

# The **ROUNDDEL**

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MAY 1953



**ROYAL CANADIAN AIR FORCE**



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*This Month's Cover*



The De Havilland Otter, which was officially handed over to the R.C.A.F. last March, will be used as a light transport aircraft and also for search and rescue work, on floats, wheels, or skis. On wheels or skis it can take off, fully loaded, in about 300 ft.; it has a cruising speed of 120 knots with light load at 5000 ft., and stalling speed of about 35 knots. Capable of carrying six stretcher cases, two passengers, and a crew of two, it is powered by a 600 h.p. Pratt and Whitney Wasp engine. Its exits are located with an eye to use by pararescue personnel.

**EDITORIAL OFFICES:**  
 R.C.A.F., Victoria Island,  
 Ottawa, Ont.

## A Letter from GENERAL NORSTAD

*The Hon. Brooke Claxton, Minister of National Defence, forwarded to General Norstad a set of photographs covering the ceremonies that accompanied last December's official hand-over to N.A.T.O. of No. 2 Fighter Wing, based at Grostenquin, a part of Canada's contribution to European defence. Published below is the letter which he received in reply.*

### HEADQUARTERS ALLIED AIR FORCES CENTRAL EUROPE

Office of the Commander-in-Chief

9 February 1953.

The Honorable Brooke Claxton,  
Minister of National Defence,  
Ottawa, Canada.

My dear Mr. Minister:

Thank you for your thoughtfulness in sending me a set of souvenir prints of the ceremony at Gros Tenquin. It was a most impressive occasion and I enjoyed the opportunity to participate.

I too found it useful to have an opportunity to discuss with you some of our mutual problems. As you know, there are many difficulties connected with settling a new unit into place. However, I am sure that your top commanders at Air Division, whom I consider to be outstanding officers, will have a smooth-running organization in the minimum of time. I assure you that we, for our part, will give them all possible assistance during the adjustment period.

Incidentally, I would like to take this opportunity to let you know how pleased I am with the Canadian officers and airmen being sent to Europe. Without exception they have been of the highest calibre, and they are making a significant contribution to our common effort. You may be justly proud of them as representatives of Canada.

Again, thank you for your thoughtfulness. My very best wishes to you.

Yours sincerely,

(sgd.) Lauris Norstad,  
General, USAF,  
Commander-in-Chief.

# SGT. SHATTERPROOF'S LIPS ARE SEALED



It was two o'clock. The warm sun, aided by a hearty lunch, was filling the office with somnolence. Before her typewriter, Hildegarde had been struggling valiantly to maintain the erect position expected by the Canadian taxpayer of its Civil Servants during working-hours. But it was a losing fight. She was sagging badly, and the brisk chatter of her keys had slowed to the conversational speed of a Trappist monk. All that now sustained her was her corsetry. Within it, one felt, Hildegarde's hundred and eighty pounds of womanhood had long since ceased to quiver with zeal for the Nation's welfare.

Nor, I must admit, was my own case much better. Lacking corsets, I slumped unashamedly at my desk. My only concession to appearance was the Hand of the Thinker, strategically overshadowing the Bent Brow. The fact that the brow was bent over one of dear old Group Captain Heavywater's little gems may, of course, have had something to do with the editorial torpor. The manuscript was entitled "Fun with Hydrogen: an Atomic Primer for Service Tots," but I question if even the comparative frivolity of Kant's "Critique of Pure Reason" could have afforded me much in the way of belly-laughs on such an afternoon. It is a mere legend, circulated by disgruntled writers, that editors are the only children of Nature whom the mating-season leaves unmoved.

I opened my eyes and, without waking Hildegarde, eased out of the office. Once in the sunlight, I paused briefly to check up on the technique of an amorous chickadee, and ambled on towards the canteen. Presently, armed with a cup of black coffee, I was sitting on a rock at the far end of the Island, looking out across the swiftly-flowing waters of the Ottawa River.

A mile or so away, the Parliament Buildings roosted on their hilltop perch. Being notoriously

ill-informed on anything relating to current affairs, I did not know if the members were laying at that moment. Nor did I care. In my mellow mood, not even Hansard could have shaken my conviction that God was in his Heaven and all was right with the world. I caught myself hoping drowsily that Sir John A., up there on his pedestal, wasn't perspiring too freely in his bronze coat and trousers.

I must have snoozed off; for, the next thing I knew, the Fathers of the Confederation were pointing out to me, in a sort of Gilbert-and-Sullivan chorus, that Abraham Lincoln gave his second inaugural address in 1865. Although they informed me, they were now in the Upper House, they still kept their fingers on the pulse of public affairs, and they'd been a bit put out by reading on page 32 of the March issue of "The Roundel" that their distinguished contemporary wasn't going to give that particular address until 1965. "In fact," remarked Mr. Tupper, "we understand that the incident has occasioned no little unrest in the American Compound. If the prime purpose of 'The Roundel', Sir, is the creation of international incidents—"

That all-too-familiar phrase awakened me with a start. I lifted my head. There, sure enough, monolithic and censorious, the bulk of Sgt. Shatterproof loomed in majesty above me. I received the unpleasant impression that he had been talking for some time.

"So, Sir, at last we come to! We emerge from our coma. We intend, no doubt, to step briskly back to our office with the air of a man returning from an important conference. We shall speak sharply, no doubt, to the loyal girl who, worn out by her labours on our behalf, sleeps the sleep of the exhausted before her smoking typewriter. But, Sir, though the world may be deceived, a Shatterproof is not!"

I rose to my feet.

“Hello, Sergeant,” I said, without much enthusiasm. “How did *you* find me?”

“The grapevine,” he said, in the sort of voice that an F.B.I. man might use to an axe-murderer. “But have no fears, Sir. The matter will go no further than the eight-hundred-odd people on Victoria Island. My lips are sealed.”

I forebore from remarking that I wished this last statement was true. Instead, I asked him what brought him here.

He gazed at me coldly.

“If, Sir,” he began, “the prime purpose of ‘The Roundel’ is the creation—”

I held up a hand.

“Mr. Tupper has already told me that,” I said. “And, anyway, it was a misprint. Surely that’s not all you came to Ottawa for?”

He paused.

“No, Sir, it is not. I come on a mission of mercy. Stirred by the havoc wreaked on our Station by the alliance between Nursing Sister Bussable and the Spring, I have decided to reveal to the world one of Goody Shatterproof’s most secret recipes.”

“Goody Shatterproof?”

“No other, Sir. Goody Shatterproof, the Hen-Wife of Hartlepool — and one of my most distinguished ancestors. She was the mother of Mastiff Shatterproof, the founder of the Canadian branch of my family. Mastiff, if you recall your history, left his fishing-grounds on the Dogger Banks and emigrated to Canada somewhere in the fifteen-twenties. He was one of the first men to wave to Cartier when the latter arrived in the Gulf of the St. Lawrence.”

“Indeed? But this recipe you speak of . . . ?”

He looked around him with great care, as though to ensure that he was not observed. Then, after effecting an entrance into the inside breast pocket of his tunic, he produced a piece of paper, which he unfolded. Eyeing me solemnly over the top of it, he said:

“You are about to hear, Sir, the sovereign specific against Spring Fever. Being a man of iron self-control, I have not myself found it necessary to try out its virtues. None the less, it has been used in my family for centuries with unqualified

success — and mine has been no small family.”

That did not sound to me as though the success had been quite unqualified; but I said nothing. Shatterproof removed his pipe from his mouth, cleared his throat, and began:

“‘Take of chicken’s liver three parts, and with this you are to compound two hairs from a bishop’s cassock, taking care only that he be not a dissenter. Then — ’”

At this point a jarring voice from behind interrupted us.

“Hey, here’s yer tea, Sir. Bin lookin’ for you all over. Why cancha stay put?”

We swung round. It was Claudette, our messenger-girl, whom to see is — well, if not to love, at least to think about for more than a fleeting instant, but whom to hear is to envy the deaf.

I took the tea and thanked her, doing my best to avoid noticing the fact that her nylon blouse seemed to be superimposed on a slip only slightly less sheer. My tact, however, was uncalled-for. Claudette’s glance was for Sgt. Shatterproof alone.

“Hi there, Muscle-bound,” she said. “Long time no see. Where yer bin hiding?”

Then, with a flirt of her flower-print skirt, she tripped away away, humming “Don’t Let the Stars Get in Your Eyes.”

A glazed expression entered the old wardog’s eyes. Goody Shatterproof’s recipe dropped from his fingers. Holding his Q.R. (Air) between his knees, he straightened his cap, adjusted his tie so that the frayed edge was concealed, hastily relit his pipe, and squared his shoulders.

“If you will excuse me, Sir,” he said, “I must be going. I have just recollected something rather important.”

With that, he gave me a hurried salute and marched off in the direction of the Test House, around whose corner Claudette’s astonishing legs were at that moment bearing her.

I called out after him:

“Wait a minute, Sergeant! What about Goody Shatterproof?”

The reply that came to me over his shoulder betrayed little respect either for his own ancestry or for the editorial taste.

# MANNING THE FORCE

By Squadron Leader W. H. Cleaver

*(Shortly after the appearance in "The Roundel" of his article on photographic survey, Sqn. Ldr. Cleaver was transferred from No. 414 Squadron to A.F.H.Q., where he exchanged the hardships of the Far North for the comparatively sybaritic environment of the Directorate of Personnel Manning. He has now been in charge of R.C.A.F. recruiting publicity and advertising for more than two years.—Editor.)*

ONE OF THE MOST important jobs in the R.C.A.F. today is that of bringing the Air Force up to the strength required by Canada's commitments as a member of the United Nations and a signatory of N.A.T.O. The Service is being called upon to expand at a rate never before demanded in time of peace. Despite the fact, however, that Canada has only a limited pool of manpower, and despite the fact that the other armed forces, industry, and the professions, are competing with us, this expansion is being steadily achieved.

The Directorate of Personnel Manning, which forms part of the Personnel Division, is a relatively small organization. This directorate administratively and functionally controls twenty-two R.C.A.F. Recruiting Units located in key cities and towns across Canada. Each of these units is a self-contained entity, with its own commanding officer, but each is assigned to a parent unit (generally the nearest R.C.A.F. station) for accounting and supply purposes.

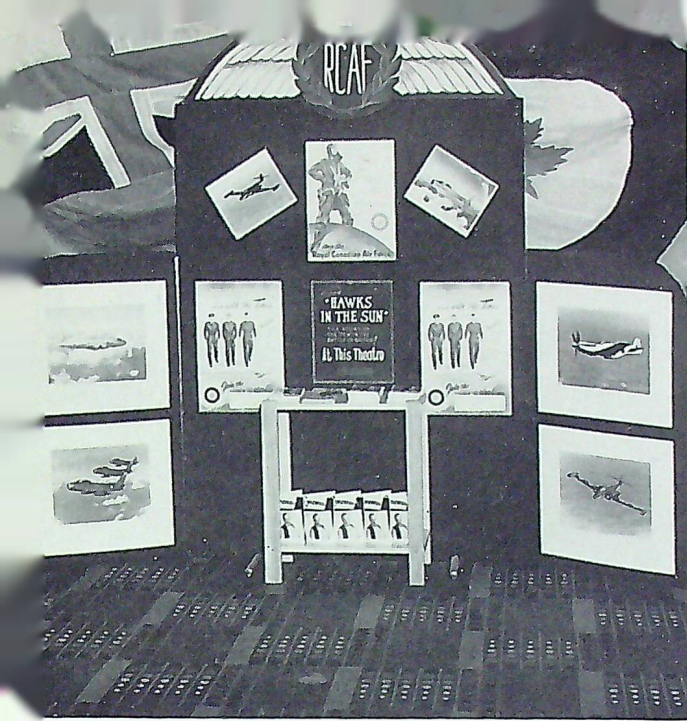
In order to staff the Recruiting Units, officers, airmen and airwomen are specially selected from all of the various trades and branches in the R.C.A.F. Recruiting personnel are chosen for their appearance, personality, trade proficiency, and ability to meet the public. They must possess sales ability and considerable experience of and pride in the Air Force. They must have at their finger-tips all the facts concerning Air Force life and its career possibilities, and they must be aware of the value of good public relations. In addition, the recruiter must know his territory as well as a salesman knows his, and he must cover

that territory constantly. It is a proven fact that mobile recruiting, as conducted from the Recruiting Units, produces well over half the enrolments in the R.C.A.F. today. In support of his activities, the recruiter has a strong, planned advertising campaign; valuable assistance from public relations officers at A.F.H.Q., commands, groups, and stations; and invaluable aid from his parent unit. His job has a high priority in the estimation of all his superior officers.

Recruiting personnel work hard. Theirs is not a task which confines itself to strict "working-hours," as most of us understand the phrase. When

*Waiting-room at the Saint John, N.B., Recruiting Unit.*





*Recruiting display in Calgary theatre.*

he is "on the road," the recruiter does a lot of travelling; he interviews prospective recruits with whom he can talk only in the evening; and he visits Air Cadet Squadrons, Service Clubs, Association Wings, and Royal Canadian Flying Clubs. He assists in all recruiting for the Auxiliary and the Reserve, he enrolls personnel in the various university plans, and he interviews candidates for the Canadian Services Colleges. The Recruiting Officer is often a member of the university interview boards to which undergraduates apply for assistance upon joining the R.C.A.F. as cadets and potential officers. He is a career counsellor in high schools, where he shows films and, in co-operation with school guidance officers, gives lectures upon the various phases of Air Force life.

None the less, recruiting has its lighter moments, particularly when a mobile unit is on the road with its vehicle. The vehicle, we might interject here, can be the familiar "pie-wagon," an aircraft, bus, or train. It can even be — and, on the east and west coasts, often is — a sea-going dory or launch.

\* \* \*

Recruiting in the Yukon and North-West Territories is carried out by air from the unit at Edmonton. The Queen Charlotte Islands are canvassed from Victoria, the Magdalen Islands

from Summerside, and the outports of Newfoundland and Labrador are visited from St. John's. All of these far-away places have yielded recruits for the R.C.A.F., and the trips made to bring the willing applicants into the fold have provided many a laugh.

For instance, when the Zoo Train visited Nanaimo B.C., the local radio station took its listeners on a tour of the cages by remote control. At one point the broadcast came out as follows:

" . . . and here is the bronze-bottomed baboon, a native of the Cameroons. This fierce-looking animal subsists on a diet of grubs, fruit, birds' eggs, etc. . . . and here is Flight Lieutenant Hugh Campbell, your R.C.A.F. Career Counsellor."

On another occasion, a mobile recruiting officer disappeared while en route to an evening speaking-engagement. The driver was astonished when the officer stepped from the vehicle at the side of a country road—and dropped from view, apparently into the bowels of the earth. The earth's bowels in this instance turned out to be about six feet deep and full of muddy and malodorous water. (How genuine the driver's astonishment really was, has not been discovered.)

*Mobile recruiting by sea.*





*Briefing before a mobile trip from Victoria.*

Application forms R332, which are undoubtedly crystal clear to their designer, apparently baffle some applicants. Before its revision, the form required information as to "Father's Employment — Type of Work and Description." A good answer was: "Plumber — Short and stout with a red face."

Fort William reports that game on the road in that area is always a hazard. In the fall of the year, a moose in the road is an obstacle not to be taken lightly, for it seems that, at that season, the bull moose regards anything that moves as a worthy opponent. The Recruiting Unit's vehicle is not considered to be a match for an amorous bull moose, and orders call for a hasty retreat from such encounters. Hotels in the hinterland of that area are not quite in the Waldorf class, and sometimes ptomaine poisoning offers a serious threat. Despite the rugged conditions, however, hospitality is second to none. In fact, it can, on occasion, be somewhat overwhelming. A recruiting officer is seldom a match for the hard-drinking logger, in town on a spree, who insists that one have a drink

with him and who won't take "no" for an answer — being all too willing, indeed, to use force to ensure that his hospitality is not avoided.

During a mobile recruiting visit to an Eastern Nova Scotia town, the temporary recruiting office in the town hall was invaded by a group of about twenty boisterous youths. They were all given the general information regarding enrolment in the R.C.A.F., and classification tests were passed to each one. At this point, in spite of warnings by the recruiting officer, everyone opened his test form and started talking to his chum. Just as the officer was about to give up trying to maintain order, the largest member — and apparently the leader — of the group stood up and requested permission to say a few words. It was granted, and for the next five minutes the ears of the recruiter were assailed by some of the choicest language ever heard in that not-too-puritan town. The gist of the speech was that from now on everybody was to do as the officer said and any character who didn't would be taken outside and given

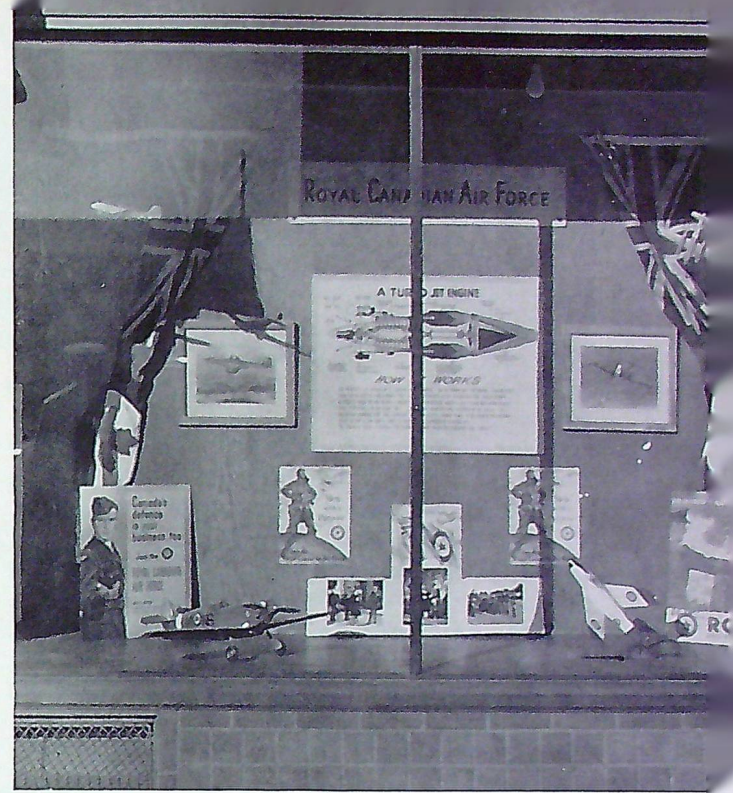
something to convince him as to just who was the leader of the — town Second Avenue Gang. From then on the testing proceeded in silence and according to prescribed rules. Unfortunately, when the results were tabulated, only one man had passed, and he wouldn't join without his pals.

