A Crepin Avenue, Chateauguay Station, Que.,
Occupation: Clerk, D.V.A., Montreal.

Miss Mary T. Jamieson (R.C.A.F.A.)

A RAY OF HOPE

Sir:

It is with a great amount of pleasure that No. 1 Wing (R.C.A.F.) receives your magazine.

The Air Cadet section is read with intense interest by all personnel of this Unit, and we are endeavouring to promote among the more literary types a desire to submit articles.

Our kindest regards to Sgt. Shatterproof.

Flt. Lt. R. R. Brooks,
Adjutant, No. 1 Wing, R.C.A.C.

(Sgt. Shatteroroof thanks the members of No. 1 Wing for their good wishes and advises us that at long last he sees a ray of hope for "The Roundel." "Too long," he writes, "has the heavy hand of the older generation retarded 'The Roundel's' growth. Let us hope that the voice of youth will soon ring loud and clear above the steady booming of Brass." — Editor).

INDIVIDUAL COPIES OF "THE ROUNDEL"

Dear Sir:

As a former member of the R.C.A.F., I am very desirous of being placed on the mailing list of "The Roundel." It is one of the finest magazines of its type I have ever had the pleasure of reading.

I am not a member of the R.C.A.F.A., but only because no Wing has yet been organized on P.E.I. However, I intend to start the ball rolling as soon as I find more information on how to go about it.

I have the June 1950 copy of "The Roundel" and would appreciate it if you have any back numbers that could be sent to me.

I am not enclosing subscription fee, as I do not as yet know the amount required.

John Hopkirk,
Box 538, Summerside, P.E.I.

(We publish Mr. Hopkirk's letter as it gives us the opportunity to answer many similar enquiries that reach this office. Since there is no charge made for "The Roundel," individual distribution cannot, in the ordinary course of events, be made except to members of the R.C.A.F. Association. In districts where no Wing exists, the Association has many members-at-large, all of whom receive "The Roundel." Full particulars regarding membership fees, the formation of Wings, etc., may be obtained by writing to:

The General Secretary,
R.C.A.F. Association,
424 Metcalfe Street,
Ottawa, Ontario.

— Editor)

NO. 1 R. AND C. WING

Dear Sir:

I would like to suggest the publication in "The Roundel" of the story of No. 1 Radar and Communications Wing (Reserve) of Montreal, which, with its subordinate Air Control and Warning Units in Quebec City, Sherbrooke, St. Anne de Bellevue and Ottawa, is the first of many throughout the country. As your historical articles have been prepared mainly by the Air Historian, dealing almost entirely with the different squadrons' wartime histories, the thought occurred to me that No. 1 R. & C. might not be covered.

Inasmuch as a radar and radio network forms the keystone of any air defence scheme, and as personnel of the Reserve, both from units such as No. 1 R. & C. and the inactive component, will be required to bolster the Regular Force Air Control and Warning Units in the event of emergency, I think that our story would be of general interest to your readers. I might add that the Unit's achievements to date in the fields of recruiting and training, despite very serious handicaps occasioned by inadequate accommodation and equipment, have been almost phenomenal, and should prove an inspiration to others faced with similar problems throughout the Service.

Incidentally, I thoroughly enjoyed reading the story of my own war-time squadron (No. 426) and seeing the photographs of some of the chaps I knew then.

Flying Officer H.B. Ripstein,
No. 1 R. & C. Wing (R.C.A.F. Reserve.)

(Flying Officer Ripstein's thought is an excellent one) "The Roundel" will be very happy indeed to publish a story on No. 1 R. & C. Wing. We would, however, much appreciate it if the Wing would prepare its own history for us, providing suitable illustrations and photographs. A history written by those who helped in its making must necessarily have a greater wealth of personal detail and "local colour" than one prepared in A.F.H.Q. — Editor).

"TEE EMM"

Dear Sir:

I would like to see more reprints of P. O. Prune. Is there anywhere one can obtain a complete set of "TEE EMM"?

F. H. Rowan (R.C.A.F.A.)

(We shall do our best in the matter of Prune reprints. A complete set of "TEE EMM" appears to be rather more scarce than the proverbial hen's tooth — in England as well as in our own country. A complete set would probably be worth a sizeable sum. — Editor)

Answers to "What's the Score?"

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

July-August Shipments of "The Roundel"

Twenty-two bulk and a few individual shipments of the July-August issue were strike-bound in transit. By the time this issue has made its appearance, we trust that all delayed copies will have been received.—Editor


The
ROUNDEL