

The **ROUNDDEL**

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ROYAL CANADIAN AIR FORCE



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This Month's Cover



The shadow of a Search and Rescue
 Canso drifts across the northern bush.
 (See article on page 14.)

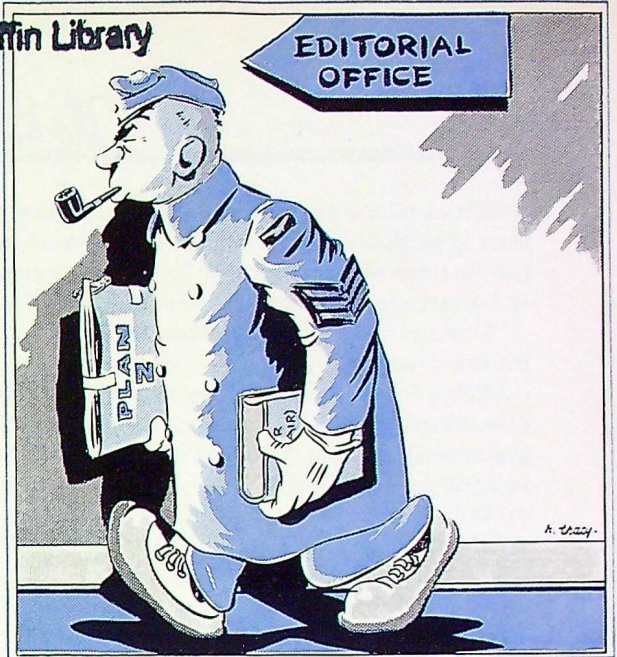
Sgt. Shatterproof Prepares to Mount

IT WAS FOUR-THIRTY, and the shades of night were falling fast. Yet no responsive "Excelsiors!" rose to the editorial lips. True, I was not passing through an alpine village, but I doubt whether it would have made much difference if I had been. Indeed, if anything could be less conducive to gaiety than sitting at a desk in A.F.H.Q. on a bleak December evening, passing through an alpine village would probably be it. Far be it from me, however, to argue with Longfellow. Let me put the situation in a nutshell and say briefly that the cosmos was crumbling about me.

The Shrewd Reader will suggest, perhaps, that it was something I'd eaten. If he does, the Shrewd Reader will be wrong. Never had I been more eupeptic. My sickness was not of the belly. It was of the soul. For I had, that very noon, witnessed the final triumph of the Fifth Horseman of the Apocalypse, Commercialism.

It occurred in Toyland, at Shamble's Department Store. I had fought my way through a few last-minute purchases and was taking a breather in a corner, right beside the floor manager's office. Suddenly an indignant voice from within assailed my ears. Glancing cautiously round the edge of the open doorway, I saw Father Christmas and the manager apparently engaged in altercation. Father Christmas (whom, despite his whiskers and the five-cent cigar sticking out through them, I recognized as an actor in the local repertory company, noted for his interpretation of sacred rôles) was saying:

"... and don't blame me for your lousy sales! Where are your machine guns and sub-atomic disintegrators? Where's your mediaeval torture set? Where's your universal destroyer? Why, man, you haven't got a damn thing! Go over and take a look at Gastley's Elfin Market — Flash Gordon



ray pistols, Hopalongs that shoot real bullets when you grip 'em by the legs and press their stomachs, war-criminal-trial outfits complete with gallows — everything a red-blooded kid could wish for. It'd be a real pleasure to play Santa there. But this place — phooey! You guys don't understand even the rudiments of selling!"

It was in pensive mood that I ambled back to the office. Not merely was my heart bleeding for Shamble, not merely had one of my last illusions been shattered, but (I realized) there wasn't a single flesh-hook or thumb-screw in any of the parcels I'd sent to my small-boy friends. Evidently, I was effete. I was a has-been. I was not cooking with gas . . .

So sunk in gloom was I by four-thirty that I was unaware of Sgt. Shatterproof's arrival until he actually loomed before my desk. I returned his salute with an apathetic nod.

"Hello, Sergeant," I said. "Why the stealthy approach? Normally I can hear your martial stride three corridors away."

He said nothing for a few moments — only stood there gazing at me with glittering eyes. Then he remarked:

"The footfalls of Fate are seldom audible, Sir."

"Look, Shatterproof," I said, not without heat, "if you've come here to criticise and censure, I'm in no mood for it. I—"

He patted the air with a soothing pipe-stem.

"Let us calm ourselves, Sir. More urgent things than 'The Roundel' demand our attention. It is not Shatterproof the Critic who stands before you. It is Shatterproof the Man of Destiny."

"Destiny?" I repeated vacantly. "Destiny? Oh yes, of course — destiny."

"Echo, Sir," he reminded me with some sternness, "is not comment. Let us pull ourselves together. — To proceed. The hour is about to strike. In a few days the fateful year of 1951 will be upon us. But it will not find Canada — or Shatterproof — unprepared. Plan Z is ready. On January the first, it goes forward to His Majesty."

"Plan Z? I thought they'd only reached Plan—" Shatterproof smiled grimly.

"You mean the Brass? Possibly so, Sir. But I am, as usual, thinking in somewhat broader terms than the Brass. My Plan Z is a plan to end all plans. It takes care of everything."

"A sort of economic snake-oil, eh? The Answer to the Human Problem? Is that it?"

"I flatter myself that it is, Sir. One grows tired of chaos."

While I was considering the truth of his last statement, he refilled his pipe and lit it. When it was going to his satisfaction, he proceeded:

"Plan Z starts with the assumption that the next war—if there is to be one—is over. Then—"

"Quite an assumption," I broke in.

He gave me a cold glance.

"But not an unreasonable one, Sir. After all, I have been building up this Service for some years now."

I sighed. "O.K. Go on."

He continued to eye me dubiously for a few seconds; then his expression cleared and he went on:

"Our assumption granted, we find ourselves faced with the problem of reorganising our world on a sound basis. That is where Plan Z comes in."

"It solves everything?"

"Naturally, Sir. I have checked it twice."

I stood up.

"Shatterproof," I said, "You have accomplished what all the philosophers and sociologists of 3000 years have failed to do. Let me be the first to congratulate you." (He inclined his head graciously.) "But tell me more. What was your first step in the formulation of Plan Z?"

"My first step, Sir?" His expression changed to that of a man who has dared the utmost. "I stopped reading the newspapers and looked myself squarely in the face. Then—"

The 'phone rang.

"Sgt. Nuttall speaking, Sir. Is Sgt. Shatterproof there?"

"He is."

"W.O.1 Gallstone's on the line, Sir — long distance. He wants to know what the hell Shatterproof thinks he's doing in Ottawa when he's supposed to be Orderly Sergeant to-night."

"Tell W.O.1 Gallstone he's just leaving," I said, and hung up.

Shatterproof took it calmly. He removed his pipe and tapped the dottle into my ash-tray.

"Let us not discompose ourselves, Sir. Plan Y takes care of all such situations."

"Plan—?"

"Plan Y, Sir, That is the plan which makes planning possible." He wrestled sharply with the lining of his trousers pocket and dragged forth a huge watch. "In exactly five minutes from now Sgt. Catacomb will automatically report for duty. —None the less, I shall leave. W.O.1 Gallstone may call again, and we have little in common."

He saluted and turned on his heel.

"Half a minute, Sergeant. Don't you want to give the boys in the field a New Year greeting?"

He looked back over his shoulder.

"Tell them, Sir, that Shatterproof is ready to vault into the saddle."

And with that, the old Leviathan was gone.

Wisdom

"A man doesn't begin to attain wisdom until he recognizes that he is no longer indispensable."

Rear-Admiral Richard E. Byrd: "Alone." ("Air Clues")

No. 421 (Fighter) Squadron



(Prepared by the Air Historian)

DURING THE SECOND WORLD WAR eleven day-fighter squadrons of the Royal Canadian Air Force served overseas in the Western European and Mediterranean theatres. Five of these squadrons (Nos. 401, 402, 441, 442 and 443) had been formed in Canada before going overseas; the remaining six were formed in the United Kingdom under the terms of Article XV of the British Commonwealth Air Training Plan agreement. The last of the latter group was No. 421, which was formed at Digby, Lincolnshire, on 9 April 1942, and became operational a month later. For the next three years it served with Fighter Command and 2nd Tactical Air Force, and by the end of the war had established a reputation as one of the best fighter units in the R.C.A.F. Its pilots destroyed more than 90 enemy aircraft in combat, probably destroyed 10, and damaged at least 50 more.

Adopted by the McColl-Frontenac Oil Company, No. 421 Squadron carried the familiar Indian head emblem of that company on its aircraft and naturally became known as the Red Indian squadron. Its official badge is a modification of the McColl-Frontenac insignia, showing an Indian's head in gold superimposed upon two crossed tomahawks in red. The motto is "Bellicum Cecinere," which means "They have sounded the war trumpet."

On its formation the squadron was equipped with Spitfire V-B aircraft, and it flew Spitfires (chiefly

the famous Mark IX-B) throughout the whole of its career overseas. The squadron letters, painted on the fuselage of the aircraft, were AU — letters that swept the skies from the Bristol Channel to the Baltic Sea.

The first leader of the Red Indians was Sqn. Ldr. F. W. Kelly, who formed the squadron, got it ready for operations, and brought it through its first weeks of active duty. His successors* were: Sqn. Ldr. F. C. Willis, 14 July 1942: missing on 8 November 1942. Sqn. Ldr. F. E. Green, D.F.C., 17 November 1942: tour expired on 10 April 1943. Sqn. Ldr. J. D. Hall, 13 April 1943: posted on 17 June 1943. Sqn. Ldr. P. L. Archer, D.F.C., 17 June 1943: missing on the same day. Sqn. Ldr. R. W. McNair, D.F.C., 19 June 1943: promoted on 16 October 1943. Sqn. Ldr. C. M. Magwood, D.F.C., 17 October 1943: posted on 12 December 1943. Sqn. Ldr. J. F. Lambert, 13 December 1943: missing on 20 December 1943. Sqn. Ldr. W. A. G. Conrad, D.F.C., 1 January 1944: tour expired on 27 July 1944. Sqn. Ldr. W. A. Prest, 28 July 1944: tour expired on 21 November 1944. Sqn. Ldr. J. D. Browne, D.F.C., 23 November 1944: squadron disbanded on 23 July 1945.