Again, the annals tell how the recruiting officer from St. John's, Nfld., waited all night for a train which was due to leave at 2200 hours and finally departed at 0700. On finding his berth already occupied by a snoring human, he made inquiry and found that he was on Thursday's train which was exactly three days late.

Our recital of recruiting *curiosa* might be continued almost indefinitely, but space does not permit. We therefore bring it to a close with two small items of information that may interest the reader. The first is, that the vehicle which is used to drive from island to island in the Magdalens at low tide has to be desalted after every trip; the second, that the longest mobile recruiting trip was made by an officer from Halifax who, on his way to Tokyo via the No. 426 Squadron airlift, interviewed a prospective G.C.A. operator stationed as a civilian with the U.S.A.F. at Shemya in the Aleutians. The man was very experienced and had already applied by letter to Ottawa.

\* \* \*

Because of the thorough and enthusiastic operations of our recruiting personnel, the R.C.A.F. has grown in the past two years from a force of 20,120 to its present strength of more than 40,000. However, we must still keep growing, and the road ahead may be somewhat more difficult. Thus, it is up to every member of the Service to see that we reach our objectives and that we maintain our



*Edmonton window display.*

progress. Each of us should be conscious of the immense importance of recruiting and should be ready at all times to impart correct information about the R.C.A.F. to anyone who shows interest. Every officer, airman, and airwoman, should be a living advertisement for the R.C.A.F., should understand the recruiting organization, and should know the location of the Recruiting Unit nearest his or her place of duty. If every fourth person in the Service were to bring in one recruit during 1953, our strength would be increased by 10,000.

With the active support of everyone in it, the Force will soon be manned.

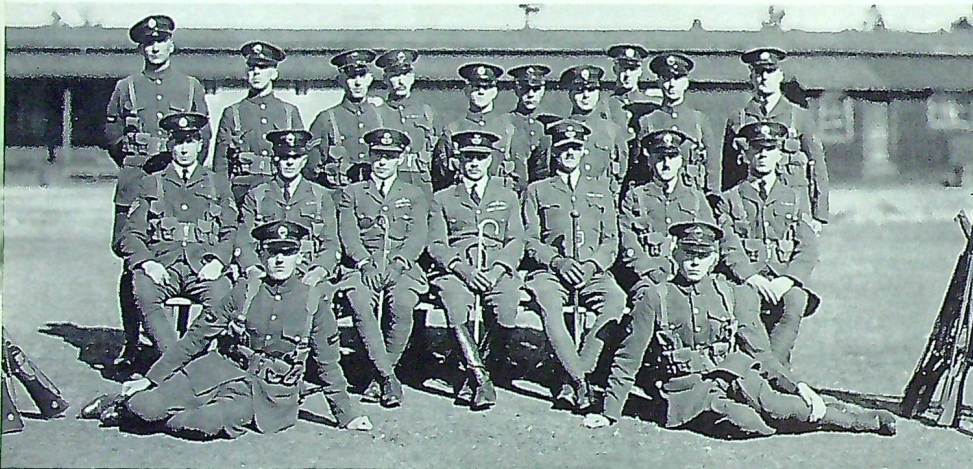


# Pin-Points in the Past

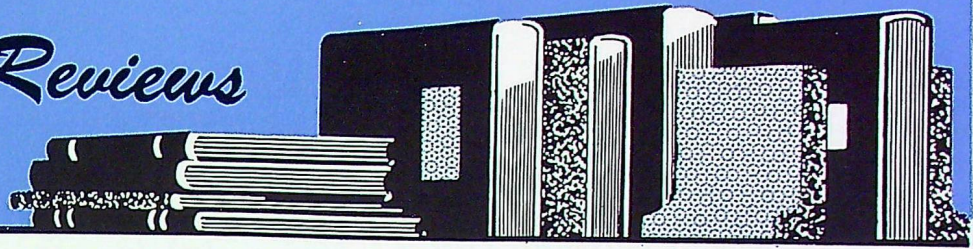
From Group Capt. J. B. Boyd we have received the accompanying photograph of the N.C.O.'s Drill Instructional Course at Camp Borden in 1928. Only one of the men shown in the group is still in the Service — L.A.C. J. D. Syme, who is now Group Capt. J. D. Syme, M.B.E., Commanding Officer of R.C.A.F. Station Camp Borden. Left to right are: (standing) L.A.C. Sameh (Sgt., deceased), Cpl. J. R. Sherwood (Flt. Lt., retired), Cpl. R. H. Barr (Flying Officer, ret.), Cpl. J. L. McKeown (Sgt., dec.), Cpl. Cameron (released), Cpl. W. Wilcox (Flt. Lt., ret.), Cpl. J. R. E. M. McPartlin (Flt. Lt., ret.), Cpl. W. Neal (Flt. Lt., ret.), Cpl. E. E. Murphy (Sqn. Ldr., ret.), Sgt. F. Lund (Wing Cdr., ret.); (seated)

Sgt. R. C. Kent (Flying Officer, ret.), W.O.2 J. Wibberley (Sqn. Ldr., ret.), Flt. Lt. G. R. Howsam (Air Vice-Marshal, ret.), Wing Cdr. G. M. Croil (Air Marshal, ret.), W.O.1 L. J. Dyte (Sqn. Ldr., ret.), W.O.2 J. B. Boyd (Group Capt., ret.), Sgt. B. Holdsworth (W.O.1, ret.); (on ground) L.A.C. Bradley (Cpl., rel.), L.A.C. J. D. Syme.

The second photograph, taken at the Isabella St. siding in Ottawa, shows the departure of No. 110 (Army Co-op.) Squadron for England in February 1940. Left to right are: Flt. Sgt. (W.O.1) and Mrs. R. L. Kritsch, Flt. Sgt. (W.O.2) and Mrs. D. R. Baker, Flt. Sgt. (Flying Officer) and Mrs. L. A. Bailey. Army Medical and Dental Corps personnel are leaning from windows behind Flt. Sgt. Baker, and L.A.C.'s Oleskovis and Young are visible above the bowler hat of the man at right of group.



## Book Reviews



### THE AMAZING LIVES OF "SOS" COHEN

A Book Review by Wing Commander F. H. Hitchins, Air Historian.

ANTHONY RICHARDSON'S new book\* should be required reading for those who framed and those who administer article 15.17 of Q.R. (Air). A wing commander on the flying list is to be retired at 49 years of age. What nonsense for a man like Wing Commander L. F. W. Cohen, D.S.O., M.C., D.F.C.! At 69, when he should have been rusticated in retirement for two decades, "Sos" Cohen was out flying on operations with a crew almost young enough to be his grandsons. On the eve of his 70th birthday he received the D.F.C. on the recommendation of his A.O.C.-in-C., a youngster of 46, who had not even been born when Sos put up his first campaign ribbon.

From 1883, when he first cheated death in a boating accident, until 1944, when he again evaded the reaper on a burning Halifax, Sos Cohen's life was adventure spelled with a capital "A" ("A" for "Africa" at first, and later "A" for "Air"). His career was more than a few crowded hours; it was six decades of brimming years.

Born in 1874, the son of a prosperous shipping-merchant of Newcastle-on-Tyne, the boy was officially named Lionel Frederick William Cohen, but his schoolmates gave him the nickname "Sos"

(derived from "Sausage") which stayed with him throughout his life. His boyhood passed in a very comfortable Victorian setting, brightened by boyish dreams aroused by visits to his father's cargo ships. One might see the hand of destiny in the boating accident that happened to Sos when he was eight, for it was a young African lad that saved him from drowning.

On the death of the father the family moved to London, where 14-year-old Sos began a new life as a clerk in the office of a general merchant. But the lad, dreaming of far-away places, was not to be put off with a desk job, checking inventories and prices of goods that came from those lands; he ran away and, lying about his age, took the Queen's shilling as a recruit in the Royal Marine Light Infantry. For three months he was happy in his new life in the barracks at Deal, until his family located him, bought his discharge, and for punishment (as they thought) shipped him off to Africa to the care of an uncle in Johannesburg. To Sos it seemed the realization of his boyhood dreams.

But the pot of gold at the rainbow's end had not yet been reached. In Jo'burg, a settlement of corrugated iron shimmering under a film of red dust, Sos was again assigned to desk jobs; and again he rebelled. He joined the police guard engaged on smallpox quarantine, distinguished

\*Anthony Richardson: *The Crowded Hours — The Story of 'Sos' Cohen*. Foreword by Marshal of the Royal Air Force Sir John Slessor, G.C.B., D.S.O., M.C., Chief of the Air Staff. Max Parrish, London; 1952. Pp. 247; frontispiece and maps. Distributed in Canada by Clarke, Irwin & Company Limited, Toronto. \$3.25.

himself by checking, single-handed, a break from the native camp, and then was clapped in jail for falling asleep on duty.

When his fine was paid by his uncle, Sos left Johannesburg and, still pursuing the will-o'-wisp adventure, tramped north to Pretoria. There he was quickly rolled of his last penny and forced to take a job as waiter in a hotel. Sacked from this job when he dumped a bowl of soup on the head of an obnoxious guest, Sos went back to clerking again with a mining company until the mines closed. Then he took to the road once more, heading north to Victoria in Rhodesia. En route the 17-year-old youth came face to face with a lion — and learned that the only thing worse than having no rifle was having an empty one.

In Rhodesia, Sos's dream of adventure at last became a reality. Enlisting as a volunteer trooper in the Victoria Column of the forces of the British South Africa Company, he saw action in the Matabele War of 1893, fighting against the *impis* of King Lobengula. Sos came out of the campaign with malaria, and the first in a long row of medal ribbons for four wars — a row to which, half a century later, the D.F.C. was added.

There had been adventure, but no pot of gold. Returning to Cape Town, he tried his hand at selling jewellery and boots and working on a newspaper before going home to England for a brief visit. In 1897 he was back in Africa, working again for his uncle in Johannesburg as director of several mining companies. His feet were still restless and, striking out once more on his own, Sos went to Delagoa Bay in Portuguese East Africa, where he entered into a partnership with a German ship-chandler and butcher. Young Cohen prospered at cattle-trading until his partner began to drink too heavily and "the element of enterprise and adventure" began to recede from the business. Moving on again, up the coast to Chungwani, he became a contractor recruiting native labour for the gold mines. It was a profitable business, but three times it almost cost Sos his life. Once he had to subdue a drunken, spear-waving African chief. Then he was bitten by a deadly green mamba snake and was saved only by the bravery and quick thinking of his negro servants. Hardly had he

recovered when his life was again placed in jeopardy by a strange case of mistaken identity. While riding alone through the bush, Sos was picked up by a Portuguese patrol in the belief that he was a German gun-runner and leader of a native revolt. Sentenced to death, he was saved from the firing squad at the last moment by a chance encounter with a Portuguese official whom he knew.

While Sos had been prospering, and cheating death, in Portuguese East Africa, relations between the British and Boers in South Africa had been going from bad to worse until, in October 1899, war broke out. His offer of service brought him a very unusual and dangerous assignment — to patrol the border between Mozambique and Transvaal in order to prevent gun-runners or enemy agents getting across to the Boers and also to pick up information for the British intelligence. It was the sort of work Sos loved — out in the bush as his own master. As leader of a force of native irregulars, he kept guard over 300 miles of frontier, intercepted contraband and saboteurs, and outwitted raiding parties (commandos) of Boers who had vowed to capture him. After a time the need for the border patrol diminished, and Cohen joined the Rand Rifles but saw no further action before hostilities ended.

After the Boer War, Sos settled down (at last!) in Johannesburg, became a member of the Stock Exchange, married an actress from a touring theatrical company, and began to build up a fortune. It was at this time that he made his first ventures into the air. A flight in a barn-storming biplane (1000 yards in two hops at "the dizzy height of some 25 feet") was uneventful, but a balloon ascension with a famous aeronaut (for which Sos paid a fee of £60) almost ended in tragedy. While the passengers regaled themselves with copious drafts of champagne, the balloon rose to 16,000 feet and drifted towards the mountains as daylight waned. When the time came to descend it was discovered that the gas release cord had come adrift from its cleat and was floating far out of reach of the basket. To retrieve it, Sos made a perilous climb up the rigging to the gasbag where he was able to grasp the cord. The descent down

the guy ropes to the tilted and swaying basket was even worse than the ascent.

For a decade "the tempo of his life was serene," and Sos prospered. Then, overnight, his fortune was wiped out by the bankruptcy of several of his clients. Forced to leave the stock exchange, Sos, now nearly 40 years old, started over again from the bottom, working as a "learner" miner at five bob a day. And again the cold hand of death clutched at him — and missed. A rock fall in a gold mine took the lives of 18 men and buried him under debris for two hours. A lad at his side was killed, but Sos received only severe bruises and an injured ankle. A week later the First World War broke out.

Commissioned as an officer in the First South African Horse, Sos served in General Van Deventer's Mounted Brigade in the campaign against Von Lettow-Vorbeck in German East Africa. He distinguished himself in a brisk little action in which his troop captured an enemy force of over 400, and then was employed chiefly on reconnaissance work to locate the very elusive foe.

In June 1916, when a squadron of the Royal Naval Air Service was sent up to give air support to Van Deventer's brigade, Lt. Cohen was given the job of preparing, on very short notice, an airstrip at Kondoa Irangi for the use of its B.E.2c's and Voisins. The unit was short of observers, and, when it turned to the army for volunteers, Sos was quick to apply and was seconded for a time to the R.N.A.S. He made many reconnaissance flights in the lumbering Voisins and helped to select and lay out new airstrips as the brigade advanced in pursuit of Von Lettow-Vorbeck's forces.

When the R.N.A.S. was recalled to Egypt, Sos formed and led a small armed intelligence unit of 40 natives which became known as "Co-Force." Similar to the Long-Range Desert Group of the Second World War, "Co-Force" worked behind the enemy lines, gathering information, attacking outposts, dodging larger forces, and living off the country as it moved. At the end of 1917, when "Co-Force" was disbanded, Cohen became liaison officer at Portuguese headquarters in East Africa. The only redeeming feature of this job was an opportunity to make a daring boat trip through

enemy-held territory to deliver ammunition to a hard-pressed British unit. Dispirited by staff work, Sos applied for a posting to more active operations in Europe, but the war ended before he got there. The calibre of his services in the East African campaign was indicated by the award of the D.S.O. and M.C. to join the ribbons of his two previous wars below the half-wing brevet of an observer which now adorned his breast.

The war over, Capt. Cohen returned to England, joined a firm of stockbrokers and again settled down — but only briefly. Appointed managing director of the Mozambique Oil and Mineral Concessions, Ltd., Sos did not require any urging to go back to Africa to prospect for the company's mineral resources. He didn't find them, but he did find more crowded hours of adventure, highlighted by two face-to-face encounters with lions. The company was soon wound up; a venture in cotton-planting in Mozambique ended when the bottom fell out of the market, and in 1926 Sos went home to England to settle down once more. Acquiring an estate in Sussex, he spent thirteen happy, prosperous years with his family, commuting to the City to his seat on the Stock Exchange.

During these years he played an active and leading part in organizing the R.A.F. Ex-Officers Reserve, which was taken over by the Air Ministry in 1937 and renamed the R.A.F. Volunteer Reserve. One suspects that it was the hand of Sos Cohen that drafted one qualification of the Ex-Officers Reserve — "no age limit for members." Lionel Cohen, D.S.O., M.C., was appointed pilot officer in the Administrative and Special Duties Branch of the R.A.F.V.R.

When the war began in 1939, Sos was crowding 65, but "the evergreen of youth (was) still thriving within the mind" and he embarked eagerly on his fourth campaign. His position of R.A.F. Coastal Command liaison officer at the Admiralty appeared to be another staff job; but not for Sos Cohen. He became a "trouble-shooter," finding out why units didn't produce expected results. As Sir John Slessor writes in his foreword, Sos's idea of checking on the training of air gunners in a unit was "to sit in the tail turret of a Liberator for about

fourteen hours in mid-winter over the North Atlantic on a convoy escort." Sos was still courting adventure and finding it. An aircraft in which he was flying caught fire; an R.A.A.F. Sunderland was holed by a U-boat that it attacked; and on his 69th sortie the engine of his Halifax was set on fire by flak from enemy ships. When he returned to base from this mission, Wing Cdr. Cohen was informed that he had been awarded the D.F.C. "in recognition of gallantry and devotion to duty in the execution of air operations."

"It was stretching pretty far the terms of reference of a liaison officer at the Admiralty," writes Sir John Slessor, "to have him constantly flying on operational sorties. But it paid off handsomely . . . He was an inspiration to all of us, in the Headquarters and in the squadrons. One just could not keep him out of the air. I have never put up a recommendation for a D.F.C. that I thought more well-deserved than for old Sos in his seventieth year. A wonderful culmination to a life of daring adventure . . ."

## Grostenquin's Boulevardières



"WHAT!" explained Cpl. Twitterwhistle, looking up at the Sergeant from the newspaper he'd just handed her. "Me? Envious? Why, I wouldn't give anything but my right arm to be there!"

She glanced again, green-eyed, at the "Moose Pelvis Monitor," on whose front page LAW

*LAW Irene Howe takes her first steps on French soil.*



Susie Dimplechuk, one of Moose Pelvis' most winsome daughters, was shown stepping starry-eyed along the Champs Elysées. Then, after a silence broken only by the beating of rain against the Orderly Room window, she murmured:

"Poor old Suzie! Just think of her missing our lovely Canadian spring! I wouldn't —"

Her soliloquy was interrupted at this point by a growl from the Warrant Officer:

"If you don't get busy, Corporal, you'll be missing a lovely Canadian forty-eight. What d'you think this place is? A home for frustrated glamour-girls?"

Cpl. Twitterwhistle checked an impulse to correct him and tell him what she really thought. Instead, she sighed the sigh of one who was meant for finer things, and went back to her job of editing Sqn. Ldr. Malarkey's travelling-claim for his latest bout of T.D. in Florida.

\* \* \*

For the benefit of all the other airwomen who have not yet made the acquaintance of Paris in the spring, here are a few photographs of some of the girls who were recently posted to No. 2 Fighter Wing at Grostenquin and who were lucky enough to have a little time off in Paris on the way there.



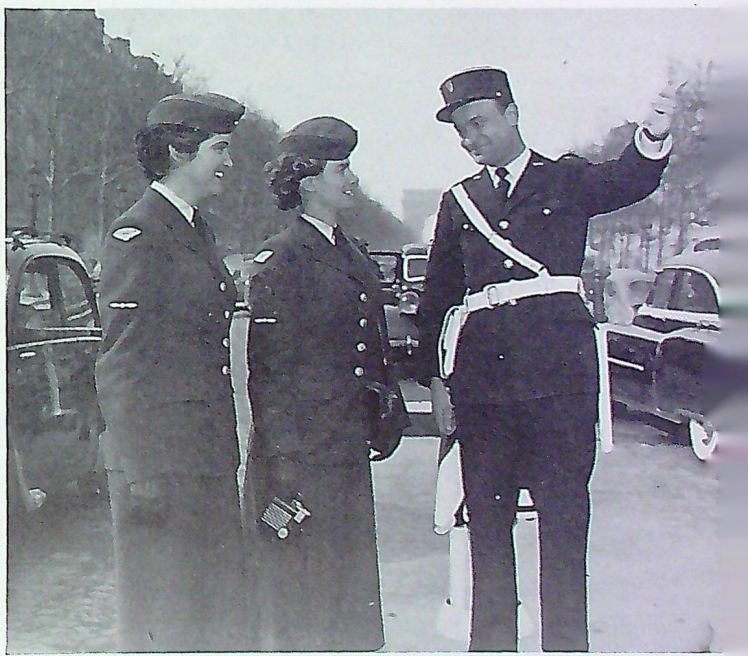
*Vie de Bohème. (L. to r.) LAW Thelma Morton, LAC N. Laforce, LAW Margaret Spencer, and Cpl. F. McKenna, drink a toast to France.*



*An excursion was made to the fashion houses of Schiaparelli, Dior, and Fath. At one of them, A.W.I Isobel McIntyre modelled a gown for (l. to r.) Phyllis Sinclair, Irene St. Jules, Margaret Longmoore, and Marion Page.*



*(L. to r.) Shirley Anderson, Donna Elliott, Marie Brown, Eunice Reiboth.*



*"Tout droit, mam'selle!" Thelma Morton (left) and Margaret Spencer.*



## THE MEANING OF PUBLIC RELATIONS

By Squadron Leader William M. Lee, Chief Public Relations Officer (R.C.A.F.)

*(The author of this article joined the R.C.A.F. in 1943, at the age of eighteen. Trained as a navigator, he served with No. 45 (Air Transport) Group of R.A.F. Ferry Command, based at Dorval. In 1946 he was sent as public relations officer to Central Air Command, Trenton, and later joined the directing staff of the Composite Training School. After a year in the latter job, he was posted to the Directorate of Public Relations at A.F.H.Q. In 1948 he attended the U.S. Armed Forces Public Relations School, where he topped his course. Sqn. Ldr. Lee, whose voice has often been heard on the air, has also appeared on television in this country.—EDITOR.)*

**W**HAT is Public Relations? What does it do? Why do we have it in the R.C.A.F.?

These questions are by no means rare, for Public Relations is undoubtedly one of the most misunderstood, or "un-understood," activities of the Royal Canadian Air Force.

There is no great mystery as to why this is the case. Like the Air Force itself, Public Relations as a profession is new. It is a product of the twentieth century; actually, a post-First World War phenomenon.

Only during the past thirty years have industrial leaders come to realize the tremendous impact of public opinion on the life and prosperity of business. The goodwill of the people can no longer be bought purely by high-pressure salesmanship and costly advertising campaigns.

But so that there will be no misunderstanding, let us state now what Public Relations is NOT. It is NOT press agency, it is NOT Hollywood whoop-

de-do, it is NOT propaganda (in its present connotation), and it is NOT strictly press liaison. Public Relations counsellors are NOT "gag-men," "build-up boys," or any of the other publicity quacks who masquerade in the shadow-land of Public Relations. What these people fail to realize is the now-accepted fact that TRUTH must be the basis for any sound Public Relations programme.

Lincoln's "You can fool some of the people all of the time and all of the people some of the time, but you can't fool all of the people all of the time" has become platitudinous, but it remains a basic maxim for Public Relations.

Public Relations is the profession of gaining for an organization the reputation it deserves. Good Public Relations is not synthetic. It must be built upon high standards of performance. No amount of false publicity can hide, indefinitely, poor quality from the eyes of the people. And we in the R.C.A.F. need have no fears in this respect. I

don't think any of us would dispute that the Air Force is a basically sound organization, composed of men genuinely interested in doing a good job in this country's defence programme. The Air Force is not perfect; very few things or people are. But there is more than pride in the Service to back up the statement that the R.C.A.F. is a formidable member of the N.A.T.O. air arm, and well worth being accepted into the normal pattern of Canadian life in these trying times.

Unscrupulous leaders in totalitarian countries can obtain acceptance of their armed forces by a volatile campaign of lies, threats, and terrorism. In a democracy, the Services must obtain public support by taking the people into their confidence, and that entails Public Relations and its major weapon, publicity.

But before going any further, let me make a categorical statement: PUBLICITY FOR PUBLICITY'S SAKE IS WRONG. There must be some purpose to any organized publicity. It must contribute something to the general Public Relations objective of the organization.

Now that brings us to the question: "What is, or should be, the Public Relations aim of the R.C.A.F.?"

I feel that the purpose of our Public Relations plan must be TO FOSTER PUBLIC UNDERSTANDING OF, CONFIDENCE IN, AND SUPPORT FOR THE R.C.A.F.

Before we can have the confidence and support of the people, we must present them with the facts so that they can assess and understand us. A modern air force is an extremely complicated technological organization. We must do everything in our power to make clear to the people how we operate, why we operate, and what we operate with. We must give them a complete understanding of what we are doing and how we are preparing for the defence of our country.

This can only be done by a frank and honest information programme. Despite the unrealistic contentions of some people, newspapers and radio stations do *not* have the vast number of reporters necessary to do the job. If the Air Force itself did not place information and facts at the disposal of news media, and assist them in gathering other stories, there is no doubt that practically the only

news of the Service conveyed to the public would be the more sensational items, such as top staff changes, new aircraft, 'plane crashes, and crime cases.

Practically all news editors now recognize this situation and encourage the Services to make information available to them. They know that most of their leaders, listeners, and viewers are also the wives, sisters, brothers, cousins, aunts, uncles, fathers and mothers, or simply friends, of men and women in the armed forces. They know that these people WANT to read about what their Servicemen are doing and why they are doing it. They know, too, that their customers are also taxpayers, sinking a lot of money into the National Defence budget, and that they want to know what they are getting in return for their hard-earned tax dollars.

We in the R.C.A.F. owe it to the people of Canada, the shareholders in our organization, to tell them, within the bounds of security, what is going on in their Air Force. Only in this way will we win and earn their respect, confidence, and support. Silence breeds only suspicion.

This is what General Lawton Collins, Chief of Staff, United States Army, has to say about the information phase of public relations:

"The responsibility of the Army is to make sure that the public has real information on which to base sound evaluation of its Army. The Army has nothing to hide, and nothing to fear, if it recognizes the public as a partner, as well as a boss; if it ignores the captious critic and assumes that public confidence is there for the making. But it cannot expect that confidence unless it is deserved. It is the responsibility of the commander to see to it that his officers and men conduct themselves in a manner that will win the public esteem, and that the military establishment has the high professional standards expected of it by the public. It is the job of the public relations officer to assist the commander in cementing this partnership with the public by providing accurate, full, and unbiased information, and by interpreting the profession of arms to a Nation which is eager to be proud of its Army."

The methods of informing the public are legion, and there is no need to go into details here. Suffice to say that the good P.R.O. will neglect no avenue in getting the facts to the people. News releases, press conferences, speeches, photographs, press stories, motion pictures, telecasts, radio broadcasts, house organs, magazine articles, tours, displays, open houses, newsreels, etc., are all outlets for information on the Air Force.

An important aspect of the P.R.O.'s job is to perceive the latent information possibilities of R.C.A.F. activities and developments, and present them in such a way that they will make the greatest possible contribution to the Public Relations programme. This often involves conceiving and organizing special events. For instance, for a variety of reasons, no special consideration was given to the first R.C.A.F. squadrons proceeding overseas in 1950, and very little public attention was attracted to the movement. But when No. 439 (Fighter) Squadron prepared to fly the Atlantic, a well-developed Public Relations programme was adopted. Preliminary news stories, tape-recorded radio interviews, photographs, and a large-scale farewell ceremony, were arranged with the Minister of National Defence, the Chief of the Air Staff, and a galaxy of reporters, photographers, announcers, television cameramen, and newsreelmen, in attendance. The result: very few people did not see, hear, or read about the flight of No. 439 Squadron to Europe.

Similarly, when the R.C.A.F. decided to accept women into the Service again, a simple announcement of the fact, which would receive momentary coverage and then be forgotten, was not considered enough. What better method to bring home to the people that the Air Force would again enrol women, than a fashion parade? And a fashion parade it was, with models, all the varied types of clothing the girls would receive, the C-5 as a backdrop, and the R.C.A.F. Central Band. Mix in a liberal dash of the newsmen similar to those who attended the departure of No. 439 Squadron, and you have national news coverage, including a cover-story in "Weekend Magazine," radio broadcasts, newsreels, and photo-stories all across Canada and in many foreign countries.

These are just two examples of how Public Relations planning can convert mediocre news occurrences into events of special national, and often international, importance.

Despite the undeniable importance of this information phase, the temptation to over-emphasize its true place in Public Relations must be resisted. Information is NOT the only responsibility of a Public Relations counsellor.

Community relations, weaving the Air Force establishment into the life of the community, must rate high on the P.R.O.'s priority list. A person in the R.C.A.F. is not a creature apart from his civilian friends just because he has donned a uniform. He is just as much an integral member of society as the milkman, the druggist, and the family doctor. It is the P.R.O.'s job to instill that understanding in the community.

Service personnel and their families should be familiar with the history, industries, and interests of the community. Similarly, the townspeople should understand why the air station is located in their area, what it contributes to their defence, and how it assists the economic prosperity of the community. Mutual community-Service problems, such as housing, education, recreation, public health, law enforcement, etc., are best solved when faced and tackled in concert.

There still exists in some quarters a misunderstanding of the rôle and purpose of the Air Force in peacetime. This misunderstanding, plus the major and minor frictions that arise between the citizens of the community and the men in uniform, can all be substantially reduced or eliminated by a sound community relations programme.

Again keeping in mind the objective of the P.R. plan (*i.e.* public understanding, confidence, and support), it becomes evident that no amount of publicity will counteract acts or deeds that do not "sit well" with the general public. No press release, radio broadcast, speech, or open house can overcome the ill effects of a decision that fails to take into account its impact on all segments of the public.

The Public Relations consequences of all proposed steps or decisions should be considered and developed along with the operational and logistics

factors. Anticipating public reaction to decisions at the planning stage is the POSITIVE approach to the problem of winning public respect and goodwill. This method is infinitely preferable to walking blindly into an awkward situation and then attempting to handle the adverse reaction with hastily improvised rebuttals and explanations.

This positive approach is no new theory. It is practised by practically all large business firms dealing in any way with the public. And the R.C.A.F. has developed into one of the biggest businesses in the country, with the added public responsibility of existing by the consent of the

people, from the standpoints of both finances and manpower.

The Canadian people now take a keen and critical interest in the R.C.A.F. They want an air force of which they can be justifiably proud. We are, in fact, giving them just that. But, they will never fully realize it if our Public Relations programme is not geared to the progress and accomplishments of the Service itself.

Public Relations — properly applied — will ensure that the public has a proper appreciation of the R.C.A.F.'s rôle in the national life of our country.

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## The Suggestion Box

*The Chief of the Air Staff has written a letter of thanks to the undermentioned N.C.O. for a suggestion which has been officially adopted by the R.C.A.F.*

Sgt. R. J. Day, of No. 6 Repair Depot, devised a new method of loading T-33 aircraft on to trailers for road transportation. By the use of cradles of his own design, he has made it possible to employ only one trailer per aircraft.

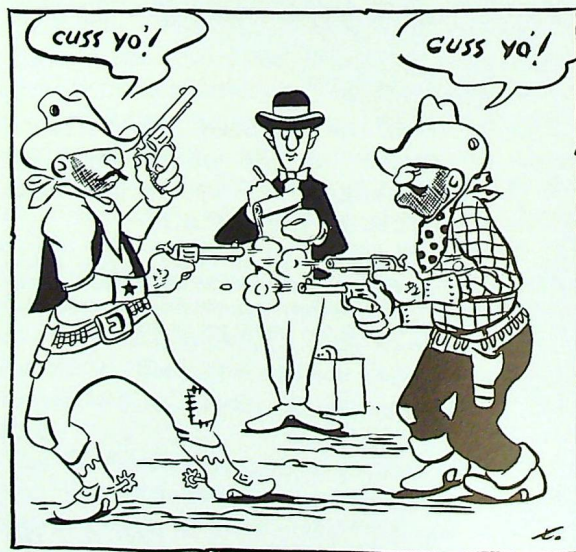


Sgt. R. J. Day

# ★ What's the Score?

It is said that, when the Defence Research Board was formed, the outline of the vanished crown on Sgt. Shatterproof's sleeve began to glow with a pure white light. The more mystically-minded among his admirers instantly deduced from this phenomenon that the new Board's first task would be a complete revision of R.C.A.F. promotion policy. Though later events — or rather, lack of events — proved them wrong on that score, there still seem to be many people who entertain only the haziest ideas as to how D.R.B. fits into the Canadian defence scheme. Mr. C. A. Pope, the Board's public relations officer, has therefore been kind enough to prepare us a questionnaire which may help to shed a little light on the matter. The Editorial Committee, for once, did pretty well on it, averaging sixteen points per member. Correct answers appear on page 48.

1. The Defence Research Board was formed in:
  - (a) 1939
  - (b) 1929
  - (c) 1942
  - (d) 1947
2. The Defence Research Board is the governing body of:
  - (a) Canada's equivalent to the U.S. Atomic Energy Commission.
  - (b) A Canadian scientific-industrial group.
  - (c) An organization concerned only with the development of weapons.
  - (d) A Federal organization sometimes called the "fourth Service."
3. The Chairman of the Defence Research Board is:
  - (a) Dr. E. W. R. Steacie.
  - (b) Dr. Kildare.
  - (c) Dr. O. M. Solandt.
  - (d) General A. G. L. MacNaughton.
4. The Defence Research Board's Chairman distinguished himself during the war for his:
  - (a) Atomic research.
  - (b) Operational research.
  - (c) Research in the field of physical chemistry.
  - (d) Development of the 17-pdr. anti-tank gun.
5. D.R.B. carries out research primarily for:
  - (a) The National Research Council.
  - (b) The Canadian Army.
  - (c) All Canadian government departments except D.V.A., External Affairs, and Finance.
  - (d) The three armed services.
6. D.R.B. employees are necessarily:
  - (a) Members of the Defence Research Board.
  - (b) Members of the Defence Scientific Service.
  - (c) Members of the Royal Canadian Scientific Service.
  - (d) Members of the Services' scientific staffs.
7. One of D.R.B.'s important activities is research on:
  - (a) Prairie warfare.
  - (b) Arctic warfare.
  - (c) Jungle warfare.
  - (d) Desert warfare.