The most successful Red Indian fighter pilot was Sqn. Ldr. R. W. McNair, who destroyed 8 enemy aircraft. Other top scorers were: Flt. Lt. P. G. Johnson, 5; Flt. Lt. K. R. Linton, 4½; Flt. Lt. H. P. M. Zary, 4; Flying Officer W. F. Cook, 3½; and Flt. Lt. B. T. Gilmour, Flying Officer A. R. Mackenzie, Flying Officer R. C. McRoberts, Flt. Lt. J. D. Mitchner, Flt. Lt. E. S. Smith and Flt. Lt. G. M. Smith, 3 each.**

While the squadron was forming, collecting its personnel, aircraft and equipment, it remained at Digby. Early in May 1942, No. 421 moved to Fairwood Common, in South Wales, where it remained, except for a few short breaks, for almost six months. Their training completed, the Red Indians became operational on 13 May and began a round of convoy patrols over shipping moving through the Bristol Channel and St. George's Channel. All fighter squadrons had at least a

*Rank and decorations shown are those held at the time of appointment to command.
**Figures include only victories won while with No. 421 Squadron.



No. 421 pilots in July 1942. Front row (l. to r.): Sgt. C. A. Davis, Flt. Sgt. J. K. Landern, Sgts. L. W. Meldeau, A. C. Aitken, W. Harten, Flt. Sgt. T. S. Judd, Sgts. C. B. Myers, H. S. Wells, Pilot Officer D. M. Iverach, Sgts. C. G. Whitney, J. O. Omand, E. G. Hutchings. Back row (l. to r.): Pilot Officers I. F. Kennedy, J. H. Murray, T. Koch, Flying Officer J. Chasanoff (Adj.), Flt. Lt. G. Robertson, Sqn. Ldr. F. C. Willis, Flt. Lts. J. H. Long, R. Cudham (M.O.), Pilot Officer A. H. Sager, Sgt. R. Clasper.

taste of this duty and all found it a tedious, although essential, chore. After six uneventful weeks at this task, No. 421 moved for ten days to Exeter to carry out scrambles and patrols over the English Channel. The brief sojourn at Exeter brought the Red Indians their first encounters with the enemy. On 6 July, in the course of two scrambles over the Channel, Flt. Lt. G. D. Robertson engaged and damaged an Me. 109 and a Ju. 88. A week after their return to Fairwood Common two pilots damaged another Ju. 88, and finally, on 27 July, two sergeant pilots, C. D. Myers and J. A. Omand, scored the first kill for No. 421 by crashing a Ju. 88 into the sea south of Pembroke. The squadron had opened its victory book, but many months passed before another success was added to the four won in July 1942.

Dieppe was a great disappointment to the Red Indians. Some days previous to 19 August they moved up to Warmwell and Ibsley, but their rôle

was to patrol convoys and make defensive scrambles. The heavy air fighting in which other Canadian fighter squadrons took part over Dieppe was denied them. Then, on 26 October, No. 421 moved to Angle, near Pembroke, for a further three-month spell of convoy patrols. Occasionally, during the last months of 1942, the squadron was shifted briefly to another base for offensive operations over enemy-held territory. It was on one such mission, as escort to Fortress bombers, that Sqn. Ldr. F. C. Willis was lost on 8 November.

The Red Indians' long exile in the doldrums of the war finally ended late in January 1943, when they left Angle and moved to Kenley, an active station in the front line of the air offensive being waged over Northern France. The daily routine (weather permitting) was now a round of circuses (escorts for bombers), fighter sweeps, and rhubarbs (ground strafes), with an occasional scramble or patrol for good measure. There were frequent calls,

too, for Army co-operation exercises, as training for the invasion of the Continent began.

For more than sixteen months No. 421 Squadron remained in this active sector, the south-eastern part of England. Kenley was its home for the greater part of this period (10½ months), but it spent periods of two weeks to two months at Redhill, Martlesham Heath, Lashenden and Headcorn. At first the enemy was disappointingly elusive, and it was not until 15 May 1943 that the Red Indians were able to add a damaged to their score, which had remained at one destroyed and three damaged since the previous July. Two days later the squadron, which had been at Redhill for a month, returned to Kenley and at the same time exchanged its Spitfire V-B's, for the new IX's. The squadron was now in the major league, and the Red Indians went on the warpath. Victory followed victory during the busy summer and autumn months, and by the end of 1943 the squadron bag had risen to more than 34 destroyed and 32 more probably destroyed or damaged.

Many of these successes had been won under the leadership of Wing Commander J. E. Johnson, wing commander flying for the Kenley Wing and then for No. 127 Airfield. When this Airfield was formed in July 1943, as a unit in 2nd Tactical Air Force, No. 421 Squadron was assigned to it along with No. 403 (Wolf) Squadron. The two squadrons remained together in No. 127 Airfield (or Wing, as it was later designated) until the end of the war. During the late summer and early autumn of 1943 the squadrons lived under canvas and became highly mobile — further preparation for days to come.

On 20 December, after the squadron had returned to winter quarters at Kenley, it fought one of the most successful actions in its career, destroying six enemy aircraft, plus three probables or damaged, but lost its C.O., Sqn. Ldr. J. F. Lambert, who had been in command for just a week. The next four months were quiet: scarcely a German was to be found, although the pilots hunted high and low.

In the spring of 1944 the squadron added a new rôle to its duties — dive-bombing — and carried out its first operation of this type on 11 April. For



Sqn. Ldr. F. W. Kelly, No. 421's first C.O.

the next eight weeks No. 421 was busily engaged on the aerial preparation for D-Day, dive-bombing V-I sites, bridges, flak posts, and rail junctions, carrying out fighter sweeps, and escorting medium bombers on their missions over France. But the Luftwaffe was still lying low and only once during these preparatory weeks did the squadron come to grips with the enemy. In the early morning of 8 May, four pilots, on a weather reconnaissance over the Cambrai area, bumped into a lone Me.110 which they promptly crashed in a field. Then they went down on the deck to shoot up an airfield at Montdidier, damaging at least three parked Ju. 88's in the process, in addition to knocking out a flak post.

The 6th of June 1944 was D-Day. For the next week the squadron patrolled over the Western Assault Area, about Cherbourg, guarding the invasion flotillas — and watching in vain for the enemy air force. Finally, on 15 June, eight pilots, flying from one of the new landing strips on the Norman coast, caught twenty F.W. 190's and Me. 109's near Caen and won a notable victory. No less than seven of the enemy were destroyed and four others were more or less severely damaged. One Canadian pilot was lost.

The next day the Red Indians left Tangmere, where they had been living under canvas since mid-April, and moved across the Channel to set up their tents at Bazenville in Normandy. There



No. 421 in September 1943. Front row (l. to r.): Pilot Officer R. W. Isbister, Flt. Lt. R. C. Wilson, Flying Officers W. J. Drope, P. C. Musgrave, Flt. Lt. W. S. Quint, Flying Officer R. G. Driver, Flt. Sgt. I. R. Forster, Flying Officer D. K. Wilson, Flt. Lt. J. N. Patterson. Middle row (l. to r.): Pilot Officer J. Bamford, Flying Officers W. E. Harten, L. R. Thorne, Flt. Lt. R. D. Phillip, Sqn. Ldr. R. W. McNair, Wing Cdr. J. E. Johnson, Sqn. Ldr. N. R. Fowlow, Flying Officers J. A. Ormand, H. P. M. Zary, R. W. Nickerson. Back row (l. to r.): Pilot Officers N. B. Dixon, W. F. Cook, K. R. Linton, J. S. Hicks, Flying Officer P. G. Johnson, Pilot Officer T. Parks, Flying Officer A. E. Fleming, Flt. Lt. F. J. Sherlock, Pilot Officers P. A. McLachlan, H. F. Packard, Flying Officer C. G. de Nancrede.

was good hunting during the next ten weeks, as the squadron patrolled over the beaches and battle area and made armed reconnaissances along the roads behind the enemy lines. By the end of August, twenty-seven F.W.'s and Me's had been added to No. 421's tally of destroyed, as well as 18 probables or damaged, and a long list of German tanks, vehicles and guns shot to pieces or set on fire. The squadron had its share in the slaughter of a Nazi army that was caught in a pocket at Falaise in August.

By the end of that month the retreating Nazi forces had drawn far out of reach of No. 421's airfield at Bazenville, and the squadron began to move forward, starting an advance that did not end until it had penetrated deep into Germany. From Bazenville the Red Indians moved first to Illiers l'Évêque, near Dreux, where, after the first two days, they were inactive—the battle

lines were too far away. The rest gave the pilots and their hardworking groundcrews an opportunity to visit nearby Paris.

On 21 September the advance was resumed and the squadron jumped forward to Beauvechain, near Brussels, where it set up quarters for a week in abandoned German barracks that leaked like sieves. The move was in time for the pilots to engage in the heavy air fighting that attended the airborne landings at Arnhem, Nijmegen and Grave, and in eight days (25 September to 2 October inclusive) they accounted for 12 destroyed and 8 damaged Me. 109's, all in the Nijmegen area.

On 1 October the Wing had moved again, to Grave in Holland, for a three-week stay before going back to the Brussels area, first to Melsbroek for a few days and then to Evere, where it remained until the end of February 1945. For many



Flt. Lt. K. R. Linton, D.F.C.



Sqn. Ldr. R. W. McNair, D.F.C. and two Bars



Sqn. Ldr. P. L. I. Archer, D.F.C.

weeks, after the action of 2 October, the squadron's front line patrols were uneventful. There were occasional tantalizing glimpses of Me. 262's (the new Nazi jet fighters) that were too fast for the Spits. to engage, and also sightings of vapour trails of the V-2 rocket bombs that the Germans were now firing against England. On Boxing Day there was a brief but satisfactory engagement when two enemy pilots made the mistake of trying to bounce a Red Indian Spitfire. In the action both Me. 109's were destroyed. These victories were the first won on the new Spitfire XVI's with which No. 421 had been re-equipped in its return from an air firing course in England in mid-December.

New Year's Day 1945 is a day that no one who was with 127 Airfield at that time will ever forget. In the Luftwaffe's last major blow of the war, formations of fighters struck at many Allied airfields in Belgium and the Netherlands, hoping to catch them napping. Considerable damage was inflicted, but the Nazis suffered heavy loss at the hands of our fighters. No. 421 escaped without injury to personnel, although five Spits. were shot up in the attack. The squadron was not in the air at the time and its pilots had no opportunity to get into the fray, except as spectators.