8. D.R.B. is composed of a headquarters and a number of divisions each specializing in various types of research. These divisions are known as:
- (a) 1, 2, 3, and 4.
  - (b) Naval, Army, R.C.A.F., and Atomic.
  - (c) A, B, C, and D.
  - (d) Atomic Power, Armed Services, Public Health, and Arctic.
9. The guided missile project at the Canadian Armament Research and Development Establishment, at Quebec, is being carried out by:
- (a) The National Aeronautical Establishment.
  - (b) The R.C.A.F.
  - (c) D.R.B.
  - (d) Jointly by the R.C.A.F. and D.R.B.
10. The Institute of Aerophysics at Downsview, Ontario, is operated by:
- (a) The R.C.A.F.
  - (b) The University of Toronto.
  - (c) The National Research Council.
  - (d) D.R.B.
11. Canada's first wind tunnel was constructed in 1902 at:
- (a) Rothesay, N.B.
  - (b) Windsor, Ontario.
  - (c) Ottawa, Ont.
  - (d) Sidney Mines, N.S.
12. The R.C.A.F. Institute of Aviation Medicine at Toronto operates in daily association with:
- (a) The Toronto General Hospital.
  - (b) The Canadian Medical Association.
  - (c) The Defence Research Medical Laboratories.
  - (d) Sunnybrook Hospital.
13. Automatically an ex-officio member of the Defence Research Board is the R.C.A.F. officer holding the position of:
- (a) Director of Air Operations.
  - (b) Chief of the Air Staff.
  - (c) Director of Armament Engineering.
  - (d) Vice-Chief of the Air Staff.
14. The Scientific Adviser to the Chief of the Air Staff, a D.R.B. divisional chief, is:
- (a) Dr. G. S. Field.
  - (b) Dr. Kildare.
  - (c) Mr. G. M. Carrie.
  - (d) Dr. J. J. Green.
15. The Thomas L. Thurlow Navigation Award, the western world's most prized navigational distinction, was won last year by Keith Greenaway, who is:
- (a) A member of the Defence Scientific Service.
  - (b) An R.C.A.F. officer on loan to D.R.B.'s Arctic Section.
  - (c) A Department of Transport inspector.
  - (d) A T.C.A. pilot.
16. The Twilight Computer, a navigational aid designed for use during arctic flights, was developed by:
- (a) The R.C.A.F.
  - (b) The National Aeronautical Establishment.
  - (c) The Department of Transport.
  - (d) The R.C.A.F. and D.R.B.
17. The Canadian Armament Research and Development Establishment is:
- (a) D.R.B.'s largest laboratory.
  - (b) The R.C.A.F.'s most important research station.
  - (c) Operated by the National Aeronautical Establishment.
  - (d) Designed only for guided missile research.
18. The Defence Research Board:
- (a) Operates a small fleet of research aircraft.
  - (b) Has no aircraft on its establishment.
  - (c) Uses only R.C.A.F. aircraft manned by scientist-flyers.
  - (d) Carries out its research on civilian aircraft only.
19. The information on the ionosphere obtained in the field by D.R.B. scientists is analyzed by scientists at:
- (a) The Defence Research Northern Laboratory, Fort Churchill.
  - (b) The Radio Physics Laboratory, Ottawa.
  - (c) Air Defence Command Headquarters, St. Hubert.
  - (d) The Industrial Health Laboratory, Ottawa.
20. Canadian research in the field of motion sickness is carried out by:
- (a) McGill University.
  - (b) The R.C.N. and the Dept. of National Health and Welfare.
  - (c) The R.C.A.F. Institute of Aviation Medicine jointly with the Defence Research Medical Laboratories.
  - (d) The Institute of Aerophysics.

# ROYAL CANADIAN AIR FORCE

# Association



## THE YORK MINSTER MEMORIAL

THE WARTIME Minister of National Defence for Air, the Honorable C. G. Power, M.C., M.P., has extended his patronage to the drive for funds to provide a share of the cost of the York Minster Memorial. The memorial, which was described in the April issue of "The Roundel," is being erected to perpetuate the memory of Commonwealth and Allied airmen who lost their lives in the Second World War.

The following letter was received by Air Vice-Marshall A. L. Morfee, C.B., C.B.E., national president of the R.C.A.F.A., from Mr. Power.

"I am deeply grateful to you for calling my attention to the proposal to erect a memorial in York Minster to the members of Bomber Command who fell in the course of duty. The kindly consideration on your part which permits me to be associated with the R.C.A.F. Association in the pursuit of this laudable object is greatly appreciated.

"It was from the region surrounding the historic city of York that so many young Canadians with dauntless courage flew their last flight to bring honour and glory to Canada and undying renown to themselves. It is indeed appropriate that there should be placed within this ancient Cathedral a shrine to commemorate their deeds and those of their Commonwealth comrades."

Writing to Mr. Power, Air Vice-Marshall Morfee said:

"The memorial will be costly, but I know that a very considerable sum has already been subscribed from sources outside Canada. Our aim is to see that Canadians, in particular Air Force veterans and the kin of those who lost their lives, have an opportunity to participate. We feel that many will wish to, and in fact be anxious to, subscribe."

The chairman of the memorial committee, Air Vice-Marshall G. E. Brookes, C.B., O.B.E., has sent out letters and brochures on the shrine to the presidents of all Wings, asking for their support.

The drive is also being brought to the attention of Air Force personnel by means of letters to Air Officers Commanding as well as through the medium of Air Force Routine Orders.

## GROUP CONVENTIONS

Last month's Association section contained a brief report on the Maritime Group Convention, and this month we have reports from most of the remaining Groups. All Groups reported successful meetings, with enthusiasm at a high level. The resolutions passed will be considered by a resolutions committee to be consolidated before presentation to the National Convention in May.

*Ex-Air Force personnel of Sault Ste. Marie, who, after listening to an address by Air Vice-Marshall G. E. Brookes, C.B., O.B.E., decided to form a Wing. (L. to r.) J. Macquarrie, W. Lidkea, A. N. Shrive, G. W. Knudsen, Air Vice-Marshall Brookes, G. E. Russell, D. McKinnon, C. B. Guest, B. Wilton, A. Harnden, J. H. Buckley.*



### Quebec Group

Group President J. René Gauthier, Q.C., reported a year that was for the most part encouraging and successful. Wings took part in Air Cadet work, Air Force day observance, recruiting, *bon voyage* parties for R.C.A.F. personnel leaving for overseas, and many other activities. It was also noted in the report that members of the executive had made a point of visiting Wings in the Group on several occasions.

The night before the Quebec Group meeting in Montreal, a dinner and reception were held, which delegates and many special guests attended.

The executive for the coming year is as follows:

President:	J. René Gauthier (re-elected).
Vice-Pres. (Montreal):	Harold M. Feldman.
Vice-Pres. (Quebec):	Armand Lavigueur.
Vice-Pres. (Sherbrooke):	Frank W. Edwards.
Treasurer:	Bernard A. Gillies.
Secretary:	Wallace G. Phillips.
Members:	Rean E. Meyer.
	George R. Ellis.
	Mrs. Anita Charbonneau.
	Patrick J. Haberlin.
	Stanley Phillips.

### Ontario Group

For the first time, the Ontario Group this year held a two-day convention, meeting at R.C.A.F. Station Toronto. Detailed reports from all Wing delegates present were given, outlining the past year's activities. Delegates were present from the two new Polish Wings at Hamilton and Toronto.

It was decided to divide the Group into six different regions, with five or six Wings in each region, each to have a regional vice-president. It was felt this would make for better liaison between Wings, and that strong Wings would be able to help out the weaker ones.

The new executive is as follows:

Hon. President:	Air Vice-Marshal G. E. Brookes, C.B., C.B.E.
President:	H. W. R. Sayers.

*Presentation of Charter to No. 431 (Krakow) Wing in Hamilton, Ont. (L. to r.) S. Olszewski; Sqn. Ldr. A. C. Golab; Air Vice-Marshal A. L. Morfee, C.B., C.B.E.; Tadeusz Kajzer, Wing president; A. Majchrzyk, Wing secretary.*



Past President: H. C. Beaupré.  
 1st Vice-Pres.: T. K. Whitney.  
 Secretary: T. Eberts.  
 Treasurer: H. Kelly.  
 Vice-Pres.  
 (Northern Ont. Region): Ralph Christie.  
 Vice-Pres.  
 (Eastern Ont. Region): W. J. P. Frame.  
 Vice-Pres.  
 (Quinte Region): H. Wright.  
 Vice-Pres.  
 (Central Ont. Region): H. Brennan.  
 Vice-Pres.  
 (Western Ont. Region): J. Vankiekebelt.  
 Vice-Pres.  
 (Border Region): M. Dunlop.

### Alberta Group

President T. C. Segsworth presided at the meeting of the Alberta Group held in Edmonton. Reports of the Wings were presented and Air Vice-Marshal K. M. Guthrie, C.B., C.B.E., past-president of the Group, stated that the reports were excellent and that they were improving steadily at each convention.

A special speaker at the meeting was Group Captain M. P. Martyn, Chief Staff Officer, Tactical Air Group Headquarters, who expressed the appreciation of the R.C.A.F. for assistance being rendered by the Association.

*The R.C.A.F. Central Band gave a concert on the occasion of Sherbrooke Wing's third anniversary dinner. (L. to r.) D. A. Stevenson; Mrs. E. Fuller; Air Vice-Marshal Morfee; E. Fuller, president; Mrs. Morfee; Col. Emile Levesque, Mayor of Sherbrooke.*

The new executive is as follows:

President:	B. E. Crane.
Vice-Pres. (North):	W. D. Ferris.
Vice-Pres. (Central):	H. E. Ross.
Vice-Pres. (South):	J. E. Moffatt.
Secretary:	F. A. Sutherland.
Treasurer:	J. F. Rowand.
Legal Adviser:	R. D. White.

Reports of the Manitoba-Northwestern Ontario, Saskatchewan, and British Columbia Groups, were not received in time for this issue.

*Mlle. Denise Darcel, well-known French actress, who attended a meeting of Montreal's Maple Leaf Wing in order to pick the winning ticket in the Wing's Coronation Tour lottery.*



WHERE THERE'S A WING THERE'S A WAY

30 April, 1953

The Secretary,  
R.C.A.F.A. Headquarters.

Dear Sir:

They told us at the last meeting you wanted to hear regular accounts of our activities. I have been appointed to keep you posted on what goes on in No. 900 (Ardua) Wing, so here goes. Let me first point out that I am not a journalist or *littérateur*, so I will simply have to state facts in as straightforward a manner as possible. Our activities are numerous and we have great plans for the future. Therefore a brief summary of one thing at a time will probably be the best way of putting you in the picture.

It has always been agreed by our members that a Wing should have a home of its own if it is to really thrive. Well, thanks to the kindness of the R.C.A.F., we are at last getting places with our accommodation.

As you may have heard, the Air Force built a potato-cellar some time ago out in Blackmire

Swamp, and this they have given us permission to use. The only snag is that the structure is sinking into the soft ground at an alarming rate of inches per year. However, we can use it until it goes out of sight, and even after that we might be able to work our way in and out by burrowing.

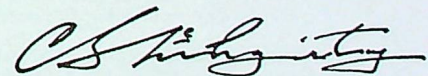
Getting to and from our quarters poses a bit of a problem. The building is about seven miles away by road, but the road has been impassable for several years. It is much closer, only about two miles, on a bee-line through the rather heavy bush.

We all got together in town and struck off in line astern, hanging on to one another's coat-tails so as not to become separated. Our Treasurer, a former navigator, led the formation and brought us out right on the nose. We don't expect as much trouble on future trips, since we blazed a trail right into the place from Main Street. We also hope to get a work-party out one week-end to cut away some of the shrubbery. It wasn't too easy the first time, as you can well imagine, especially as we had to cart several cases of refreshments with us. Despite slightly torn clothing, we arrived in high spirits. The building was a bit damp, as it had not been used for some time, and there was quite a thick layer of mud on the floor. But otherwise everything was fine.

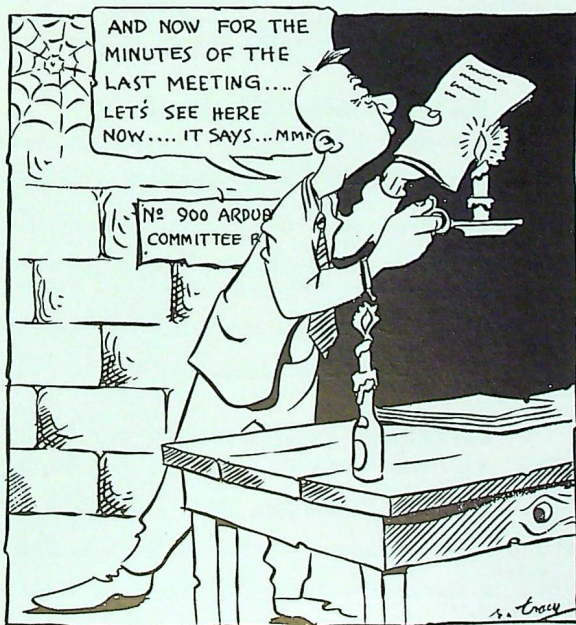
We were able to get through a fair amount of business before the candles went out. It is amazing how quickly thirty-two paid-up members can use up a given quantity of oxygen. We have a solution to this minor difficulty, however. One of our more active members, who is employed with the city Works and Bricks Department, says it won't be much of a job to break a hole through the reinforced concrete roof.

There will be more details in my next report. In the meantime, rest assured that the Ardua Wing is very much alive and in full support of the Aims and Objections of our Association.

Yours, with Air Power,



Corresponding-Secretary.



# Personnel Movements ★ ★ ★

## OFFICERS: JANUARY

S/L F. J. Rapp—1 Air Div HQ, France, to AMCHQ, Ottawa.  
S/L R. E. Young, MBE—2 FWgHQ, France, to 3 FWgHQ, Germany.

## OFFICERS FEBRUARY

S/L J. R. Bell—11 SD, Calgary, to 1 Air Div HQ, France.  
S/L J. F. Drake, AFC—407 (MR) Sqn, Comox, to RCAF Stn Comox.  
S/L G. J. Foley, MBE—5 SD, Moncton, to MGpHQ, Halifax.  
W/C Gellner, DFC—2 FWgHQ, France, to 3 FWgHQ, Germany.  
S/L W. T. H. Gill, DFC—1 FWgHQ, UK, to 441 (F) Sqn, UK.  
S/L W. I. Gordon—2 FWgHQ, France, to 3 FWgHQ, Germany.  
G/C R. T. Hamilton—ECPE Det Namao to RCAF Stn Chatham.  
G/C A. C. Hull, DFC—2 FWgHQ, France, to 3 FWgHQ, Germany.  
S/L M. C. Kearns—1 PRC to RCAF Stn Rockcliffe.  
S/L G. M. Kightley—426 (T) Sqn, Dorval, to RCAF Unit Fort Churchill.  
S/L J. A. O. Levesque—1 (F) OTU, Chatham, to 421 (F) Sqn, France.  
S/L B. D. McArthur—2 FWgHQ, France, to 3 FWgHQ, Germany.  
G/C J. D. Mitchner, DFC—434 (F) Sqn, Germany, to RCAF Stn Uplands.  
W/C W. P. Pleasance, DFC—RCAF Stn Greenwood to CJS Washington.  
S/L H. C. Robinson—2 FWgHQ, France, to 3 FWgHQ, Germany.  
G/C C. G. Ruttan, DSO—AFHQ to TacAgp, Edmonton.  
S/L A. A. Sherlock, DFC—AFHQ to 400 (F) Sqn (Aux), Toronto.  
W/C A. R. Sinclair—CJS London to ATCHQ, Lachine.  
S/L B. F. Stoughton—2 FWgHQ, France, to 3 FWgHQ, Germany.  
W/C C. C. Underhill—33 ACW Sqn, Falconbridge, to 11 TSU, Montreal.  
S/L M. G. Utas, DFC—ADCHQ, St. Hubert, to 1 Air Div HQ, France.

## OFFICERS: MARCH

S/L C. D. Barnett, DFC—AFF, Calgary, to 129 AFF, Trenton.  
W/C A. V. Branscombe—ADCHQ, St. Hubert, to RCAF Stn Winnipeg.  
S/L W. C. Christmas—412 (T) Sqn, Rockcliffe, to 1 IFS, Centralia.  
S/L D. F. Clark—RCAF Stn Goose Bay to AFHQ.  
W/C H. F. Darragh, AFC—1 FIS, Trenton, to 1 (F) OTU, Chatham.  
S/L E. K. Fallis—RCAF Stn Winnipeg to TCHQ, Trenton.  
S/L J. W. Fiander—430 (F) Sqn, France, to 414 (F) Sqn, Bagotville.  
S/L M. C. Fumerton—AMCHQ, Ottawa, to 1 SD, Weston.  
S/L P. F. Greenway—CEPE, Rockcliffe, to AMCHQ, Ottawa.  
W/C L. A. Hall—1 PRC, Lachine, to RCAF Stn St. Hubert.  
S/L E. R. Heggtveit—RCAF Stn Uplands to 444 (F) Sqn, St. Hubert.  
S/L J. J. Higgins—RU Vancouver to AFHQ.

G/C G. A. Hiltz, AFC—4th ATAF, Germany, to 1 Air Div HQ, France.  
W/C W. C. Kent—11 TSU, Montreal, to 34 ACW Sqn, Senneterre.  
W/C R. J. Lawler—ADCHQ, St. Hubert, to 3 (AW) OTU, North Bay.  
S/L A. G. Lawrence, DFC, AFC—1 PWS, MacDonald, to 3 (AW) OTU, North Bay.  
G/C J. H. L. Le Comte, DFC—AAS, Trenton, to 1 Air Div HQ, France.  
W/C H. S. Lisson, DFC—AFHQ to 1 Air Div HQ, France.  
S/L J. B. Little—RCAF Stn St. John to AFHQ.  
S/L J. MacKay, DFC—416 (F) Sqn, France, to RCAF Special Force, Korea.  
S/L M. B. MacMillan—ATCHQ, Lachine, to RCAF Stn Lachine.  
W/C C. W. Macnab—AMCHQ, Ottawa, to 2 FWgHQ, France.  
W/C W. A. G. McLeish, DFC, AFC—RCAF Unit Fort Churchill to AFHQ.  
S/L C. H. Mooers—11 TSU, Montreal, to AMCHQ, Ottawa.  
S/L A. K. Ogilvie, DFC—6 RD, Trenton, to 129 AFF, Trenton.  
S/L A. A. Proctor, AFC—129 AFF, Trenton, to AMCHQ, Ottawa.  
S/L W. H. Smith, BEM—408 (Ph) Sqn, Rockcliffe, to AFHQ.  
S/L G. J. Sweanor—426 (T) Sqn, Dorval, to AFHQ.  
W/C H. R. R. Trepanier—CJS Washington to AFHQ.  
G/C N. S. G. Wade—RCAF Stn Goose Bay to CJS London.

## WARRANT OFFICERS: JANUARY

WO2 F. E. Cooper—2 FWgHQ, France, to 3 FWgHQ, Germany.  
WO2 C. A. J. Gamman—2 FWgHQ, France, to 3 FWgHQ, Germany.  
WO2 L. S. Hall—2 FWgHQ, France, to 3 FWgHQ, Germany.  
WO2 L. T. Seguin—2 FWgHQ, France, to 3 FWgHQ, Germany.

## WARRANT OFFICERS: FEBRUARY

WO2 J. V. Abram—6 RD, Trenton, to RCAF Stn Goose Bay.  
WO2 B. A. Andrews—2 FWgHQ, France, to 3 FWgHQ, Germany.  
WO1 S. G. Cable—RCAF Stn Trenton to TacAgpHQ, Edmonton.  
WO1 G. Gauvreau—2 FWgHQ, to 3 FWgHQ, Germany.  
WO2 L. D. McTavish—2 FWgHQ, France, to 3 FWgHQ, Germany.  
WO1 W. J. Mosher—11 TSU, Montreal, to 24 ACW Sqn, Senneterre.  
WO2 G. K. Wright—1 PRC, Lachine, to 407 (MR) Sqn, Comox.

## WARRANT OFFICERS: MARCH

WO2 C. W. Baine—4 OTU, Lachine, to 412 (T) Sqn, Rockcliffe.  
WO2 A. Bordeau—2 FWgHQ, France, to 3 FWgHQ, Germany.  
WO2 J. A. K. J. Burnett—CEPE, Rockcliffe, to 6 RD, Trenton.  
WO2 R. A. Davidson—2 FWgHQ, France, to 3 FWgHQ, Germany.



WO2 W. M. Fleming — RCAF Stn Claresholm to RCAF Stn Trenton.

WO2 L. M. Flewelling — TCHQ, Trenton, to AFHQ.

WO2 H. S. Garrett — 13 ExU, Trenton, to 1 R&CS, Clinton.

WO2 N. M. Hamill — RCAF Stn Trenton to 1 R&CS, Clinton.

WO2 C. W. Hatnean — AFHQ to 3 FWgHQ, Germany.

WO1 J. S. Hoare — 2 FWgHQ, France, to 1 Air Div HQ, France.

WO2 P. E. La Rue — CEPE Det Namao to 444 (F) Sqn, St. Hubert.

WO2 H. H. Mellish, BEM — AMCHQ, Ottawa, to RCAF Stn. Centralia.

WO2 C. S. O'Leary — 1 SD, Weston, to 3 FWgHQ, Germany.

WO2 A. Smith — 1 SD, Weston, to 2 FWgHQ, France.

WO1 R. G. Stevens — MGpHQ, Halifax, to RCAF Stn Rockcliffe.

WO2 N. T. Swan — AAS, Trenton, to 1 R&CS, Clinton.

WO2 E. C. Turner — AFHQ to AMCHQ, Ottawa.

#### KEY TO ABBREVIATIONS

AAS	— Air Armament School	IFS	— Instrument Flying School
ACW	— Aircraft Control and Warning	MGpHQ	— Maritime Group Headquarters
ADCHQ	— Air Defence Command Headquarters	(MR)	— Maritime Reconnaissance
AFB	— Acceptance and Ferry Flight	OTU	— Operational Training Unit
Air Div HQ	— Air Division Headquarters	(Ph)	— Photographic
AMCHQ	— Air Materiel Command Headquarters	PRC	— Personnel Reception Centre
ATAF	— Allied Tactical Air Force	PWS	— Pilot Weapons School
ATCHQ	— Air Transport Command Headquarters	R&CS	— Radar and Communications School
(AW)	— All-weather	RD	— Repair Depot
CEPE	— Central Experimental and Proving Establishment	RU	— Recruiting Unit
CJS	— Canadian Joint Staff	SD	— Supply Depot
Det	— Detachment	(T)	— Transport
ExU	— Examination Unit	TacAGpHQ	— Tactical Air Group Headquarters
(F)	— Fighter	TCHQ	— Training Command Headquarters
FIS	— Flying Instructors' School	TSU	— Technical Services Unit
FWgHQ	— Fighter Wing Headquarters		

## BANG ON

The inhabitants of officers' messes in Fighter Command are chuckling over the tale reputed to concern two very senior officers in the recent Exercise Ardent.

One officer, flying his jet, overshot the runway on landing and the aircraft went through a fence. Another officer of equal status sent this signal: "Congratulations on being the first officer of air rank to go through the barrier. I heard you from here."

("R.A.F. Review")

# The Human Factor in Aircraft Accidents

By J. A. Newton

(Group Captain, Royal Air Force, A.F.C., A.R.Ae.S.)

Technical Officer, Operations/Accident Investigation, I.C.A.O.

(Reprinted by courtesy of the "ICAO Monthly Bulletin")

*(For his article, which first appeared in the Journal of the Royal Aeronautical Society, February 1951, Mr. Newton was awarded an R.Ae.S. Premium Award. The views expressed are those of the author and not necessarily those of the International Civil Aviation Organization.)*

RECENTLY published statistics give the impression that an excessively high percentage of non-carrier aircraft accidents investigated were primarily due to human error. Further, an examination of available data covering the past decade gives the same impression in respect of *all* aircraft accidents occurring during that period. The figures quoted convey in fact the unpalatable implication that, although in nearly a half century of aviation great strides have apparently been made in increasing the reliability of the aeroplane, very little has been accomplished in reducing the element of human error in aircraft accidents. Why is this?

\* \* \*

It has been claimed that the possibility of accidents in flying is inevitable by reason of the inherent conditions of flying which necessitate, besides reliance on the technical factor, consider-

able reliance upon the skill, judgment, memory, and physical and psychological conditions of the human being. These latter qualifications can vary between different human beings and from day to day in the same human being, so that, unlike the technical factor, which can be predicted fairly accurately, the probability and frequency of accidents occurring due to the human factor, are extremely difficult to predict and therefore to prevent.

Since human error in aircraft operation is less likely to be reduced by improving the human being than by simplifying the task that is given to him, efforts to reduce accidents by providing better personnel and training have not produced an appreciable result. A large proportion of the accidents in recent years could have been prevented by better flying qualities, a more reliable engine, better weather forecasting, better lighted runways or some other improvement in whatever it was that made flight conditions so difficult that the pilot made a mistake. If a task is extremely easy, errors in its performance will be equally rare. As a task increases in difficulty, errors grow more frequent. It would seem, therefore, that errors may be reduced in number and gravity by reducing the difficulty encountered by the human in the performance of any task.

Since it is primarily from the investigation of accidents and incidents that advances in aviation safety are made, one is led to question the validity of these findings for reason that they are not compatible with the dictates of reason. They suggest in fact that too high a dependence has been placed upon infallibility in the human organism with respect to every aspect of aerial operation.

A brief study of the known factors relating to this problem may therefore be timely.

It may readily be appreciated that it is essential for everyone connected with aviation to realize how great a part is played in air safety by the human element and to understand the limits to which man can be subjected. Although accidents attributed to human error are not confined to errors made by pilots, since others, such as air crew members and ground personnel, contribute to the accident toll by mistakes in their work, both in maintenance and the operation of aircraft, this article is mainly directed towards the consideration of so-called "pilot error." The implications apply largely to all personnel.

\* \* \*

Fortunately for the human race the majority of its members pass through certain biological and psychological changes ranging through an extreme zest for adventure, recklessness and lack of a sense of responsibility, to an increased sense of responsibility, carefulness, conservatism and a growing concern for social and economic security. The average individual finds the first few years of flying exciting and glamorous, and in the case of pilots, filled with a great sense of power arising out of the absolute control of a machine in the three dimensions. This power brings with it a false sense of security which may overpower in many cases and influence the airman to take risks unknowingly. This period might be termed the first psychological stage of a pilot's career, and it is during this time that much can be done to mould his mind in the wise use of his powers.

The second psychological stage usually occurs after two to four years of experience and may be

brought about gradually or abruptly according to the circumstances. The gradual change to a more conservative outlook comes about when experience has been gained and the newness has worn off. Knowledge of the structural, mechanical and performance limitations of his vehicle is acquired, together with an appreciation of such hazards as bad weather and icing, as well as an awareness of other uncertain and unpredictable factors. An abrupt change is usually precipitated by narrow escapes or accidents in which the individual or others of his acquaintance are involved.

The third psychological stage is reached only after a period of approximately ten years and is characterized by a gradual increase to the maximum conservatism. During this decade the individual is likely to have been subjected to severe and sustained stresses in his work and in his home life that may have produced a marked apprehension towards his occupation. This occasions one of the most critical situations in the career of an airman, since the problem of economic and social security generates a tension arising out of the conflict between necessity and fear.

The fourth stage is not usually reached until the late thirties when the airman has successfully passed through the preceding stages and has acquired that conservatism that is the natural result of increasing age and sagacity.

\* \* \*

The analysis of human make-up with its underlying physiological and psychological tendencies, its idiosyncrasies and habits, all reacting under varying stresses and physical environments, is an extremely complex task. The medical profession has made a special study of the medical aspects of aviation since 1910, but in the early years concentrated on general physical fitness rather than on the psychological aspect. Consequently, during the War of 1914-1918, men who had suffered considerable stress in combat but were otherwise physically fit, were transferred to flying with disastrous results. The importance of the psychological aspect of aviation then began gradually to

be realized and the first steps were taken in the direction of psychological study.

During recent years this psychological field has been intensively studied and considerable progress has been made as a result of the vast amount of material that became available during the Second World War from observations of Air Force personnel suffering from "operational fatigue," as it was then termed.

Although the greatest care is now exercised in the original selection of personnel for work requiring a high degree of psychological balance, it is still extremely difficult to detect every case of unbalance; nor will this careful original selection of personnel entirely eliminate possible later deterioration in certain cases, in spite of the care taken to watch for symptoms of deterioration in subsequent medical examinations.

To most pilots the admission of human fallibility as a factor in lowering the safety ratio of flying is taboo. This is partly because of ignorance of the true nature and origin of such fallibility, and partly because most personnel suffer from it in some degree. Because such fallibility is a constitutional characteristic of human beings, there is no such thing as a cure for it; this paper is intended to bring the human element into open court so that the individual may be helped to become aware of some of the factors influencing his mental and physical equipment, its functions and limitations. Straight thinking and lucid discussion are necessary premises for intelligent action to reduce the possibility of accidents arising out of such limitations.

Medical research has contributed greatly to the prevention of aircraft accidents, by recommending changes in design, by devising medical standards, by pointing out differences in training or procedure, or by suggesting the addition of equipment; but progress in the design and operation of aircraft, especially in recent years, has tended to some extent to outstrip the results of such medical research. Aircraft are being designed to fly higher and faster, to climb and descend more rapidly, and to land faster than ever before. Aircraft now fly through weather that would have grounded them a few years ago and rapid passage from one

climatic extreme to another is a routine occurrence. Special problems arise from the use of pressurized cabins and of large aircraft with increased weight and longer range, fitted with greater complications and lack of standardization of the modern cockpit, culminating in the advent of jet and rocket motors, while the atomic engine looms as a future possibility. This evolution has resulted in the installation of an awe-inspiring number of "essentials," hypothetically contributing towards making the aircraft proof against accidents. Since, however, many of them are merely tools at the disposal of the human pilot, rather than automatically-operated safeguards, they actually expand the field of human fallibility and provide further sources of "pilot error."

Therefore, as far as the human factor is concerned, two opposing influences are at work, one tending to increase the difficulties of overcoming human fallibility and the other to decrease them. The incidence of accidents ascribed to human error shows that the former has kept pace with the latter for a number of years; as fast as one hazard is eliminated a new one takes its place. Since it must be accepted *a priori* that it is impossible entirely to eliminate the possibility of accidents resulting from human error, the impossibility of predicting accurately the human reaction to any set of circumstances must be taken into account. It is therefore inevitable to conclude that those responsible for advances in the design of aircraft and of auxiliary equipment for the operational development of these new designs, must work in close collaboration with operationally experienced experts and with medical research workers so that they do not ask that human beings exceed their natural limitations. If the number of accidents ascribed to human error is to be reduced, the Industry must direct its attention to developing aircraft and means of operating them within the capacity of the average human being.

Accidents directly attributed to human error are normally classed as:

- (i) Error of judgment
- (ii) Poor technique
- (iii) Disobedience of orders
- (iv) Carelessness
- (v) Negligence



Contributory causes to these major classes can be divided into the following five subdivisions:

- |                             |                         |
|-----------------------------|-------------------------|
| (a) Lack of experience      | } Inherent or temporary |
| (b) Physical condition      |                         |
| (c) Physical defects        |                         |
| (d) Psychological condition |                         |
| (e) Poor reaction           |                         |

A short study of these cause factors is given below.

\* \* \*

*Error of judgment* is generally considered to cover those accidents caused by the failure of personnel to make the correct decision under prevailing circumstances. Judgment is the decision made as a result of the intelligent appraisal of the situation in relation to all known factors in the light of experience and training. Accidents are sometimes caused not by a wrong decision, but by lack of any decision.

*Poor technique* is poor operation resulting from a lack of skill and co-ordination. Psychologically it is the physical expression of the mental decision, either or both of which can be in error. Usually poor technique can be traced back to the training stage and it is here, during training, that one of the most important contributions to future accident prevention can be made.

*Disobedience of orders* is the cause of a high percentage of accidents resulting from refractory personnel who combine obstinacy with recklessness. This type of individual is inclined to take chances, not with harmful intent, but with the attitude of trying anything once — as in many cases it turns out to be. In war this spirit may be an admirable and in fact valuable asset, but in times of peace the tragedy often accompanying this attitude is decidedly out of place and discipline must be used to suppress it. The presence of refractoriness, if well controlled, is an asset in air crew in that it relieves to a great extent the conscious inhibitory effort. It facilitates the repression of any phobia or traumatism and innate instincts such as self-preservation, fear of falling, and so on, through helping in the adjustment of the three-dimensional environment, especially when difficult conditions

are faced. When refractoriness is accompanied by lack of self-control or carelessness, or has become a habit, the chances of an accident are substantially increased.

Disobedience of orders, whether national, company, school or instructor's, is said to lead to an accident in one of every four violations. This type of accident is more prevalent in private and miscellaneous flying. It is present to a lesser degree in non-scheduled air transport and only to a very small extent in scheduled air transport. This shows that the superior training and discipline to which the airline pilot is subjected has its effect. In fact, the only way to lessen accidents of this nature is to improve the discipline at the schools and companies and educate the private flier to rid himself of the feeling that "it couldn't happen to me." Further discipline can be exercised by prompt action on the part of the authorities in punishing the surviving offenders in a way that hurts.

*Carelessness* infers that the pilot knew better but as a result of circumstances failed to do the right thing. These circumstances are generally attributed to inattention and are the result of one or other of the two conditions known as "pre-occupation" and "depression." Preoccupation is the surrender of the mind to feelings and habits stronger than anything in the present situation. Depression is the mental state in which one's functions are inactive and physical response tardy. Either state may work towards bringing about the other, and one or both may produce a state of inattention.

*Negligence* is more usually associated with sins of omission rather than with those of commission. The act, or absence of action, is closely associated with preoccupation which, in turn, is associated with forgetfulness or absentmindedness. Forgetfulness, or the failure to recall, is often due to the lack of a stimulus to set the cycle of remembrance working. Absentmindedness is not so much the inability to recall as it is a characteristic of thinking behaviour. A preoccupied airman may encounter difficulties and his responses may be unsuitable because of this mental habit.

In *lack of experience* we have perhaps the main cause of accidents. Accidents in this category can be neatly classed as those caused as a result of perplexity. This condition is defined as ignorance, the lack of necessary information when encountering unfamiliar conditions, leading to bewilderment. This is not the perquisite of the new man; often the old hand is faced with this situation. Causes leading to perplexity may be lack of initial training or lack of recent practice leading to a deterioration of former ability. Lack of experience or the maintenance of ability, therefore, can cover the general field or any special task. Accidents in this category can be classed under *Error of judgment or Poor technique*.

*Physical condition.* Under this heading are those cases where physical or mental disease or condition cause a person to be below the normal standard necessary to perform his duties safely. This disease or condition may be either inherent (not susceptible to remedy within a reasonable period of time) or it may be temporary (susceptible to remedy and not subject to frequent repetition).

Most inherent diseases are detected by a doctor either by examination or from information given him, but in some cases doctors have missed the symptoms when making an examination and the person, if he knows he has the disease, has hidden all signs from the doctor.

How to prevent airmen from operating when suffering from temporary disease is one of the most difficult problems in aviation. It is common practice to treat a "cold" as just an everyday happening and to carry on work. A "common cold" nevertheless can give high temperatures, which, in turn, impair the efficiency of the human body.

There are also the various diseases of the tropics which, although they are not serious in themselves and sometimes only last for a few hours, may seriously reduce efficiency during their occurrence.