Later in January there were two good days of action which cost the dwindling Luftwaffe seven more F.E. 190's destroyed, for a loss of two Red Indian Spitfires. The squadron was now chiefly employed on armed reconnaissances into Germany, shooting up locomotives, freight cars and vehicles.



Left to right: Sqn. Ldr. J. D. Browne, D.F.C., Cpl. B. Miller, LAC R. W. Morehen, Cpl. L. G. Newberry, Sgt. G. E. Montgomery



Sqdn. Ldr. F. E. Green, D.F.C.

In February it resumed dive-bombing too in a rail interdiction campaign designed to paralyse all enemy movements.

At the beginning of March, No. 127 Wing left Evere for Petit Brogel in north-eastern Belgium. Patrols and fighter sweeps by the Red Indians were uneventful, but armed reconnaissances and dive-bombing shows yielded satisfactory results in vehicles destroyed, lines cut and buildings blasted.

In the early morning of 31 March, Flying Officer O. H. Levere destroyed an F.W. 190 and the squadron then resumed its travels. Crossing into Holland, it spent ten days at Eindhoven before moving, on short notice, into Germany to set up tents at Goch. Two days later another hurried move took No. 421 to Diepholz for a fortnight's stay before advancing again to Reinshlen in the last days of April. The final weeks of the war were occupied with patrols and armed reconnaissances, frequently with bombs, into the Bremen, Hamburg, and Lübeck areas; and the squadron's toll of engines, freight cars, and vehicles of all sorts rose higher and higher. Even ships made their appearance in the Red Indians' bag.

On May Day, during an armed recce on which roads packed with vehicles were strafed and 33 M.E.T. destroyed and 10 damaged, three pilots caught an F.W. 190 and finished it off. It was the squadron's last victory of the war. The next three days were filled with fruitful armed recces and



Flt. Lt. J. D. Mitchner, D.F.C.

Flt. Lt. G. M. Smith, D.F.C.





Cpl. C. Garlough and LAC W. Wingrove



Flt. Lt. B. T. Gilmour, D.F.C.

Flying Officer R. C. McRoberts, D.F.C.



LAC's G. Simpson and H. Scott start up a Merlin



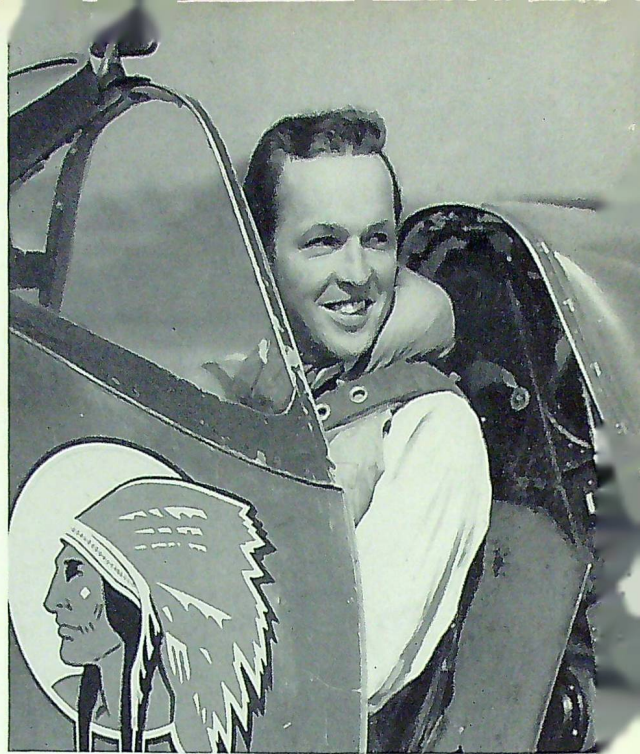
bomb attacks on shipping, and then hostilities in north-western Germany ended with the surrender on Luneburg Heath. The squadron and wing celebrated with a pyrotechnics display that far surpassed the wildest 24th of May in Canada.

No. 421 remained at Reinsehlen until early in July, escorting aircraft to Copenhagen and other points, and participating in fly-pasts to show the R.A.F. roundels to the liberated people of Denmark and over German cities. Then, after a few days at Fassberg, the squadron went to Utersen in Germany, where it was disbanded on 23 July 1945.

* * *

Four years passed. The R.C.A.F. was demobilized, its great wartime structure was cut down, and 200,000 of its personnel returned to civvy street. But at the same time plans were being carefully prepared for its peace-time organization and development. And as, step by step, these plans were put into effect, the number "421" reappeared in the R.C.A.F.'s list of units. On 15

Sgt. H. Miller, of M.T. maintenance



Flt. Lt. A. H. Sager

September 1949 the Red Indian Squadron was re-born at Chatham, N.B., as the second Regular fighter squadron in the Air Defence Group. The early months of its second tour were taken up with organization and training on Vampire jets for air interceptor operations. In the summer of 1950 four pilots completed an air support course at the Joint Training Centre at Rivers, where they received theoretical and practical training in the use of aircraft in co-operation with ground forces.

After these pilots returned to Chatham the squadron began preparations for a move farther afield. In June 1950, Defence Minister Claxton had announced that, in order to acquire experience in the latest techniques of air operations, it had been arranged to send R.C.A.F. fighter squadrons to the United Kingdom, in rotation, to fly and train in close co-operation with units of the Royal Air Force. No. 421 Squadron, now under the command of Sqn. Ldr. R. T. P. Davidson, D.F.C., was selected as the first of our squadrons to receive this overseas experience. The move is scheduled to take place this month (January 1951) and marks an important step in the evolution of Canada's defence plans.

The ROYAL CANADIAN AIR CADETS



By Arthur Macdonald,
Director of Publicity, Air Cadet League of Canada

1951 PLANS

AN UNPUBLICIZED but extremely important Air Cadet League event took place a short time ago when the National Executive Committee of the League met in a full-day session at Montreal. Purpose of the meeting: to discuss new plans for the activities of the Royal Canadian Air Cadets during 1951.

With League President M. Banker Bates in the chair, the meeting was attended by such prominent League executives as Honorary President C. Douglas Taylor, immediate Past-President D. Alex Ross, and Vice-Presidents G. M. Eaton and H. L. Garner. Mr. L. S. Marsh, of Montreal, was also present, along with Air Marshal Robert Leckie, C.B., D.S.O., D.S.C., D.F.C., special consultant to the League. A special guest was Mr. Darroch Macgillivray, who heads up the League in the tenth province of Newfoundland.

While it may seem that a conference room in the Mount Royal Hotel is somewhat far removed from the demanding task of training Air Cadets at squadron level, the directors kept "the boy" very much in the forefront of their thinking throughout the day. And the decisions they reached will have an effect on the operations of every squadron in Canada during the forthcoming year.

In the following paragraphs we shall attempt to summarize executive recommendations on certain League activities and outline a few of the plans made for 1951.

Expansion Campaign

Reports from the provinces indicate that the drive to increase Air Cadet strength by 50% has proceeded according to expectations. In several parts of the country (notably the Maritime Provinces) the 50% expansion was attained in short order. All provinces report a considerable increase in numbers over last year and are moving steadily toward the goal set for them. There are two phases to the expansion drive:

Phase "A"— A target strength of 19,500 by the end of 1950. The 19,000 figure was passed in mid-November and we can therefore rest assured that the target for Phase "A" has been comfortably attained.

Phase "B"— A gradual increase to 22,500 cadets during 1951. Because of supply and administration problems in connection with the opening of new units, Phase "B" will move at a somewhat slower pace than Phase "A." The rate of increase will be governed by such factors as availability of uniforms, training publications, training aids, etc.

One note of caution was sounded by the meeting: the expansion in numbers does not imply any lowering of standards for enrolment in the squadrons. Commanding officers in particular are requested to concentrate on high calibre lads who will be a credit to their squadrons and to the movement.

Exchange Visits

It has been decided to continue the "get acquainted" exchange flights between Canada,

ROYAL CANADIAN AIR CADETS 155 SQUADRON



No. 155 (Sault Ste. Marie) Squadron puts on an unusually attractive display

the United States, and Britain. The necessary top level arrangements will be made during a special "exchange visits conference" to be held in London, England, April 1951. The League will be represented at this conference by Honorary President C. Douglas Taylor who will be accompanied by General Manager George M. Ross and Wing Commander R. M. Cox, D.F.C., A.F.C., Senior Air Cadet Liaison Officer.

It will be recalled that last year the League played host to an Air Cadet from Sweden, an idea which met with considerable success. The plan may be expanded to other European countries in 1951, although the details may not be worked out for several months yet.

One of the most important matters in connection with exchange visits is the selection of suitable candidates to represent Canada abroad. In the

final analysis this is a squadron responsibility, although further screening is done at provincial and national levels. Squadron commanders are asked to recommend only the very highest type of lad to receive this award and thoroughly to brief successful candidates on their responsibilities while on tour.

Flying Training

Considerable executive disappointment was expressed over the fact that not all of the 225 R.C.A.F. Flying Training Scholarships were taken up last year, despite the fact that 299 cadets passed the qualifying written examinations and were permitted to take medical exams at R.C.A.F. expense.

Chief reason for the high number of medical rejects was defective vision. (R.C.A.F. visual re-

quirements are extremely high when compared with those of Private Pilot's License applicants). It has been decided to eliminate the chief cause of medical failures by insisting that all applicants undergo an eye examination *before* writing the qualifying exams. This examination will be at squadron expense.

Full information on the procedure covering flying training scholarships in 1951 will be sent to all squadrons through the regular League Headquarters Bulletin service.

Air Cadet Week

The week of April 15-22nd will be observed as "Air Cadet Week" throughout Canada. This will be the 10th Anniversary Week of the League, and squadrons are urged to make special plans for observing the League's tenth birthday. Promotion and campaign materials for Air Cadet Week will be supplied by League Headquarters at a later date.

International Drill Competition

The 1951 version of the International Drill Competition will be staged in conjunction with the Canadian National Exhibition late in August. The massive C.N.E. outdoor stage provides an ideal setting for this event.

The Canadian drill team will be selected from the four Maritime provinces — Newfoundland, Nova Scotia, New Brunswick, and Prince Edward Island. Candidates from each squadron in the Maritimes will report to the Air Cadet camp at

Summerside for special training and selection before travelling to Toronto to defend the Beau Trophy. The team will go all out in an attempt to make it four straight for Canada.