*Physical defects.* Under this heading are those cases resulting from physical defects which may be either inherent or temporary.

The human body is such a highly organized and versatile piece of machinery that the loss of a single arm, leg, hand or foot, does not in many cases impair physical efficiency to an appreciable degree. The body and mind have reserves which are rarely called into full activity, and we have pilots who fly perfectly well with only one arm, leg or eye. Compensation, however, is far from being complete, and fatigue and loss of "balance" is likely to set in much earlier with these persons than those with no defects.

*The psychological condition,* for the purposes of this paper, is the condition of the mind, conscious or sub-conscious, in relation to the sensations, feelings, emotions and memories which affect the judgment and skill of a person in a manner detrimental to the efficient conduct of his work.

Most people have experienced the effects of delusion and illusion, the former being the mental state of mistaken belief resulting from an error of judgment, and the latter, the state in which sensuous perception conveys an impression other than the truth of what is perceived. It is under these conditions that many unexplained accidents occur; unexplained because of a lack of tangible evidence.

There are five main senses, sight, hearing, touch, taste and smell, which, by giving the precise interpretation of what the senses "feel," enable the human to function correctly.

To conduct his work, the pilot requires a combination of three of these senses, sight, hearing and touch, which must be well co-ordinated and of a high standard. The most important of these senses is sight or vision, since an aircraft in flight has freedom of movement in three planes, and reliance on outside visual aids for orientation is necessary to control the aircraft. When the visibility of outside aids is restricted by either weather conditions or darkness, the precise attitude of the aircraft may be difficult, and in some cases impossible, to determine by sight and in this case the senses may not be able to interpret correctly the movements of the aircraft. In fact in many cases the interpretation given by the senses will



be the opposite to the actual position or movement of the aircraft, hence the effect or illusion or delusion.

It is vital, therefore, to the pilot that he does not fly into conditions where outside vision is restricted, unless the aircraft is fitted with instruments to replace or to supplement the vision in respect of outside references. Pilots should be certain also that during flight all three senses are in good order and not fatigued, for even instruments are useless if the senses are too ill or fatigued to follow correctly the messages relayed by them.

Although the psychological condition is apparent in many forms and often contributes to an accident through worry, fear, fatigue, loss of face, and so on, the following two examples will indicate the form it might take.

There has been a suspicion for many years that inexplicable accidents to airline aircraft, in many cases captained by exceptionally experienced personnel, have been due to "mesmeric stupor." This condition can easily be brought about by the combination of relaxation, fatigue, continuous engine noise and mesmeric effort of looking at lighted instruments, and so on, which causes the pilot to lose a material part of his facilities of thinking, perceiving, and understanding. This condition, when encountered, unfortunately leaves the pilot and others unaware of his condition. Pilots will make absurd mistakes without knowledge of them or remembering them later. In fact, after an accident pilots have sworn that they read off a certain height on their altimeter, whereas the aircraft was much lower and all evidence pointed to the fact that the altimeter was reading correctly.

The other example is the so-called "leans." The "leans" are a false physical sensation or type of vertigo experienced sometimes by pilots during instrument or combined instrument and visual flight and in exceptional cases, when forward visibility is bad. This sensation is stronger and more apt to occur when the pilot is fatigued or confused, or when there is an element of recognized danger present. When a pilot is momentarily occupied with other things, a slow lateral tilting

of the aircraft or other movement from straight and level normally will remain unnoticed up to a certain point. Due to the sensory perception of movement being disproportionate, the mind is more sensitive to strong accelerations than to weak ones and this slow movement is not recorded. The correction, however, being fast, makes an immediate impression and there is an opposite sensory illusion that the aircraft is now tilted and needs to be moved in the opposite direction to regain its level. The ability, or willingness, to ignore these false warnings is conditional on the will power, training and experience of the pilot. If the sensory illusion is not ignored there will be a continuous tendency to "lean" markedly to one side and the mental and muscular effort required to control the aircraft, in a short time will tire and disconcert the pilot to such an extent that control will be lost, or marginal limits will not be maintained. The "leans" can also be caused by the optical illusion due to the non-parallelism of roads, shore lines, railways, clouds, and so on, in bad visibility and in rows of lights or light couples when seen without other references on dark nights. The most usual of these cases takes place when the pilot attempts to fly under conditions of alternate visual contact and instrument flight, especially when landing in bad weather conditions when quick transition from the exclusive use of the normal senses to the use of the specially developed instrument interpretation and *vice versa* is made. There seems to be a repeated slight time-lag in the changeover, during which the senses reorientate themselves and during which time there is a tendency to "lean." This period appears to be cumulative and measurably increased with fatigue.

*Poor reaction* is closely related to the psychological condition and, like physical and mental disease or defects, is either inherent or temporary. Poor reaction also has a great deal to do with accidents attributed to poor judgment.

"Reaction" should be coupled with time, and "reaction time" will be the interval between the stimuli and the resulting action. Reaction time may be different for different stimuli, such as the reaction time stimulated by sight and the reaction

time stimulated by hearing. These times will vary in each individual and at any particular period, depending upon attention as well as physical equipment. Reaction time may also vary according to the degree of stimulus; a loud noise or bright light near at hand will produce a more rapid reaction than a faint signal at some distance.

The necessity of stopping to recognize or differentiate between signals, or of choosing between types of reaction to them, lengthens reaction time. Emotional association prolongs it further.

Closely associated with reaction is a feeling of movement called position sense, the two component senses of which, sight and touch, work more or less independently. If sight or touch are inaccurate, position sense will be defective.

Finally, before leaving the study of human factors, a short study should be made of temperamental extremes — the excitable and the phlegmatic.

In the excitable temperament there exist two conditions, the mental condition and the cause of the excitement (which is often fear). For the latter the person must recognize something (often imaginative) that will set off the mental response. A noticeable characteristic of this type is the constant visualisation of more difficulties than actually exist.

The phlegmatic is exactly the opposite type and is nearly as great an accident risk in that he is liable to be too slow to respond or to recognize danger when circumstances demand it.

\* \* \*

Habit has been mentioned a number of times in this paper. The human builds up his skill in developing automatic precision—a function which the mind unconsciously controls. As habits can be

bad as well as good, it is obvious that strict discipline and training are needed to develop the good and eliminate the bad. Even good habits can become bad ones if a changed condition requires different action, which might be encountered in flying in different types of aircraft or flying in different conditions to that in which the habit has been developed. This change of habit often has serious consequences when the pilot is faced with an emergency and instinctively reverts to action under the stimulus of the old habit. Serious consideration needs to be given, therefore, to any innovation that calls for changes in aviation practice.

An effort has been made to show that human actions in any set of circumstances are fundamentally unpredictable. Unfortunately in aviation the smallest human error can cause a serious accident and a consequent loss of life, equipment and public confidence. While a great deal can be accomplished by selection, training, discipline, mechanical aids, maintenance of standards and the increase in reliability of the present “essentials” in an aircraft, it can be assumed that the human element remains the weakest link in the chain of safety.

If accidents are to be reduced and the public attracted to this mode of transport, then designers, operators, operating personnel and those responsible for preparing air regulations, in addition to aiming at methods for the prevention of mistakes and emergencies, must always have the following in mind:—

“Can, we, by the simplification of controls, equipment, procedures and rules, reduce the load of ground and air personnel so that any initial mistake or emergency will not be too great a load for the human link, thereby precipitating an accident?”





# BIRD FLIGHT

By John Barlee

(Reprinted by courtesy of "Shell Aviation News.")

**B**IRD FLIGHT presents complex problems to those who are used to dealing with the aerodynamics of ordinary aircraft. All observations must be qualitative, not quantitative, for all measurements are variable from bird to bird. The bird adds further difficulties by altering most of its measurements at will to suit different flight conditions. Thus wing-area, aspect-ratio, sweep-back, dihedral and many such factors which we usually regard as fixed are far otherwise in a bird.

We hear a lot about the marvels of modern aircraft, but we tend to forget that except for speed and ceiling birds are superior in all aspects of flight. Let me give a couple of examples: A pair of swallows I found nesting in a loft had to enter through a slit in the wall which was far narrower than their wing-span. Yet all day they flew in and out without apparent difficulty, sometimes meeting in the slit when going in opposite directions.

The goldeneye, a species of diving duck, can fly exceedingly fast, can swim on the surface of the water and can dive and swim below in search of food. Not content with such versatility, it nests in holes in trees. Now, a duck is a type of a bird definitely not designed for tree-climbing or for perching on twigs. The goldeneye gets over this by flying directly into its nesting-hole and stopping when it gets inside. How it manages this feat without damage to itself remains a mystery.

Many of the details of design incorporated in modern aircraft have been used by birds for millions of years. Slots, retractable undercarriages, and variable sweep-back are examples. If designers would study birds more carefully they might discover other refinements which they could use.

## Evolution of flight

Passive or gliding flight has been attained by a number of groups of animals. Such animals as the "flying-fox" climb to a height in a tree and, launching forth, glide for a distance. A fold of skin, widely stretched between the forelimb and hind limb on each side, is used as the sustaining surface. Such animals glide only and do not flap. In true flight, power is applied during flight, and long sustained flights can be made. This type of flight has been achieved by pterodactyls, bats and birds, but before we consider these let us look at the flying fish.

The special interest of the flying fish is that the wings are not the means of propulsion, and here we have the nearest approach in nature to flight on the principles used by man. Although vibration of the wings has been observed, there is no true flapping, and the flight is no more than a prolonged glide of up to a hundred yards, the fish sometimes reaching a height sufficient to land it on the deck of a ship. The sustaining surfaces are the specially large pectoral fins which have a curved aerofoil section. The wing-loading is greater than in any bird.

The fish takes off in the following manner — it emerges from the water at its swimming speed, estimated at 15-20 m.p.h., the pectoral fins are at once extended and the fish then taxis along with all except its rapidly-vibrating tail above the surface. During the next second the fish accelerates to about 40 m.p.h. and takes off on its glide. During the taxiing the rapid vibration of the tail may set up a quivering of the "wings" and this quivering is what has so often been described as flapping. Speed begins to drop once the fish is airborne and after a few seconds it falls back into the water, though by dropping its tail below the surface it can taxi up to take-off speed again, and so embark upon a second glide.

The sustaining surface of the bat resembles that of the prehistoric pterodactyl and is composed of skin held out by the elongated finger bones and attached also to the hind legs. The use of the hind limb in stretching the wing leads to undercarriage difficulties and the creature is unable to rise from a flat surface. Unlike the pterodactyl, however,

temperature control in the bat is fairly well developed although it is abandoned when the animal is hibernating. Lack of heat conservation was a disadvantage in the pterodactyl, for a cold-blooded animal cannot produce such sustained power as a warm-blooded one, and falls far behind it in intelligence.

Still, we must not sneer at the bat, for it is able to land head-downwards clinging by its hind legs to a crevice in the roof of a completely dark cave. This feat is achieved by the use of an echo-sounding system, for the eyes are not well developed. As the bat flies it emits through its nose a succession of short pulses of ultra-sonic sound of a frequency of 50,000 cycles/sec. Echoes are received by the bat's highly developed ears, and enable the bat to locate obstacles accurately. The bat's habit of getting tangled in ladies' hair may be due to the poor echo-giving qualities of the latter!

### Birds

It is considered likely that birds evolved from reptiles which ran rapidly on their hind-legs, waving their fore-legs to aid balance. Large scales, developed along the trailing edge of the fore-limb, may eventually have evolved into feathers, though it is equally possible that feathers were evolved first as an aid to heat conservation, and were later put into use as an aid to flight. Which came first, feathers or flight?—this question is still unanswered. The presence of a flattened fore-limb enabled the ancestral bird first to glide from branches or to taxi with occasional jumps and short glides, and later to develop true flight. Flight was certainly evolved as a means of escape from enemies, and where birds have found themselves without enemies they have in many cases lost the power of flight.

The development of temperature-control by feathers put birds far ahead of the lower animals. The high rate of metabolism thus achieved gives birds a high power-weight ratio, and is shown by the birds' high temperature (up to 111° F. in the swift), the large amount of food they have to eat every day and the rate at which they digest and assimilate it, and the amazing quickness of their reactions.

The blood system which distributes food and oxygen to the muscles is extremely efficient. The heart may be as much as 10% of the total weight of the bird, the heart-beat is extremely rapid, and the blood contains a very high percentage of haemoglobin. The lungs which absorb the oxygen have seven accessory air-sacs leading from them. These sacs expand and contract and help to sweep out air, so preventing dead pockets from being formed in the lungs. At rest, the rate of breathing of a pigeon is 29 per minute; walking, it is 180 per minute; and flying, 450 per minute.

Feathers have other advantages:

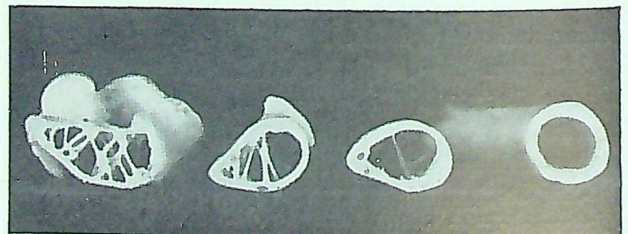
- They enable the wing to be quite independent of the legs and so have allowed the latter to evolve separately. Thus the feet can act as paddles for swimming, or as weapons for attack, as well as forming an efficient undercarriage.
- Feathers are fully replaceable, and are in fact replaced every year.
- The feathered wing is easy to fold.

### The Wing

The centre section, which moves least during flapping, has a good aerofoil section and provides most lift. The wing-tips are more flexible, and during the wing beat they twist and so drive air downwards and backwards, giving some lift and all the forward thrust.

The bird's wing is a normal vertebrate forelimb, much modified. The bones are the same as in the human arm — an upper arm bone, the humerus; two forearm bones, the radius and ulna; and a carpo-metacarpus formed from the wrist and hand bones, many of which have disappeared in the bird, most of those which remain having fused together. The long bones of the wing are very light in weight but are immensely strong, being tubular in construction.

*Cross-sections of the gannet's humerus.*



A typical example of this is the series of cross-sections of the gannet's humerus. It can be seen that in the central region the section is roughly circular while towards the end, where the section is no longer circular, struts are developed. The Chief Designer of Short Brothers and Harland has written to the author, "The bones you sent me are really amazing and most interesting, particularly the way in which the internal struts and cellular construction only occur where the cross-section has had to depart from the circle. It is a beautiful piece of structural design and I only wish we could do half as well."

The bird has the advantage in that the bone is laid down by the bone-forming tissue only where the latter is in a state of strain. Thus every strain is counteracted by an increase of strength exactly where it is needed.

The strength of the apparently fragile bones of a bird is emphasized by the test carried out with the wing bone of a gannet similar to the sectioned specimen referred to above. This humerus or upper arm bone was nine inches long and just under half-an-inch in diameter at the centre. It weighed just over two-thirds of an ounce. It was supported on two wooden blocks and a weight-carrier (2 lb.) was hung by a cord from the middle. 10 lb. weights were added till the bone was supporting 1 cwt. (112 lb.). The weight was then increased to 127 lb., but the bone suddenly collapsed.

The feathers can be divided into large flight feathers and small contour feathers. The latter overlap each other and fill in the spaces which otherwise might appear between the quills of the flight feathers; they also form a smooth surface for the leading edge of the wing and for the body of the bird. The tail feathers also are overlapped by contour feathers in the same way. The main flight feathers are anchored to the wing bones but are free to twist and move a certain amount.

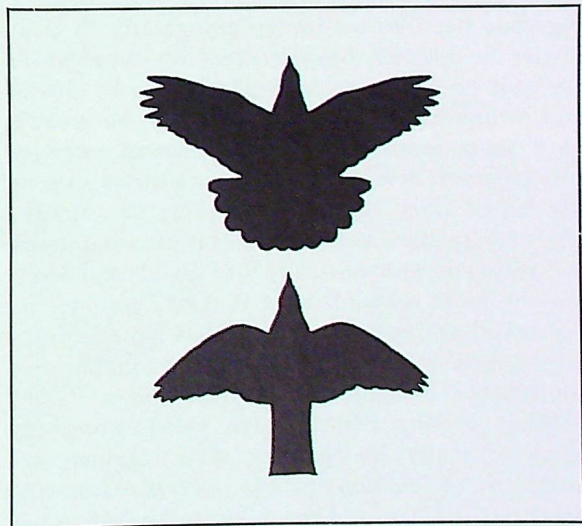
Wing-flapping is produced by the breast muscles which are fixed at one end to the keel of the breast-bone and at the other to the humerus. The main muscle pulls the wing down, and a smaller one, used chiefly during take-off, raises the wing. The latter muscle lies under the main breast muscle

and is paler in appearance, being not so richly supplied with blood. The breast muscles may form as much as 25% of the total weight of the bird. The keel on the breast bone is not found in birds, such as penguins, which have lost the power of flight. Many other muscles in the wing itself are used for spreading and folding, for holding the wing rigid, to rotate the humerus and to alter the relative positions of the various parts of the wing during flight.

When the wing is fully spread it can be seen that the flight feathers are divided into three groups. The primaries form the wing-tip, and spring from the carpo-metacarpus; the secondaries, which arise from the radius and ulna, form most of the rest of the wing; the tertiaries, which spring from the humerus, are near the body.

In addition to these the thumb of the "hand," which is separate from the rest of the carpo-metacarpus, bears a small tuft of feathers known as the alula or "bastard-plume." This can be seen very easily on the leading edge of the wing, just about halfway along. The alula is sucked up when the wing is stalled and forms a leading edge slot.

*Silhouettes of a wood-pigeon showing attitude in fast level flight (bottom) and in landing or turning (top). The photographs show how sweep-back can be varied within wide limits, how wing-tip slots open as the wings come forward, and wing and tail areas are increased.*



When the primary feathers are fully spread, wing-tip slots may appear between them. These slots are poorly developed in high-aspect-ratio gliding birds such as the fulmar, but are extremely well developed in low-aspect-ratio soaring birds such as the vulture and the raven. The slots form a most efficient anti-stalling device, and so help the wing to give enough lift at slow speeds.

As a bird flies faster the wing tips are swept back, closing the wing-tip slots which are now not needed, decreasing the wing area and so reducing drag. When the bird wishes to turn or land, the wing tips are swept forward again, and at the same time the tail feathers can be spread fully to give extra supporting area. The action of the tail as a control surface is considerable and large tails are usually found on woodland birds which must manoeuvre sharply when flying through trees, e.g. sparrow-hawk, pheasant and pigeon. When manoeuvring, the tail can be shut, spread, depressed, elevated, tilted or curved.

Steering is carried out by the joint action of wings and tail sometimes assisted by the lowering of a foot. A turning bird can often be seen with one wing more fully extended than the other.

Birds use a variety of methods to gain air-speed when taking off. The simplest is the dive from a tree or cliff; large wading birds such as herons do a shallow dive from the height of their long legs. Small birds can often manage with a jump and a vigorous flap. Water birds vary greatly in their ability to take off; broadly speaking, those which are able to escape from their enemies by diving and swimming under water have not so great a need for a quick and efficient take-off as those which cannot dive. Thus the diving ducks such as the tufted duck have to taxi along the surface, while the mallard and other surface-feeding ducks can spring almost vertically into the air and climb steeply. Most sea-birds must taxi for a distance, as do swans, and it is on record that gannets have been found incapable of taking off due to the combination of a flat calm and no wind.

When landing, a bird reduces speed as much as possible, either by vigorous flaps against the direction of motion or by gliding upwards. Finally it stalls on to the landing place, taking off

the remaining speed by means of a couple of flaps. When the wings are turned so that the angle of attack is about  $90^\circ$  they act almost like a parachute. Birds with a high wing-loading, such as razorbills, find great difficulty in landing on ledges of cliffs, though they find little difficulty in planing down on to water.

### Gliding

All birds glide to a certain extent, but some glide more than others. The advanced gliders are sharply divided into long-winged fast gliders and short-winged slow gliders. The slow gliders, which typically have a low-aspect-ratio square-tipped wing with many deep wing-tip slots, usually make use of ascending air-currents such as thermals, in which they soar.

Fast gliders make use of the differences in wind speed found near the surface of the ocean, caused by the friction of the air with the water. These birds have long narrow wings devoid of slots. The albatross, with a wing span of up to eleven feet, is the supreme exponent of this method. Gliding at high speed across or down wind, it plunges from the upper faster layer of air into the lower slower layer. This causes the bird's air speed to increase by the difference between the speeds of the two layers. Turning head to wind and zooming up into the upper layer, the bird gets a big lift from the momentary increase of air speed which it gets as it does so. Having achieved this height, it turns and starts its long glide down wind again.

Of course, the air is not sharply divided into two layers, but is really an infinite number of layers, each being slowed down by the layer beneath, but the principle holds good all the same. This method can be used only by fast *heavy* gliders, and only in the layers of air within about 50 feet of the surface of the ocean. If it were not for the slowing down of the lower layers, this method would be impossible. In still air the albatross has to flap like other birds.

Some gliders, especially the shearwater, are helped by air being deflected upwards or being suddenly pushed upwards by ocean waves. Gulls, which have a lower aspect-ratio than the albatross, use up-currents caused by wind being deflected by

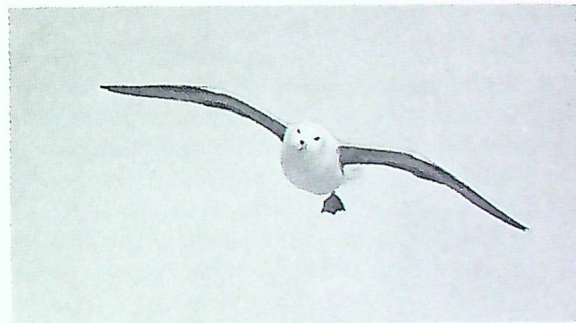
Razorbill flying flat out downwind with a probable ground speed of over 60 m.p.h. An evolutionary reduction in the razorbill's wing area demands fast flight to achieve the necessary lift.



Razorbill in a fast glide using tail and webbed feet as extra control surfaces. The small size of the wing is particularly apparent in this photograph.



The fulmar, a high-aspect-ratio fast glider, using one foot to steer its flight.



Gannet completely stalled while landing with vigorous back-pedalling action of the wings. Note the lifting of the feathers below the leading edges of the wing.



cliffs or buildings, as well as those created at the sterns of ships.

Most normal flight can be fitted into one of the following categories:

- *Direct continuous flapping.* This is found in all sizes of birds from the swan down to the wren. The bird's path is horizontal. The rate of flapping depends on the wing-loading, being slow in such birds as the heron and fast in the duck.

- *Undulating flight.* This is flapping interrupted by a regular momentary closure of the wings. During the flapping phase the bird recovers the height lost during the closure of its wings. The great majority of small perching birds use this method. It is hard to see what advantage is gained, for any rest during the closed phase would be more than cancelled by the increased effort needed during the flapping phase.

- *Regular flapping interrupted by glides.* This method is found in many birds of prey and in the gannet, fulmar, shearwater and game birds. There is wide variation here, for no one can say that a gannet and a grouse fly in the same way. Basically, however, the action is the same.

- *Long glides interrupted by an occasional flap, prolonged gliding and soaring.* Included here are the two types exemplified by the albatross and the vulture — high-aspect-ratio fast gliders and low-aspect-ratio soarers.

- *Other types, including the following — (a)* Jerky, fitting and zigzagging flight (warbler, chat, robin, redstart, nightjar). *(b)* Jerky and dashing (swallow, martin, swift, falcon). *(c)* Hovering (kestrel, kingfisher, tern, humming-bird). *(d)* Headlong diving (kingfisher, gannet, tern).

## Speed

Accurate measurements of speed are hard to obtain. Near the end of the last century a famous ornithologist claimed that migrating birds flew at great heights, and at speeds of 200 m.p.h. and over. Now that these claims have been shown to be grossly inaccurate, there is a tendency to minimize the speeds and to claim for birds only the most moderate performances. Not long ago a scientist who should have known better claimed that the sparrow had a speed greater than the sparrowhawk! The following speeds may be taken as approximately accurate:

Small perching birds, e.g. sparrows . . . . .	10-20 m.p.h.
Swallow, martin . . . . .	20-30 m.p.h.
Gull . . . . .	20-35 m.p.h.
Gannet . . . . .	45-50 m.p.h.
Pigeon . . . . .	c. 50 m.p.h.
Razorbill . . . . .	40-50 m.p.h.
Swift . . . . .	50-80 m.p.h.
Peregrine swooping . . . . .	more than 100 m.p.h.

Estimates of speed are confused by the fact that a small bird flapping its wings rapidly looks much faster than a large bird flapping its wings slowly.

## Endurance

Several land birds have been proved to cross up to 2,000 miles of ocean on their migrations to remote oceanic islands. In these cases their powers of accurate navigation are more astonishing than their endurance.

The Arctic tern nests within 600 miles of the North Pole, and, in the northern hemisphere winter, is found as far south as the edge of the pack ice around the South Pole, a round journey of over 20,000 miles each year. A shearwater taken from its nest in the British Isles was recently released near Boston, U.S.A. It returned, covering 3,200 miles in just under 13 days.

A swift probably averages about 50 m.p.h. as it flies around catching insects for its young, and usually is in the air for nearly all the daylight hours. It must cover a very great distance each day — probably more than 200,000 miles per annum.

Not long ago a flock of lapwings took off one winter evening from the north of England and headed for Ireland. Since there was an easterly wind of about 55 m.p.h. and the birds' speed was about 45 m.p.h., they overshot their mark and a large number of them arrived in Newfoundland next day.

## Ceiling and Payload

It is unusual for birds to be seen flying over 2,000 ft., and any accurate records of birds over this height would be most welcome. There are a number of such records, many of which show that birds often cross high mountain passes on migration. A much-quoted record is of a flock of geese photographed through a telescope while a photograph of the sun was being taken. Measurements are said to have shown that these geese were at a height of 5 miles. The condor, soaring over the Andes, must sometimes approach this.

Birds do not have any very great weight-lifting ability. Stories of eagles carrying away young children are almost certainly exaggerated. It is doubtful if an eagle could lift anything heavier than a sickly lamb. Gannets and cormorants, when frightened, often vomit up their last meal before taking off.

### Loss of flight

When birds inhabit remote places where there are no natural enemies, it may be to their advantage not to be able to fly. Once a bird becomes flightless there is no need for there to be a limit to its size, and so such birds as the ostrich reach a very large size, and the extinct moa was much bigger still. The heaviest bird capable of flight is the swan, and it has great difficulty in hoisting itself into the air, having to run a long distance across the surface of the water before taking off like a heavily-loaded bomber.

Birds which use their wings to swim under water have an evolutionary pressure on them towards a reduction in wing area. Water as a medium is so much denser than air that the propelling surface need not be large, and the buoyancy of the water holds up the bird without the need for supporting surfaces. Thus we find that the extinct great auk, the penguin, and several fossil birds, have greatly

reduced wings or no wings at all. A close relative of the great auk, the razorbill, is gradually following in the same direction. Its wings are reduced slightly already, and so it has to fly very fast in order to get enough lift from the reduced wing-area. To fly fast it has to beat its wings very rapidly, and this requires very powerful and heavy breast muscles. Thus a reduction in wing-area has led to an increase in weight, and if this process of "development" goes on much longer the razorbill will be grounded permanently.

Several interesting species are much nearer flightlessness than the razorbill. The Laysan teal can fly only about 100 yards before becoming exhausted, while the steamer duck of the Falkland Islands exists in two species, one of which can only just fly, while the other heavier one cannot take off. It can, however, move across the surface of the water with great rapidity, using its tiny wings like the paddles of a paddle-steamer.

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### **SPLICE THE M. B.!**

If you hadn't read it in this column you wouldn't have believed it. An American pilot of a British naval jet went with it over the side of a carrier. In the sinking 'plane the pilot, wishing he was out of it, had a bright idea. One guess? Yes, he used his ejector seat.

(*"The Aeroplane"*: U.K.)

# HOW TO DRIVE A CAR IN PARIS

By Wing Commander J. R. Mitchell, D.F.C., A.F.C.

Assistant Canadian National Military Representative, S.H.A.P.E.

**T**O DRIVE in Paris, a man needs three things: nerve, push, and horn. (Well, all right — and a car. We assume the car). If he has enough nerve, he can get along without push; if he has enough push, he can get along without nerve. But if he thinks he can drive in Paris without a good loud horn, he has more nerve and push than is good for him.

In Paris, there is a whole series of occasions when blowing the horn is essential. These are:

- When you see another car.
- When you see a pedestrian.
- When you see anything in a road, like a road or something.
- When you come to an intersection.
- When you are in an intersection.
- When you leave an intersection.
- When you have driven quite a while without seeing an intersection.
- When you come to a place where it looks as if there should be an intersection.
- When your nerve or push gets to the point of being too much for you.

Blowing the horn at any other time, however, is a penal offense.

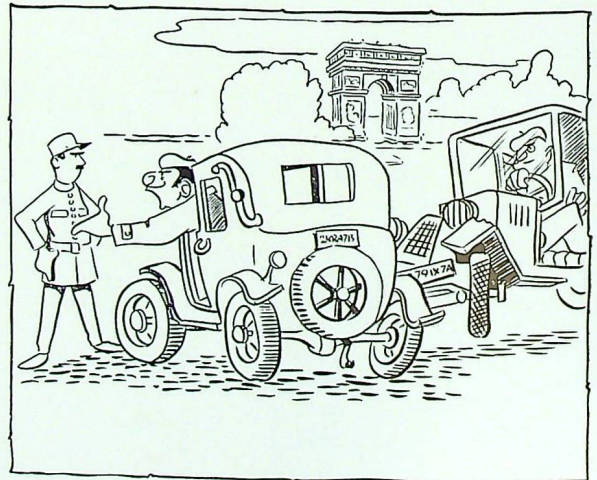
It will be immediately realized that the primary purpose of the horn is to ensure safety at intersections. The fact that the horn does not accomplish this can be attributed more to the intersections than to the horn. A Paris intersection is more than merely the junction of two streets — it is a crisis!

Let us imagine that you are driving peacefully up a side-street when, to your horror, you discover that it impinges on the Champs Elysées

(the largest avenue in all Paris). There is nothing to do but press on. You do so.

As you approach the corner, you blow on your horn. Naturally, the hordes of people crossing the street turn and look at you scornfully. Here is where the *foreign* driver makes his mistake. He slows down. We cannot emphasize too strongly the essential error in slowing down. It encourages the pedestrians, who really need no encouragement.

*The thing to do is to speed up.* In this way, any pedestrian who is struck a glancing blow will be driven to the side and will not become entangled with the wheels. In a heavy car, this is primarily a matter of aesthetics; but in a light car it is important, since light cars tend to be uncomfortable when driving directly over pedestrians.



Of course, if a pedestrian is struck squarely, he will probably go under the wheels; on the other hand, pedestrians who are careless enough to be struck squarely have long ago been weaned out. The law of the Champs Elysées has the same rigor as the law of the jungle, which is roughly similar.

Once past the stream of pedestrians, you are ready to enter the traffic on the avenue. The thing to remember now is that *you must not stop moving*. At times it is essential to slow down a little, but this is a sign of weakness and must not be permitted to become a habit. *Let the other man slow up*.

Driving across the street is now a simple problem in integral calculus, represented by the formula  $nt/dt = ko dx$ , where  $t$  = your speed,  $y$  = the speed of the other cars,  $k$  = the amount of life insurance you have,  $o$  = the number of your beneficiaries, and  $x = x$ . Any one who can handle that simple formula will have no trouble.

Half-way across the street is a rest period, in the form of a rank of taxi cabs. These, however, have the option of starting up without warning.

On the other side of the street, of course, you must make your way through another horde of pedestrians. The thing to watch here is the speed of your car. Among new drivers, the trip across the Champ Elysées tends to slow up a car a little, and the pedestrian may therefore be attacked at a speed somewhat less than optimum. Practice will teach when to accelerate at the proper moment. Above all things, **DO NOT SLOW UP**, as so many amateurs do, directly after hitting a pedestrian. *A proper follow-through is absolutely essential for the best results.*

When this technique has been properly mastered, the driver may begin to undertake the Paris traffic circle, of which the finest example is the Etoile (Arc de Triomphe), with twelve streets radiating off it. Twelve main streets, no less! There are two principal methods of driving around the Etoile: the inside, or dead-man's curve method, and the outside, or marching-through-Georgia method. Each has its merits. In the inside method, *you drive into the Etoile as fast as your motor will carry you and aim directly at the Arc de Triomphe*. This brings you straight across the

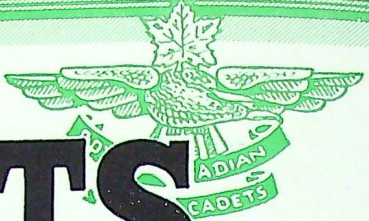


bows of every car that is making the circle. Once you get as far in as the roadway allows, you begin to circle. As soon as you get opposite the street you are looking for, *you turn at right angles and drive out*, again crossing the bows of all other cars.

The outside method is just the reverse. Here, by staying on the outside of the stream all the way, any car that wants to get out of the main traffic must cut across your bows. As a general rule, the inside method causes more consternation if you are only going about one or two streets around, as from Avenue Hoche to Avenue MacMahon. The outside method does the maximum damage when you are going from Avenue MacMahon to Avenue Hoche. There is also a third method, known as the Middle Method, combining the worst features of the other two. It is not recommended for beginners. It is not, in fact, recommended at all.

This will do for a brief introduction to Paris traffic. Although more complicated, it is also more effective than the method used by the French themselves, which is to **SHUT THE EYES TIGHTLY WHEN SETTING OUT AND TO REOPEN THEM ONLY UPON ARRIVAL AT THE DESTINATION OR THE HOSPITAL.**

# The ROYAL CANADIAN AIR CADETS



By Arthur Macdonald, Air Cadet League of Canada

## ANNUAL INSPECTIONS

Once again it is annual inspection time for Air Cadet squadrons across Canada. During the coming month, high-ranking R.C.A.F. officers will visit every squadron in the country to check on the training given, note the improvements over last year's performance, and point the way toward greater proficiency in 1954.

Interest in the annual inspections is heightened by the fact that all squadrons will again be competing for the R.C.A.F. Association Trophy, an impressive award which goes to the squadron rated as the most proficient in Canada. It was won for the first time last year by No. 187 (High River) Squadron.

The trophy was presented two years ago by the R.C.A.F.A., which hoped by this means to raise the standard of Air Cadet training across Canada. Squadrons are rated in accordance with a formula developed by the Association in conjunction with the Air Cadet League and R.C.A.F. The formula takes into account virtually all factors of squadron operation, including average attendance, number of hours devoted to syllabus subjects, performance of cadets at annual inspection, efficiency of the local sponsoring committee, public relations, and extra-curricular activities. The scoring procedure, which will be amended from time to time to meet changing conditions, is outlined in a special

squadron assessment form printed by Air Cadet League Headquarters and distributed some time ago to all units.