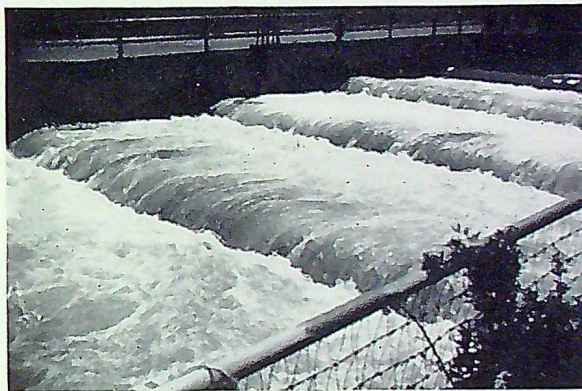
SPECIAL TROPHIES AWARDED

Mr. Denys H. Back, who was League representative on the U.S. exchange tour last year, has presented trophies for the best essay and best photographs to come out of the trip. The winners:

Best Essay: W.O.2 Victor B. Walker, 30 (Estevan) Squadron, Estevan, Sask.

Best Photograph: Sgt. Hugh L. Hales, 201 (Centre O) Squadron, Toronto, Ont.

Excerpts from W. O. 2 Walker's winning essay were published in the last issue of "The Roundel." The winning photograph is reproduced here.



Sgt. Hales's winning photograph: fish ladders at Bonneville Dam

TRACERS

MR. J. VICTOR VALIQUET would be very grateful for definite information as to the fate of his younger brother, who was pilot of one of two Spitfires in No. 41 Squadron (R.A.F.) that were missing after an 800-mile flight to Malta from the aircraft carrier "Wasp." His regimental number

was Can. 10251, and his rank that of W.O.1. Pilots of any of the forty aircraft that arrived safely after this flight are asked to contact Mr. Valiquet. His address is: R.M.S. Nitchequon, c/o Mt. Laurier Aviation, St. Jean de Brebeuf, Roberval, P.Q.

Search and Rescue in the R.C.A.F.

By Sqn. Ldr. S. R. Miller

(The author of this article was in charge of the R.C.A.F.'s first Rescue Co-ordination Centre at Eastern Air Command H.Q. from its formation in January 1947 to March 1949, since which time he has been S.A.R. staff officer at A.F.H.Q. in Ottawa.—EDITOR)

ON 10 JANUARY 1946 the Cabinet Defence Committee directed that "an adequate rescue organization for aircraft in distress could be provided by existing services in co-operation and that the Department of National Defence for Air should undertake responsibility for the necessary co-ordination to this end." Such a course of action was approved in principle by the Cabinet on January 16th, and, by direction of the Chief of the Air Staff, the R.C.A.F. assumed chairmanship of an Interdepartmental Search and Rescue Committee composed of representatives from the Department of National Defence (Navy, Army and Air), Department of Fisheries, Department of Justice (R.C.M.P.), and Department of Transport.

As a result of the deliberations of this Committee, an organization was recommended to co-ordinate and control search and rescue activity in Canada and the approaches thereto. In the Committee's report the rôle of the Search and Rescue Service was defined as follows:

Primary Rôle: The Search and Rescue Service shall provide aid to aircraft in distress, within the continental limits of Canada and the approaches thereto, in accordance with international agreements and national requirements.

Secondary Rôle: The Search and Rescue Service shall have as a secondary rôle the provision of aid in any necessary circumstance, particularly in regard to shipping in distress in Canadian coastal waters.

The report further stated, "The Department of National Defence for Air shall undertake responsibility for the co-ordination and supervision of the Search and Rescue Service"; and at a meeting of the Cabinet on 18 June 1947 the report and recommendations of the Interdepartmental Committee on Search and Rescue were finally approved.

In June 1950, following research by a special Interdepartmental Committee into ways and means of ensuring greater protection in the event of marine disaster, certain changes were made and the secondary rôle of S.A.R. was more clearly defined:

"The R.C.A.F. is designated as the agency for co-ordinating all marine search and rescue services through its Rescue Co-ordination Centres at Halifax, Vancouver and Trenton."

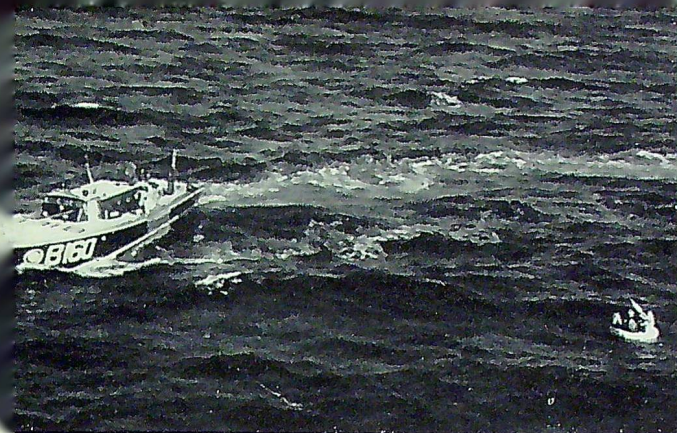
The primary rôle of search and rescue as defined above makes reference to international agreements. The international aspects of search and rescue are directed by the International Civil Aviation Organization, commonly referred to as I.C.A.O.* This organization now has a membership of 56 governments, 21 of which are represented on the Council which holds practically continuous meetings in Montreal, I.C.A.O.'s World Headquarters. The search and rescue section of I.C.A.O. is one of ten such technical sections.

* * *

To accomplish co-ordination, control and termination of search and rescue incidents, Canada and its approaches have been divided into five search and rescue areas. These areas, with the Group or Command headquarters responsible for each, are:

Atlantic S.A.R. Area — Maritime Group H.Q., Halifax
Eastern S.A.R. Area — Training Command H.Q., Trenton

*I.C.A.O. had its beginnings at the International Civil Aviation Conference held in Chicago on 1 November to 7 December, 1944. As a result of this conference the Provisional Civil Aviation Organization was formed, and the first meeting was held in Dublin in March 1946.



S.A.R. launch "Takuli" rescues Anson crew.

Central S.A.R. Area — Tactical Group H.Q., Winnipeg
 Western S.A.R. Area — North-West Air Command H.Q.,
 Edmonton
 Pacific S.A.R. Area — No. 12 Group H.Q., Vancouver

Five rescue co-ordination centres are established at the H.Q.'s listed. Each of these centres is equipped with wall maps, plotting-boards, special communications equipment, etc., to carry out its assigned task. The only two centres with international commitments are those at Vancouver and Halifax. These are the largest and most active of the five centres and are fully manned 24 hours daily.

Thirty-four aircraft, specially equipped for search and rescue and established primarily for this purpose, are based at the following locations:

Greenwood, N.S.	Churchill, Man.
Torbay, Nfld.	Edmonton, Alta.
Goose Bay, Labrador	Whitehorse, Yukon
Trenton, Ont.	Fort Nelson, B.C.
Winnipeg, Man.	Vancouver, B.C.

Five types of aircraft are used:

Lancaster	Dakota (ski-wheel equipped)
Canso	Norseman (skis, wheels, floats)
Helicopter	

In addition to the primary aircraft facilities established specifically for search and rescue, any R.C.A.F. aircraft may be used in large searches. Such aircraft are referred to as secondary facilities.

Each rescue unit has specialized equipment for search and rescue. Such items as droppable containers of various types, droppable dinghy equipment, large droppable medical kits, portable radios, emergency rations and large supplies of specialized clothing and survival equipment are held in stock.

In addition to aircrew, search and rescue units are responsible for other personnel especially trained for various rescue duties. Ground search and rescue parties, composed of personnel normally employed on other duties, are maintained at strategic locations across Canada. These men are volunteers, and they take lectures and proceed on many practice trips into bush or uninhabited country. A great deal of this work is done in their own free time. They are qualified to proceed over land to the scene of a distress, carry out rudimentary first aid, and to live in the bush in all types of weather for extended periods.

Para-rescue teams are based wherever rescue units are located. A full team consists of four men, and some of the smaller units have a team of two men. They are fully trained in first aid, bush survival and jumping techniques, and are prepared to jump to the scene of a distress in any type of terrain or weather. They are also qualified safety equipment technicians.

High-speed rescue launches, capable of a top speed of 46 knots, are established for search and rescue duties in Dartmouth, N.S., and Patricia Bay, B.C. Crash boats are available for search and rescue at Goose Bay, Trenton, and Patricia Bay.

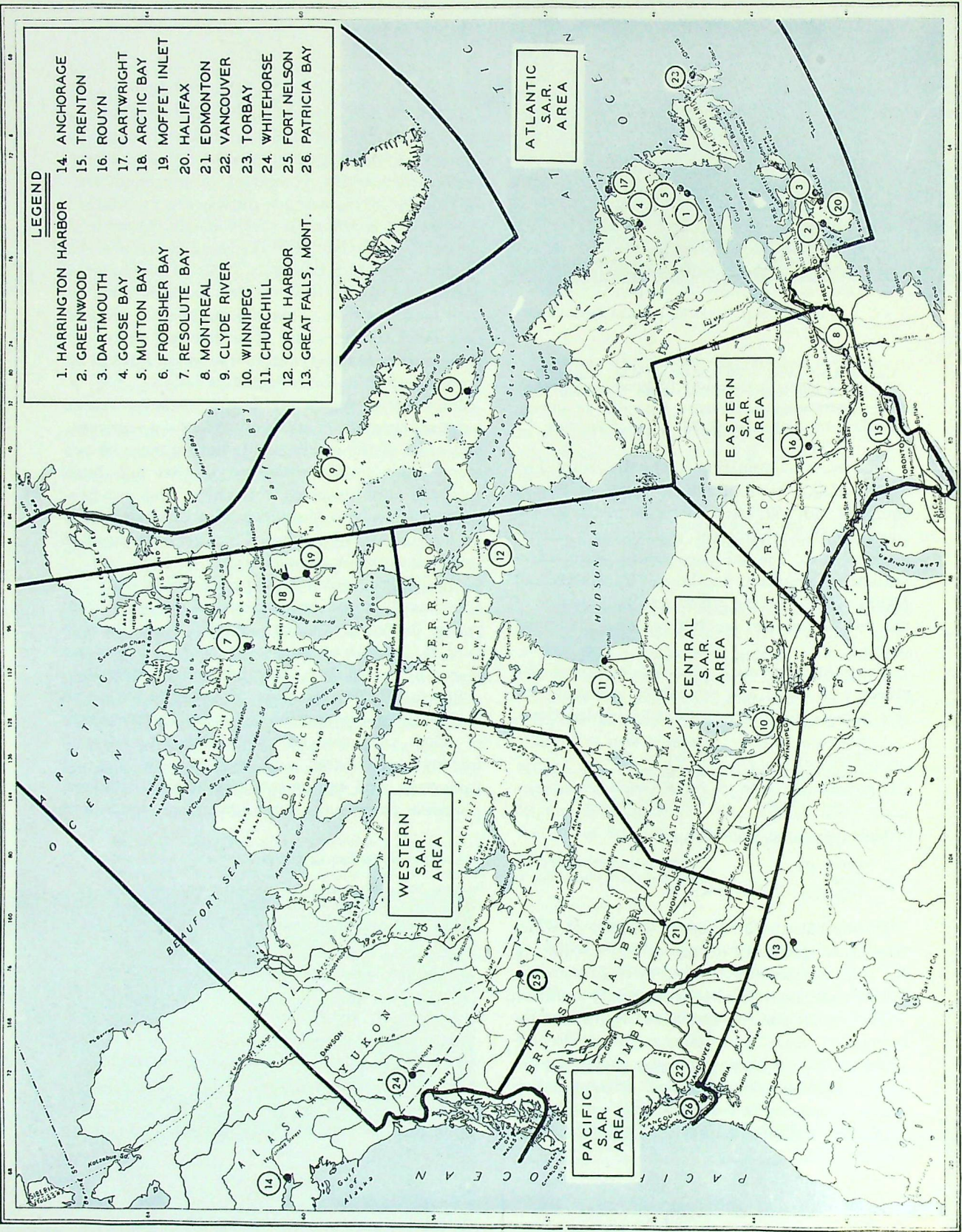
Special W/T frequencies are set aside for search and rescue operations in each area. The frequency of 3000 kilocycles has been designated as an international search and rescue scene-of-action frequency, and equipment such as handie-talkies, portable pack sets, communications equipment

Low altitude jumping practice



LEGEND

- | | |
|------------------------|------------------|
| 1. HARRINGTON HARBOR | 14. ANCHORAGE |
| 2. GREENWOOD | 15. TRENTON |
| 3. DARTMOUTH | 16. ROUYN |
| 4. GOOSE BAY | 17. CARTWRIGHT |
| 5. MUTTON BAY | 18. ARCTIC BAY |
| 6. FROBISHER BAY | 19. MOFFET INLET |
| 7. RESOLUTE BAY | 20. HALIFAX |
| 8. MONTREAL | 21. EDMONTON |
| 9. CLYDE RIVER | 22. VANCOUVER |
| 10. WINNIPEG | 23. TORBAY |
| 11. CHURCHILL | 24. WHITEHORSE |
| 12. CORAL HARBOR | 25. FORT NELSON |
| 13. GREAT FALLS, MONT. | 26. PATRICIA BAY |



carried in jeeps, etc., is set up to transmit and receive on this frequency.

The R.C.A.F., however, by no means provides all the facilities for successful operation of the Canadian Search and Rescue Service. The Air Force provides co-ordination of all facilities, but without the help of the Royal Canadian Mounted Police (especially the Marine division), the Royal Canadian Navy, the Army, Department of Transport, Department of Fisheries, commercial towing and salvage companies and many others, the results achieved in successful operations would not have been possible. Close liaison, too, has been maintained with U.S. forces set up to provide search and rescue services in or adjacent to Canadian areas of responsibility.

Search and rescue operations fall into four main categories; those concerned with aircraft in distress, marine distress, mercy flights, and miscellaneous (which includes searches for missing persons). Between 1 April 1949 and 31 March 1950 the following search and rescue operations were conducted by the R.C.A.F.:

Aircraft in distress	42
Marine distress	34
Mercy flights	165
Miscellaneous and missing persons	25

In carrying out these 266 operations, R.C.A.F. aircraft flew a total of 3,783 hrs. 35 mins. In addition, R.C.A.F. co-ordination centres co-ordinated numerous other S.A.R. activities, such as unreported aircraft, etc. No charges are levied for R.C.A.F. search and rescue operations except for mercy flights performed at the request of another government department and which are a matter of convenience rather than life and death.

Though many search and rescue missions are routine and monotonous tasks, the accounts of some of them read like adventure stories. One of the most dramatic mercy flights ever carried out was to the isolated community of Harrington Harbour, on the north shore of the Strait of Belle Isle.

In the midst of the traditional celebrations on New Year's Eve 1947-48, a message was received by the rescue co ordination centre in Halifax to the effect that a 14-year-old girl at Harrington



Cpl. T. W. L. Dawson demonstrates how to get to the ground after landing in a tree

Harbour was seriously ill with pneumonia and required immediate hospitalization.

There are no holidays in the search and rescue service. As at all times, the rescue co-ordination centre was manned and a duty crew was standing by at Greenwood. Within a few minutes wires were humming. The duty crew's celebrations came to an abrupt end. With a hasty farewell to their wives and sweethearts, they headed for the hangar and took off in their Canso for Dartmouth. There they picked up a Royal Canadian Navy Nursing Sister, a medical attendant, oxygen equipment and other medical supplies. Soon they were in the air again, heading north. The weather was bitterly cold and the thoughts of the crew were on the water landing they would have to make. Probably they thought too of the warm messes they had left behind and the parties continuing without them.

Meanwhile, the rescue centre in Halifax had sent a message to Harrington Harbour, advising that help was on the way. Weather conditions were



LAC E. Cockerton renders first aid to "crash" victim, while Sgt. W. Farr and Cpl. R. R. Robinson carry second "survivor" from aircraft during para-rescue exercises at R.C.A.F. Station Trenton

checked and re-checked. It soon became apparent that the Canso could not return to Dartmouth, so arrangements were made for them to continue to Goose Bay.

Finally the Canso reached its destination. Landing conditions, to say the least, were not favourable. The water was rough, and it was cold. In a case of this nature the final decision to land or not to land rests with the captain of the aircraft. The captain, in the present case, was Flying Officer R. B. West, D.F.C., A.F.C., and after careful consideration he decided that a landing was feasible. As the Canso approached for a landing, a small boat put out from shore to meet it. The message to Harrington Harbour had stated that it was most desirable that take-off be made without delay, in order to minimize the risk occasioned by water freezing on the aircraft. However, the occupants of the boat brought, not the expected patient, but very discouraging news. The condition of the girl was such that she could not be moved. In fact, she was given only half an hour to live.

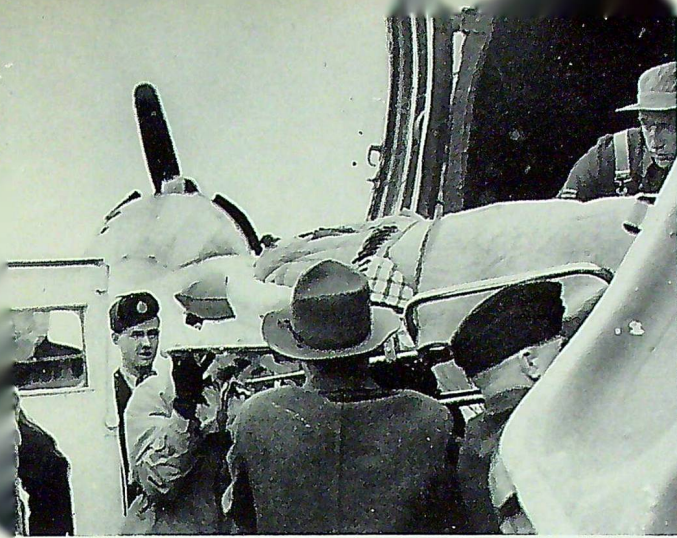
The Navy Nursing Sister and medical attendant immediately went ashore with their equipment. Oxygen was administered; and after some time it was considered safe to move the girl to the aircraft — where, throughout the entire trip to Goose, the administration of oxygen was continued. The

take-off from Harrington Harbour was extremely hazardous. Ice had collected on the aircraft in the air and during its stay on the water, and radio aerials were torn away. None the less, the flight was successful, and the patient was immediately placed in the R.C.A.F. hospital. After two weeks of treatment, which necessitated the flying in of five aircraft-loads of oxygen from Montreal, she recovered sufficiently to be flown to Halifax for further hospitalization and treatment.

The people of Harrington Harbour were most grateful for the help received in this emergency and wanted to show their appreciation in some way. During a Sunday morning church service shortly after the dramatic rescue, the minister announced that the collection that day would be donated to the R.C.A.F. Benevolent Fund as a token of their feelings. The collection was four times as large as the normal average on that occasion. This was in a community where money is, to say the least, not a plentiful commodity.

Before Flying Officer West and his weary crew had time to do much more than contemplate a well-earned rest, an urgent message came in from the rescue co-ordination centre in Halifax. A woman in Mutton Bay, another isolated spot close to Harrington Harbour, was seriously ill and must be evacuated immediately if she was to live. The weather was checked: though not good, it was judged to be flyable, and the Canso was soon in the air again. This flight, too, was successful in spite of the many difficulties; and the sick woman was soon safe in a Halifax hospital. Only then did the crew get home to Greenwood and to sleep. For these trips Flying Officer West was awarded the A.F.C. Later he was awarded the McKee Trophy for the year 1949, both for these and for his many other search and rescue missions.

Many other lives have been saved by the search and rescue organization. In October 1949, Sqn. Ldr. W. G. McLeish, D.F.C., Officer Commanding 103 S.A.R. Flight, Greenwood, flew the longest mercy flight ever carried out by the R.C.A.F. The route was from Greenwood to Goose Bay, and on via Frobisher to Resolute, where the patient was picked up and flown via Winnipeg to Montreal. The distance of 6,500 miles involved more than



Mrs. S. Dodds, wife of a Dept. of Transport meteorologist, is transferred from R.C.A.F. rescue aircraft into ambulance at Winnipeg after being brought down from Arctic Bay on Baffin Island

25 hours' flying. After leaving Frobisher, the only stops were for fuel and to land the sick man at Montreal. On this flight, take-off from Frobisher was made in a howling arctic gale, in darkness, with only the lights of a truck for guidance through the blowing snow. The runway lighting system had failed and the urgency of the flight could permit of no delay.

Early last year Sqn. Ldr. McLeish landed a Lancaster aircraft on snow and ice at Clyde River, Baffin Island, to evacuate an Eskimo boy who had frozen his feet and developed gangrene. The snow was deeper than reported and only by almost continuous taxying was it possible to keep the big aircraft from becoming hopelessly stuck.