The trophy itself is of most impressive design, depicting the spirit of modern flight. Winning squadrons will receive an attractive replica for permanent retention.

In addition to the R.C.A.F.A. Trophy, squadrons in western Canada will also be competing for the Guthrie Trophy and for Provincial Shields, which are awarded on a similar basis.

## THREE GENERAL PROBLEMS

Three problems common to practically all squadrons in Canada are:

- cadet enrolments,
- financing, and
- accommodation.

We can hardly be expected to provide easy answers to these problems here, but we can tell you about three squadrons who have tackled them with ingenuity — and considerable success.

### Enrolments

With the continued emphasis on expansion in the Air Cadet movement, you may be interested in reading how No. 82 (Brandon) Squadron doubled its strength in three months.

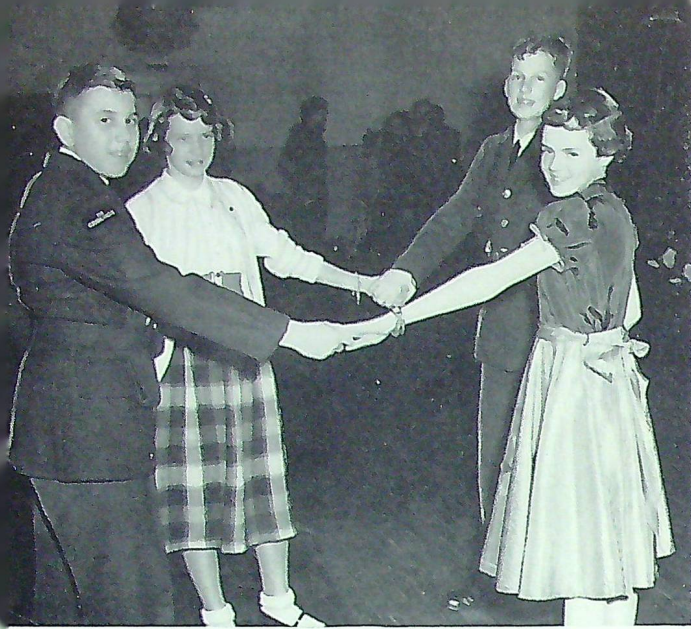


*The outstanding progress made by No. 527 (Simonds) Squadron, of Saint John, N.B., in the past two years is reflected in this photo showing a group of cadets who have earned their stripes. Several trophies won by this progressive young squadron are also pictured.*

At the start of the last training year, the strength of No. 82 Squadron was 35 cadets. Before launching an enrolment campaign, squadron officers got in touch with the manager of the Brandon Flying Club, E. R. McGill, who pledged his co-operation. The squadron was then able to announce that every air cadet who brought in a new recruit would be given a thirty-minute familiarization flight in a light aircraft. One month later, squadron strength was 45, and by the

end of December it had reached 70 cadets. Two-place aircraft — Cessna 140's and Aeronca Champs — were used so that instruction could be given while the cadets were in the air.

The scheme was so successful that the squadron is now working on a plan to provide familiarization flights for the new cadets once they have obtained a satisfactory degree of proficiency in their syllabus training.



*Cadets and their partners all set for a square dance at a party sponsored by No. 314 (Grand Falls) Squadron.*

### **Financing**

For suggestions on squadron financing we turn to No. 563 (Saltcoats) Squadron, one of the newer and more progressive units in the west.

Last spring, the Saltcoats unit commenced operations as a sub-flight of No. 17 (Yorkton) Squadron. By the end of the year, cadet strength had climbed to the point where the unit was able to stand on its own feet as an independent squadron. One of the first moves made by Saltcoats cadets was to set up a canteen in connection with local sports day and to reap a net profit of \$168. Last November, the cadets sponsored a three-act play and variety concert, which drew more than 450 people and netted over \$200. The following month they held a chicken bingo in the town hall and once again rolled up a tidy profit.

In addition to meeting routine squadron operating expenses, the funds have been used for the complete equipment of a cadet hockey team, which has joined in a league with several other towns and is well supported in the community. The squadron also decorated a large Christmas tree in the centre of the town and sponsored an immensely successful Santa Claus parade.

Of all of these activities, the squadron is probably most proud of its three-act comedy entitled "This is the Army." Written locally, the

play featured cadet talent and was the subject of much favourable comment in the area. The squadron would be glad to pass the script along to other units interested in using this unique method of raising funds.

### **Accommodation**

An effective approach to the problem of squadron accommodation has been worked out by No. 525 (West Vancouver) Squadron. Since this unit got under way in January 1951, the training programme has been hindered by lack of adequate quarters, and squadron strength has therefore been held at a fairly low level.

Last year, however, the squadron was successful in obtaining two large surplus Army huts and also a plot of rent-free ground from the municipality. The huts were moved some 400 yards to their new location, and everyone connected with the squadron pitched in to see that the job was completed promptly. Then they went to work on building-materials, furnishings, etc., and set about completely refurbishing the old huts. According to the last word from West Vancouver, a regulation 25-yard indoor range is nearing completion; the lecture rooms, orderly rooms, and offices are just about ready; and work is well advanced on an open fireplace, lounge, and kitchen.

Now that the building is in shape, the squadron is planning to launch an enrolment drive aimed at tripling its present strength.

### **SUCCESS STORY**

Ever wonder what happens to graduate Air Cadets? Here's what No. 82 (Brandon) Squadron has told us about some outstanding cadets who have gone on to bigger and better things:

A former Brandon cadet, Bill Gibson, is now flying as a co-pilot on North Stars for T.C.A. from Winnipeg to Toronto. Art Paris, the first Brandon cadet to win an exchange-visit trip, is now a graduate pharmacist. Former Sgt. Gerald Gilroy won an Air Cadet League scholarship to the University of Toronto and is now studying to become an aeronautical engineer. Flt. Sgt. Don Strang won a league scholarship to the Canadian

Services Colleges, earned his pilot's wings, and is presently attending the University of B.C. under R.C.A.F. sponsorship. Other League scholarship-winners are L.A.C. Ernest Brown, who is in his second year at Royal Roads, and Ted Dillistone, who is at the Royal Military College, Kingston. Flying scholarship — and exchange-visit winner, Flt. Sgt. Jim Wall, is an engineer at the Brandon Flying Club and is working for his commercial flying license. Flying scholarship-winner Ken Biccum was selected for pilot training with the R.C.A.F. earlier this year, and L.A.C. Terry Kerr won a \$1200 scholarship to the faculty of engineering in Queen's University.

This is only a small part of the story of a single squadron. Multiply the above by two hundred and thirty six and you have some idea of what the Air Cadet movement is doing to prepare lads for future careers.

#### CADET HERO

The town of The Pas in Manitoba will long remember Ernest Villeneuve, a 14-year-old Air Cadet who gave his life recently in an attempt to save his baby brother, Jackie, who also died when fire destroyed the Villeneuve home.

Over 400 residents of the town attended the funeral services of the boy who led his two sisters

*Promoted cadets of No. 353 Squadron receive their new rank badges from Flying Officer A. F. Malone. Left to right: Flt. Sgts. D. Boyington, M. Overbury, R. Littles, Sgts. B. Hudson, R. Hamilton, J. Dodgson.*





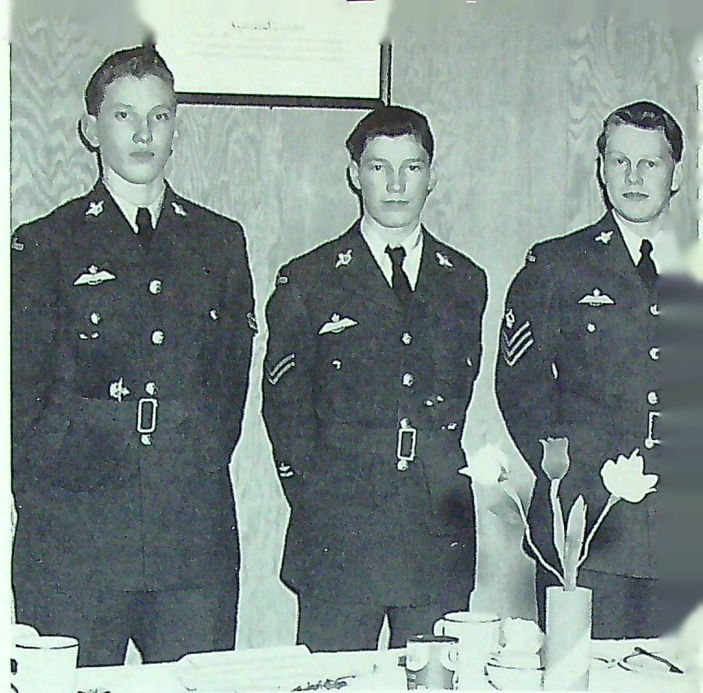
*The drum and bugle band of No. 314 (Grand Falls) Squadron, as it appeared in last year's music festival at Plaster Rock, N.B.*

to safety from a blazing frame home and turned back at the doorway to seek his young brother.

The fire, which apparently started from overheated stove-pipes, broke out when the children were sleeping. Ernest, who was awakened by shouts from downstairs, found the lower floor ablaze and led his sisters to escape by an upper window. Ignoring the pleas of his friends, he turned back into the blazing building to search for his infant brother, who had fallen through the burned floor. Both bodies were later recovered by firemen.

#### MERCY FLIGHT

A despatch from Grand Falls, N.B. tells of prompt action taken by the Air Cadet League and the R.C.A.F. to save the life of a young Grand



*These air cadets of No. 353 (Dawson Creek) Squadron won R.C.A.F. flying scholarships last year, passed the course successfully, and received Air Cadet flying badges. Left to right: Cpl. Robertson, Cpl. Lefebvre, Flt. Sgt. Hansen.*

Falls air cadet. The lad, James McGillicuddy, needed a delicate brain operation to save his life. In response to a request from the Grand Falls Air Cadet Squadron, the R.C.A.F. sent an aircraft to the U.S. Air Force Base at Presque Isle. The cadet was transported by automobile some thirty-five miles from Grand Falls, placed aboard the waiting R.C.A.F. aircraft, and flown to a Montreal hospital, where a successful operation was performed.



## KILLERS

“Neither work nor accident is the great killer. The great killers are ill-feeling, querulousness, bitterness, argument, vanity, and pride.”— Santos-Dumont.

*(Col. Pierre Paquier, in "Forces Aériennes Françaises".)*

# *Flying Saucers are Hard to Wash up*

*By John Allan May in the "Christian Science Monitor."*

There are, roughly, only two classes of people in the world — those who want "flying saucers" to be proved to be nothing more remarkable than reflected car headlamps, and those who want "flying saucers" to be proved to be flying saucers.

I place myself emphatically in the second category.

Personally, I want flying saucers to be the real (?) thing — machines operating on no theory known on earth and filled with merry little men, each four inches high and with big ears like a rabbit's. It would make things so interesting.

Also it would get nearer to taking some professors of natural science down three pegs than anything that has happened yet on this remarkable planet. One or two professors I've read about recently seem to have been getting a bit above themselves, a difficult but not impossible feat. They know so much!

This is why I, for one, was so pleased to read the other day of reports of new, strange "rotating lights" over the north of Japan. These "lights" behaved in the authentic manner, hovering and darting suddenly forward or sideways at impossible speeds, rotating merrily all the time. They were tracked on radar. They were chased by jet fighters. They were observed by properly accredited saucer-observers. Whatever they were, they were not reflected lights.

The coincidence that these objects appeared just after the military authorities had warned that they would shoot down any flying machine that flew over Japanese territory without permission has led some commentators to imagine that they must be new and fantastic Russian craft. I frankly don't believe it. Russians don't enjoy being rotated. Besides, if the Russians had any flying saucers, we would know about them. We would have invented them.

The happenings over Japan might just as well prove that Thingumbobs have a sense of humour and have been reading our papers. This seems to

me to be more likely. It is the first bit of encouragement that we Friends of the Saucer have had for quite some while.

The only people who have yet been able to shoot down a saucer are the professors. These opponents of ours had considered the day won. They acclaimed the theory of several of their kind that "flying saucers" are caused by reflections of terrestrial lights bouncing off an invisible but well-sprung ceiling in the air caused by temperature inversions. A temperature inversion is a layer of warm air balanced on top of a layer of cold air. (Don't ask me how.)

One physicist produced "flying saucers" in a laboratory by shining lights on a cup of hot chocolate. (Don't ask me why.) Another has been known to produce a temperature inversion in the classroom simply by talking. (Don't ask me who.)

Some of these professors are fond of proving the impossibility of any form of life, particularly other professors, existing outside the narrow band of air that encloses our earth. Sometimes they remember to qualify their remarks by saying "any form of life as we know it." Well, fellows, what about some form of life as we don't know it?

I like wonders. And I am sure they will never cease. The events over Japan give me hope that one day a flying saucer will descend on the campus of the Massachusetts Institute of Technology just as some learned skeptic is saying, "All these phenomena are easily explained." Before he can say any more, 70 little Thingumbobs four inches high will have poured in through the closed windows, snipped off all his coat buttons with pinkish shears, sprayed him green from head to foot with their planetary paint guns, and inverted a wicker wastebasket over his head. The leading Thingumbob will say in a voice like several bulls, "Well, explain that!" Then they'll disappear like lightning, darting and rotating as never was before, leaving him just standing there.

If any Thingumbob reads this, I would very much like to be there when it happens.

# Letters to the Editor

## ABBREVIATIONS IN "THE ROUNDel"

Dear Sir:

First, cheers for "W.O.1 (name withheld)" for his letter on the use of the term "Sergeant-Major" in the R.C.A.F. My own complaint, too, has standardization for its keynote.

The preface to C.A.P. 460, Manual of Service Writing for the Royal Canadian Air Force, begins thus: "This manual is issued to standardize writing in the R.C.A.F.". Appendix "D" to C.A.P. 460 lists the authorized abbreviations for R.C.A.F. ranks.

It will be noticed that the abbreviations for all officers' ranks have oblique strokes separating the letters, while those for the airmen's ranks do not. Yet how often we see the abbreviation for "Flight Sergeant" written as "F/S". Most of the guilty parties seem to be senior N.C.O.'s and, to use Sgt. Shatterproof's favourite expression, the Brass.

It may be, of course, that they use the incorrect form in order to avoid possible error. For example, since no punctuation is used, confusion can result from such a group of letters as "FS BO Doe". Thus, it might be wise to change the abbreviation. To conform to the system of having no oblique strokes in abbreviations for airmen's ranks, a suitable abbreviation might be FSgt". Apart from this one instance, however, the abbreviations listed in Appendix "D" are perfect.

Therefore it is rather nauseating to see the improper abbreviations which abound in the pages of "The Roundel".

Why cannot authorized abbreviations be used in "The Roundel"? To a letter asking the same question some time ago, the Editor replied that civilians might not understand them. That, in my opinion, is a rather unsatisfactory reason. Is the publication not issued mainly for R.C.A.F. and ex-R.C.A.F. personnel? Those readers who have not had any experience in the R.C.A.F. should have interest and pride in knowing and using official R.C.A.F. terms. (What is the opinion of the civilians on this statement?)

The one item in "The Roundel" that does abide by the rules is "Personnel Movements". But even here there is an error in the "Key to Abbreviations". Appendix "B" to C.A.P. 460 shows "Gp" as the abbreviation for "Group", not just "G". "MGHQ" and "TAGHQ" should therefore be "MGpHQ" and "TAGpHQ", respectively.

Why cannot Appendix "D" to C.A.P. 460, and possibly some of the other appendices, be published in "The Roundel"? It might be an excellent manner of indoctrination of civilians and of keeping R.C.A.F. personnel "genmed"! This indoctrination could even extend to the public in the form of press releases by P.R.O.'s. To a person who does not know the ranks, "AC1" means as much as Grundoon's "SKMNS".

A policy that both P.R.O.'s and the Editor of "The Roundel" might find well worth adopting is to write the rank in full the first time it is used in an article and to use the proper R.C.A.F. abbreviation thereafter. The same could apply to other R.C.A.F. terms.

Cpl. G. B. Landis,  
Support Staff,  
5000 Intelligence Unit.

*(We thank Cpl. Landis for his excellent letter. We did, as he reminds us, once state that our unofficial abbreviations were adopted out of consideration for our non-Service readers. In point of fact, however, we also considered that the general readability of the magazine would be impaired by rigid conformity with standards that had—very properly—been laid down in the Introduction of C.A.P. 460 as applicable to "Correspondence, Orders and Instructions, and Service Papers", the third of which categories refers to minutes of meetings, reports, etc. Furthermore, para. 16 of Chapter 1 of C.A.P. 460 states that "the Oxford Concise Dictionary is to be taken as an authority." This last injunction we have always followed fairly closely, even to the use of periods after initials of all kinds. We use the 1951 edition.*

*At the same time, Cpl. Landis has pointed out to us certain inexcusable inconsistencies in "Personnel Movements". In this section, which is the one "formal" section of the magazine and of interest to no one but Service personnel, we have always felt it appropriate to use the abbreviations given in the appendices to C.A.P. 460. The inconsistencies have been corrected in our present issue.—EDITOR.)*

### Answers to "What's the Score?"

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

*A horse neighs according to its rider.—(Turkish proverb.)*



## Old Faithful

The Dakota is not an easy aircraft to get down from the skies and keep down. Year after year it goes on doing its various jobs safely and well (transport, pararescue, glider- and target-towing, etc.), and although it is gradually being replaced by the Fairchild C-119, there are still plenty of Dakotas in the R.C.A.F. The one that appears on this page is used for training at the Air Radio Officers School, Centralia. The photograph was taken by Cpl. K. R. Crosby, N.C.O. i/c station photography.