As previously mentioned, mercy flights are by no means the only type of cases handled by search and rescue. There have been many searches carried out for missing aircraft. Some have been successful, in others no trace has ever been found of the object of the search. In certain cases, the missing aircraft has been located within a matter of hours, in others it has taken days or weeks. Occupants of the distressed aircraft have sometimes been found alive and well, sometimes injured or dead. They have been discovered in all types of terrain, from mountain peaks to flat prairie.

In "Operation Attaché," a search carried out for a missing U.S. Navy Beechcraft, a 12-day search was necessary before the aircraft and survivors were located. Other successful searches



Capt. Ross Willoughby, Army paratroop doctor who parachuted to Canon Turner's aid, with Mrs. Willoughby on his return to Winnipeg

have been "Operation Rush" (a search for a Canso missing on a flight between Churchill and Winnipeg and located after one day), a search for a civilian Fleet Canuck located on the peak of Mount Hozameen in B.C., and the search for an R.C.A.F. Dakota which forced-landed on an ice floe in Hudson Bay after becoming lost on a flight from Coral Harbour to Churchill.

It is in searches for missing aircraft that the whole vast organization of the search and rescue service is brought into operation. It is then that co-operating services and departments may be called upon for assistance. R.C.M.P., provincial or local police forces, Navy, Army, Department of Transport, radio stations, newspapers and many others, down to trappers or hunters in the woods who may have seen or heard some trace of a missing aircraft — any or all of these may be brought into the picture and give help. Keeping track of all the various sources of information, checking weather, investigating clues, plotting



"Attaché." The rescued (l. to r.): Capt. B. S. Custer (U.S.N.), M/Sgt. J. Scalise (U.S. Army), Capt. Sir R. Stirling-Hamilton (R.N.), St. C. Wilcox (U.S.N.)

coverage given, laying out future plans, briefing and interrogating crews, preparing press releases, and a thousand and one other tasks, constitute more than a full-time job for the rescue co-ordination centre staff.

The largest search ever carried out for an aircraft missing in Canada was "Operation Mike." This was a search for a U.S.A.F. C-54 that disappeared on 26 January 1950 while on a flight from Alaska to Great Falls, Montana. During the search a total of 3064 hrs. 30 mins. was flown by the searching aircraft, both U.S. and Canadian. The total search coverage was 1,214,115 square miles. The terrain varied from prairie to the most rugged mountainous country on the North American continent. A total of 32 agencies participated in the search under the overall control of the N.W.A.C. rescue co-ordination centre, with the searchmaster located in Whitehorse. During the first two and a half weeks of search there were only two days that could be described as excellent search weather. Temperatures during the operation ranged from an average low of -15° to an average high of -1° F. The R.C.A.F. and the U.S.A.F. involved in the operation were easily and quickly integrated into a smooth-running and efficient organization. Unfortunately, no trace was ever found of the missing C-54. It must be presumed that there are no survivors of the 7 crew and 34 passengers.

A fairly typical, small and quickly successful search and rescue operation for a missing aircraft was carried out from R.C.A.F. Station Trenton in November 1949. A civilian Norseman Aircraft had been reported missing in the Rouyn area of Quebec. A search and rescue aircraft left Trenton shortly after lunch on 5 November, searched the area until darkness fell, and then rendezvoused with the other search aircraft at a nearby airport. Next day the search was continued, and in the afternoon the crash was reported sighted by one of the search aircraft. As this aircraft had no para-rescue personnel on board, the nearest para-rescue-equipped aircraft sped to the scene. The jumper, LAC E. Cockerton, of the Trenton para-rescue team, says:

"Upon arrival a handie-talkie was dropped, but due to wind drift, the survivors couldn't get it. They had marked out in the snow that there were two survivors hurt and one dying. Rations were dropped to them, and Flt. Lt. Bayley, the pilot of our aircraft, said I was to jump. I got dressed and jumped from about 800 feet at 80 knots. I dropped in the trees about a hundred yards from the crash, landing at about noon. I was about thirty feet from the ground but lowered myself down without any trouble, using my let-down rope. I left all my equipment there and walked out on the shore of the river about ten yards from where one of the survivors, Bill Whitney, was standing. I called to him to ask if the ice was safe to walk on, and he sort of reeled back. They evidently hadn't seen me jump and had no idea where I had come from."

LAC Cockerton then proceeded to make the injured more comfortable by erecting a shelter and making beds from spruce boughs. The survivors were evacuated that same day by aircraft of a local airline company.

Before we bring this article to a close, there is room for a brief mention of two more interesting S.A.R. operations.

The first was the farthest northward mercy flight ever carried out by the R.C.A.F. It was made in a ski-wheel J.A.T.O.-equipped Dakota to a lonely arctic meteorological station on Eureka Sound, 2100 miles north of Winnipeg, in order to



The combined Army R.C.A.F. rescue team that brought Canon Turner to safety. Canon Turner's small son is shown standing beside his mother in the front row.

evacuate a man suffering from blood-poisoning. The aircraft carried para-rescue personnel and the R.C.A.F.'s only para-doctor, Sqn. Ldr. J. R. Jackson, in case it might not be possible to land at Eureka. However, all went well, and, with the patient on board, the aircraft made a J.A.T.O. take-off and brought him safely to the hospital at Fort Churchill. Total flying time was 32 hrs. 15 mins.

The second operation affords an example of the co-operation which exists between the U.S. and Canadian S.A.R. organizations. A U.S.A.F. B-50, with 16 aboard, left Goose Bay for Tucson, Arizona, on 21 September 1950. Nothing further was heard of it. Because of this complete silence as to its whereabouts, the search area was tremendous — stretching, in fact, from Goose Bay to Tucson,

Dr. C. H. Forsyth, Grenfell Mission doctor, picked up with his seriously ill wife at Cartwright, Labrador, being flown to Goose Bay



and 50 miles on either side of the aircraft's proposed track. A very large number of aircraft, both U.S. and Canadian, took part in the search, and eventually the aircraft was located by a Lancaster belonging to No. 103 S.A.R. Unit and piloted by Flying Officer J. M. Wallace, D.F.C. The survivors were finally picked up and taken to Goose Bay by a U.S.A.F. helicopter and a Grumman Albatross amphibian.

* * *

From what has been said, little though it is, it will be seen that search and rescue is a big job, calling for great courage and devotion on the part of the men engaged in it. The lives saved by the S.A.R. organization are already many, and they are increasing almost daily in number. The value of the work cannot be calculated in dollars and cents, but the cost of it is more than repaid by the gratitude of those whom it has helped in time of their most desperate need.

January Transfers

(Received from D.P.C. on 29 Nov. 1950)

Officers

S/L L. V. Carfer (C.E.)—R.C.A.F. Stn. Summerside to Air Defence Group H.Q., St. Hubert
 S/L W. A. Collins (Acc.)—Directorate of Accounts and Finance, A.F.H.Q., to Admin. Unit, A.F.H.Q.
 S/L D. K. Deyell, D.F.M. (G.L.)—No. 414 Sqn., Rockcliffe, to Air Nav. School, Summerside
 S/L P. W. A. Hamilton (Acc.)—Air Materiel Command H.Q., Ottawa, to Maritime Group H.Q., Halifax
 S/L J. R. Jackson (Med.)—N.W.A.C. Headquarters, Edmonton, to Air Defence Group H.Q.
 W/C A. G. Kenyon (G.L.)—A.F.H.Q. to R.C.A.F. Stn. Greenwood
 S/L G. H. D. Marriott (C.E.)—Air Materiel Command H.Q. to Training Command H.Q., Trenton
 S/L S. S. Mitchell (G.L.)—R.C.A.F. Stn. Trenton to No. 2 (M) O.T.U., Greenwood
 S/L R. L. Moodie, A.F.C. (Telecom.)—No. 6 Repair Depot, Trenton, to A.F.H.Q.
 S/L R. B. Murray (G.L.)—Instrument Flying School, Centralia, to Flying Training School, Gimli
 S/L F. H. Nielson (Acc.)—A.F.H.Q. to Air Materiel Command H.Q.
 W/C H. Pearce, M.B.E. (T.L.)—No. 1 Photographic Establishment, Rockcliffe, to Maritime Group H.Q.
 W/C R. O. Shaw (G.L.)—Air Transport Command H.Q., Rockcliffe, to Maritime Group H.Q.
 S/L K. J. M. Smith (Sup.)—R.C.A.F. Stn. Greenwood to Maritime Group H.Q.
 S/L H. R. R. Trepanier (Telecom.)—A.F.H.Q. to Can. Joint Staff, Washington
 S/L F. H. Watkins, D.F.C. (G.L.)—Flying Training School, Centralia, to Flying Training School, Gimli

S/L E. Wilson (G.L.)—Flying Training School, Centralia, to Flying Training School, Gimli

Warrant Officers

W.O.1 G. A. B. Brown (M. Com. Tech.)—Training Command Admin. Staff to No. 1 Radar and Comm. School, Clinton
 W.O.2 W. E. Nichol (Clk. Adm.)—Air Materiel Command H.Q. to No. 5 Supply Depot, Moncton
 W.O.1 T. H. K. Nicholson (Snn.)—No. 102 (M) Sqn., Dartmouth, to No. 122 (M) Sqn., Patricia Bay
 W.O.2 T. C. Porter (Sup. Tech.)—No. 11 Supply Depot, Calgary, to Air Materiel Command H.Q.
 W.O.1 A. C. Turner (M. Com. Tech.)—R.C.A.F. Stn. Sea Island to N.W.A.C. Headquarters
 W.O.1 J. G. Ultican (M. Rdr. Tech.)—No. 1 Radar and Comm. School, Clinton, to Training Command Admin. Staff
 W.O.2 H. Vernon (Com. Tech. G.)—R.C.A.F. Station Whitehorse to Tact. Gr. H.Q., Winnipeg

KEY TO TRADE DESIGNATIONS

Acc.	— Accounts
C.E.	— Construction Engineering
Clk. Adm.	— Clerk Administrative
G.L.	— General List
M. Com. Tech.	— Master Communications Technician
M. Rdr. Tech.	— Master Radar Technician
Med.	— Medical
Snn.	— Seaman
Sup.	— Supply
Sup. Tech.	— Supply Technician

From the Suggestion Box

THE CHIEF OF THE AIR STAFF has expressed his personal thanks to the undermentioned members of the R.C.A.F. for suggestions which have been officially adopted by the Service.

Cpl. M. S. Arnott, of No. 6 R.D., having experienced difficulty with frequent breakages of dimpling punch guide pins, designed a new type of punch free from this weakness. He further designed a new type of snaps and dimples to be fitted into a vise-block of his own construction, thus overcoming the tendency of the dimples to become misaligned after a few hammer-blows.



W. O. 2 H. J. Eagan

W. O. 2 H. J. Eagan, of No. 1 S.D., devised a new method of preparing airframe checking lists which considerably simplifies and speeds up the work of equipment assistants.




Cpl. M. S. Arnott

Sgt. F. T. Rootes, of R.C.A.F. Station Edmonton, designed modifications to the standard portable lamp used for aircraft maintenance work and to the C2 Homelite starting trolley, thereby meeting certain illumination requirements which had become evident during Exercise Sweetbriar.



Sgt. F. T. Rootes



WHAT'S THE SCORE

SINCE ALL OF OUR twenty questions for this month have already been answered in "The Roundel" during 1950, Sgt. Shatterproof warns us that the average score among *right-thinking* members of the R.C.A.F. is likely to be pretty low. The Editorial Committee's average was 15. Correct answers appear on page 48.

1. "Kriegie," during the Second World War, was:
 - (a) The name given by the Poles in England to any pretty girl
 - (b) The nickname for a prisoner of war
 - (c) The German code-word for the V-I campaign
 - (d) A British method of countering enemy radar
2. The "Orenda" is:
 - (a) A Canadian-designed jet engine
 - (b) A U.S. aircraft-carrier
 - (c) Legendary wife of the Windigo, an Indian evil spirit
 - (d) The latest development of schnorkel
3. A topographical model is:
 - (a) A girl who makes her living posing for holiday-resort advertisements
 - (b) An aircraft specially designed for survey work
 - (c) A jig used in making fretwork maps for navigation practice
 - (d) A scaled-down three-dimensional model of a given section of the earth's surface
4. Group Captain N. B. Biddable, D.S.O., was:
 - (a) The first member of the R.A.F. to cross the Channel in a glider
 - (b) R.C.A.F. winner of the Empire Services Boxing Championship in 1936
 - (c) "The most famous Station Commander in all England"
 - (d) A close associate of Air Cdre. Whittle in his earlier work on jets
5. The Sea Cucumber is:
 - (a) A nickname given to the Canso by the Eskimos
 - (b) A denizen of arctic seas
 - (c) A Mediterranean crustacean used in salads
 - (d) A vegetable much esteemed in Indo-China as a specific for gall-stones
6. Dutch, French, Italian, Belgian, and Norwegian student pilots and navigators are being trained by the R.C.A.F. as part of the plans of an organization known as the:
 - (a) JATO
 - (b) UNESCO
 - (c) NATO
 - (d) FIDO
7. The first Canadian-designed and -built jet fighter aircraft is the:
 - (a) Chinook
 - (c) Canuck
 - (c) Beaver
 - (d) Orenda
8. President of the R.C.A.F. Association is:
 - (a) Air Marshal W. A. Curtis, C.B., C.B.E., D.S.C.
 - (b) Air Vice-Marshal Robert Leckie, C.B., D.S.O., D.S.C., D.F.C.
 - (c) Air Vice-Marshal G. R. Howsam, C.B., M.C.
 - (d) Air Vice-Marshal A. L. Morfee, C.B., C.B.E.
9. In a fighter squadron in the last war the minimum ratio of ground- to aircrew was:
 - (a) 10 - 1
 - (b) 15 - 1
 - (c) 20 - 1
 - (d) 25 - 1
10. To overcome the force of the earth's gravity, a rocket must achieve an "escape velocity" of approximately:
 - (a) 18,000 m.p.h.
 - (b) 90,000 m.p.h.
 - (d) 25,000 m.p.h.
 - (d) 64,000 m.p.h.



11. Of the total number of casualties in the Battle of Britain, Canadians comprised:
 - (a) 11%
 - (b) 49%
 - (c) 1%
 - (d) 3%
12. The language of Brazil is generally known as:
 - (a) Portuguese
 - (b) Spanish
 - (c) Basque
 - (d) Provençal
13. Canada claimed the islands between her mainland and the Pole under:
 - (a) The North Atlantic Treaty
 - (b) The British North America Act
 - (c) The Treaty of Versailles
 - (d) The Sector Theory of Sovereignty
14. A bottle of beer in Karachi costs about:
 - (a) 5c.
 - (b) 25c.
 - (c) 50c.
 - (d) \$1
15. The Milky Way is composed of:
 - (a) Cosmic rays
 - (b) Millions of suns in our own galaxy
 - (c) Star dust
 - (d) Beta particles in the Heaviside Layer
16. The language of the Aggressor Forces in Exercise Sweetbriar was:
 - (a) Spanish
 - (b) Portuguese
 - (c) Basque
 - (d) Provençal
17. "Mucky Duck" was the name given to:
 - (a) The Air Force eagle by the Germans
 - (b) A bar in Yorkshire by Servicemen
 - (c) A U.S. amphibious motor vehicle by the G.I.'s
 - (d) A land-army girl in England by everybody
18. Authorized strength for the Royal Canadian Air Cadets is now:
 - (a) 15,500
 - (b) 55,000
 - (c) 22,500
 - (d) 72,000
19. The Hon. Lester Pearson, who flew round the world in an R.C.A.F. North Star last January, is Canada's Minister for:
 - (a) Agriculture
 - (b) External Affairs
 - (c) Veterans' Affairs
 - (d) Trade and Commerce
20. The most northerly permanent R.C.A.F. unit is stationed at:
 - (a) Absolute Bay
 - (b) Dissolute Bay
 - (c) Resolute Bay
 - (d) Malemute Bay



Eternal Truths

WHILE ON A VISIT recently from A.F.H.Q. to the U.S.A.F.'s 325th All-Weather Fighter Squadron at McChord Air Force Base, Tacoma, Flt. Lt. J. H. Cochrane (of our Air Weapons Branch) swelled visibly when he saw on the wall of the Group Armament Officer's office the following well-known pronunciamento:

"Without armament there is no need for

an Air Force." — Lord Trenchard

Incidentally, during the same trip Flt. Lt. Cochrane met and exposed to the F.B.I. an imposter who was wearing a Canadian Flight Lieutenant's uniform. The reason he suspected him in the first place, he says, was because his appearance was too much like what a Flight Lieutenant's ought to be!

Jan Christiaan Smuts



“Father of the R.A.F.”

By Wing Cdr. F. H. Hitchins, Air Historian

WHEN FIELD MARSHAL JAN CHRISTIAAN SMUTS died at Pretoria, South Africa, on September 11th, 1950, the world lost one of the greatest figures of the first half of the 20th century. A man of wide interests and remarkable versatility, Smuts left an indelible mark on history's page by outstanding contributions in many different fields. Statesman, soldier, scholar, patriot and philosopher, this South African “man of the world” made himself immortal as a leader in the creation and development of the Union of South Africa, the evolution of the British Commonwealth of Nations, the planning of the League of Nations, and the drafting of the United Nations organization.

To these high titles to lasting fame might be added another that is of particular interest to us of the R.C.A.F. Smuts was one of the “fathers of the Royal Air Force,” an honour that he shares with Lieutenant-General Sir David Henderson and Marshal of the Royal Air Force Lord Trenchard. The story of Smuts' contribution to the birth of the R.A.F. is told in detail in the volumes of H. A. Jone's “The War in the Air,” upon which this brief appreciation is based.

Early in 1917, after leading a successful campaign against the Germans in East Africa, Lieutenant-General Smuts came to Britain as South Africa's representative at an Imperial Conference. Within a short time Mr. Lloyd George, the British Prime Minister, invited him to join the British War Cabinet — a high honour and tribute to a man who, barely fifteen years earlier, had been a Boer commando in arms against the British. Gifted with a keen analytical mind, and free from entanglement in British internal politics, Smuts was invaluable in solving many intricate and thorny problems, and quickly proved himself, in Winston Churchill's phrase, a “wise counselor.”

Among the problems confronting the British Cabinet in the early summer of 1917, two of the most critical were the air defence of London and the whole organization and direction of air operations. Smuts was charged with finding a solution to these problems, and he became, in effect, the special adviser of the War Cabinet on air defence matters.

On June 13th, 1917, a force of long-range German bombers made a daylight attack upon



Field Marshal the Rt. Hon. J. C. Smuts

London. This was followed by a second daylight raid on July 7th. On both occasions the Gothas were able to come and go virtually with impunity; the defences were caught unprepared and unorganized for such an attack, and both aircraft and anti-aircraft artillery seemed impotent to deal with the enemy. The moral effect of the two raids was profound: the people were deeply shaken and stirred, and special meetings of the Cabinet were called to consider the urgent situation. A small committee of two was appointed on July 11th to examine not only the matter of home defence but also the broader question of a separate air service, which the German attacks had again brought into prominence. Prime Minister Lloyd George was nominally chairman of the committee, but it actually was a one-man affair — and that one man was Lieutenant-General Smuts.

With the clear-sightedness and vigour which characterised him throughout his long life, Smuts probed into the details of these problems, which must have been new in his experience. Eight days later he presented his first report on home air defence which, he rightly judged, was the more pressing. Smuts had himself witnessed the second of the German daylight raids on the capital and had made a first-hand, and immediate, study of both the physical and moral effects. He realised that, while the former were not excessive, the latter could not be ignored — and were likely to grow worse. One passage in his report has a markedly prophetic ring to our ears:

“It is probable that the air raids on London will increase to such an extent . . . that London might through aerial warfare become part of the battle front . . .”

It is true that Smuts thought that this might happen within the next year; but the fact that London was spared that ordeal until 1940 was in no small measure due to Smuts' wise counsel in 1917. To counter the enemy raiders he recommended that the defences of London, both air and ground, be reorganized and unified under one commander. That he had a keen understanding of air matters was evident throughout his report. He emphasized that air units should be trained to

fight in formation, and that air defences should be prepared and adequate to deal with real attacks which might come on the heels of feint attacks. His recommendations were accepted and immediate action taken to implement them.

The Germans did not again attack London (during that war) in daylight, but a few weeks later the situation took another turn when, early in September 1917, the Gothas began raids by night. Smuts was again called upon by the War Cabinet to investigate, and within a day he laid his recommendations before his colleagues. As immediate steps, he advocated the use of more powerful searchlights and an apron-balloon barrage, as suggested by Brigadier-General E. B. Ashmore, the newly appointed commander of the London Air Defence Area.

But Smuts again showed the clearness of his vision by pointing out that these and other proposed improvements in the defences “touch only the fringe of the danger of these night attacks . . . the only proper defence is offence. We can only defend this island effectively against air attacks by offensive measures, by attacking the enemy in his air bases on the Continent and in that way destroying his power of attacking us across the Channel.” A month later Smuts had a further opportunity to develop his theme when he headed another committee to study the flak defences of London. His ideas on the bombing of Germany certainly had an effect upon the formation of the independent air force which, under Trenchard's direction, carried out strategic long-range bombing of the Rhineland during the last year of the war.

Meanwhile the Cabinet's one-man committee on air policy had been considering the second question referred to him in July, that of the overall organisation of Britain's air forces, which Smuts regarded as the more important problem. At that time the air forces were divided between the Admiralty (the Royal Naval Air Service) and the War Office (the Royal Flying Corps). This division had, in the earlier period of the war, led to friction and to competition for personnel and material. It had meant divided responsibility in air matters and two air policies, and it had

stirred up acute controversies. To deal with these difficult, involved, and often bitter problems, air committees and boards had been set up; but these bodies, lacking any executive power, had been helpless to effect any real improvement in the situation.

Smuts' "one concern was to find an unprejudiced solution . . ." He considered the views of others and in particular those of Lieutenant-General Sir David Henderson, then Director-General of Military Aeronautics in the War Office. On July 19th, 1917, Henderson had drawn up a long memorandum in which he set forth cogent arguments in favour of a separate air ministry. Smuts agreed, and on August 17th presented to the War Cabinet his second report, which H. A. Jones has called "the most important paper in the history of the creation of the Royal Air Force."

In presenting his case for a separate air service with its own ministry and air staff, Smuts based his argument initially upon his belief (over-optimistic, as events were to prove) that, by the spring of 1918, the supply of aircraft would exceed the immediate requirements of the Army and Navy and there would be a surplus available for independent operations. Who should frame and direct the air policy for its effective use?

But his vision dipped into the future. "Air service . . . can be used as an independent means of war operations . . . an air fleet can conduct extensive operations far from, and independently of, both Army and Navy. As far as can at present be foreseen, there is absolutely no limit to the scale of its future independent war use. And the day may not be far off when aerial operations, with their devastation of enemy lands and destruction of industrial and populous centres on a vast scale, may become the principal operations of war, to which the older forms of military and naval operations may become secondary and subordinate."

(One is tempted here to cite another of his prophetic remarks: "Manpower in its war use will more and more tend to become subsidiary and auxiliary to the full development and use of mechanical power.")

The necessity for a separate air ministry and air



Field Marshal Smuts during his visit to Ottawa in June 1945

staff had become urgent. It was no longer an idea for the future, as some argued, to be carried out in less strenuous times after the war. "Events have moved so rapidly, our prospective aircraft production will soon be so great, and the possibilities of aerial warfare have grown so far beyond all previous expectations, that the change will brook no further delay . . . An air ministry should be instituted as soon as possible to amalgamate the R.N.A.S. and R.F.C. into one service, and to control and administer all matters in connection with aerial warfare of all kinds whatsoever."

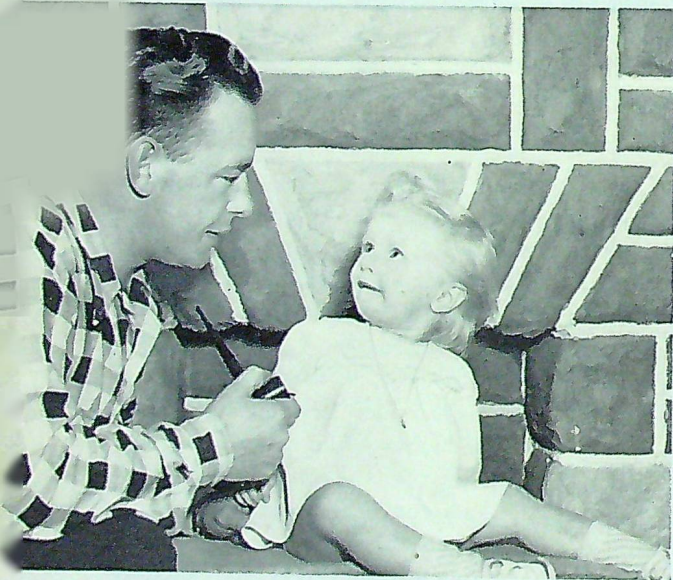
In conclusion he emphasized how important it was, for winning the war, to secure air predominance on a very large scale, "and, having secured it in this war, we should make every effort and sacrifice to maintain it for the future. Air supremacy may in the long run become as important a factor in the defence of the Empire as sea supremacy." (And this was written in 1917!)

A week after Smuts presented his report, the Cabinet met, accepted in principle his recommendations, and appointed an air organization committee to investigate details and prepare draft legislation to set up a separate air ministry and service. The South African officer was named head of this committee, in which Sir David Henderson played a leading part.

In the weeks that followed, Smuts served as chairman or member of other committees that were appointed by the War Cabinet to study further war problems, most of which were connected with the air services — aircraft supply, war priorities, manpower, etc. In particular he was chairman of the Air Policy Committee which advised the Cabinet in the interim period while the government was making up its mind whether to proceed with the immediate creation of an air

ministry or wait until quieter times. But the pressure for immediate action was too strong, and finally, in November, the Air Force bill was introduced into parliament and on the 29th of that month it became law. On January 3rd, 1918, the new Air Council, headed by the first Secretary of State for the Air Force, was named, with Lieutenant-General Sir David Henderson as Vice-President and Major-General Sir Hugh Trenchard as first Chief of the Air Staff. Then, after all the intricate details had been worked out, the Royal Naval Air Service and the Royal Flying Corps were, on April 1st, 1918, merged in the Royal Air Force.

The name of Jan Christiaan Smuts will be remembered and honoured in the Royal Air Forces, for it was his wise counsel that did so much to ensure the creation of a separate air service.



Cartoonist Off Duty

CAUGHT BY THE CAMERA while eyeing her father with slightly doubtful amazement, is little Patricia Tracy. The chap with the pipe is W.O.2 Ray Tracy, better known to our readers without benefit of capitals. The shirt, which is enough to confuse anyone except a cartoonist, probably explains Pat's expression.

ROYAL CANADIAN AIR FORCE

Association



A Letter from the U.S.A.F.A.

Editor
"The Roundel"

November 29, 1950

Dear Sir:

We have just received the November 1950 issue of "The Roundel," and have read with interest your story on our Air Force Association Convention, which was held in Boston this past August.

We appreciate very deeply the splendid story you wrote about our Association, and we are grateful for the relationships between your Air Force Association and ours. We hope that these ties will not only be maintained, but develop even more strongly in support of our almost mutual objectives in support of airpower for national security and world peace.

One of the most enjoyable portions of our Boston Convention was the presence and participation of members of the Royal Canadian Air Force and the President of the the R.C.A.F. Association. We hope your Air Force can be represented at each of our Conventions in the future.

Thanks again for your most appropriate story about our group.

Sincerely,
Robert S. Johnson
President

DOMINION PRESIDENT VISITS THE WEST

AIR VICE-MARSHAL A. L. MORFEE, C.B., C.B.E., Dominion President, visited Wings of the Manitoba-Northwestern Ontario Group and the Saskatchewan Group in early November, addressing meetings at the Lakehead, Winnipeg, Brandon, Regina, Saskatoon, Yorkton and Moose Jaw.

He was accompanied by Group Captain R. S. Turnbull, D.F.C., A.F.C., D.F.M., Director of

Reserve and Manning at Air Force Headquarters, who gave an informative and interesting talk to all Wings.

The Dominion President is at present visiting Alberta and British Columbia Wings, with meetings scheduled in Edmonton, Calgary, Lethbridge, Red Deer, Vancouver, Victoria, Courtenay and Cranbrook. He is accompanied by Wing Commander F. W. Ball, D.F.C., Reserve Liaison Officer at Air Force Headquarters.

WING NEWS

700 (City of Edmonton) Wing

On September 20th a corn roast was held at Whitemud Park, with 150 members and their wives in attendance. Walter Howard was Master of Ceremonies, and Harold Lee and Bob Wright were in charge of arrangements. Dancing followed in the Lodge.

On October 9th a General Meeting was held in the Canadian Legion Memorial Hall. Wing Commander W. C. Van Camp, D.F.C., Senior Personnel Staff Officer at N.W.A.C. Headquarters, spoke on opportunities in the Regular Air Force, and Wing Commander W. Speed, A.F.C., Commanding Officer of No. 418 (Reserve) Squadron, spoke on opportunities in the Reserve squadrons.

On October 21st a dance was held in the Officers' Lounge of No. 418 Squadron. By the kind permission of Wing Commander Speed, members of No. 700 Wing were granted the use of the lounge for their Harvest Ball. Guests of honour were Air Vice-Marshal C. H. Dunlap, C.B.E., A.O.C. North-West Air Command, and Mrs. Dunlap. J. G. Rowand, Roy Martins and Ishbel Ferris were in charge of arrangements.

On November 6th, at a General Meeting, guest speaker Sqn. Ldr. G. R. M. Hunt, N.W.A.C. Intelligence Officer, spoke on the present world situation.

The Finance Committee of the Wing has another car raffle under way, and the draw will be made at an appropriate function in the Spring. Plans are also in hand for a "Klondike Night," open to the public, featuring games of chance and old-time dancing. The Wing is now sponsoring city-wide square dance competitions, the finals of which will be held on "Klondike Night."

It has just come to our attention that the Wing forwarded \$100.00 to No. 500 (City of Winnipeg) Wing, to be donated to an Air Force veteran who suffered losses in the floods.

No. 403 (City of Sarnia) Wing

The November meeting was held in form of a Stag at the Sarnia Golf Club — casualty reports not yet received.



No. 412 painting-party (p. 34). Left to right: D. Jenner, K. Doherty, B. Frost, P. Hagarty, G. Duncan

No. 411 (Chatham) Wing

From the proceeds of two bingo nights, and an air show in August, No. 411 Wing has purchased two former Army buildings as Wing club-rooms. The buildings have to be moved, and the Wing is at present negotiating for a suitable location.

No. 416 (Kingston) Wing

This Wing also has obtained its own quarters and is at present in the throes of putting them in shape.

No. 417 (Richmond Hill) Wing

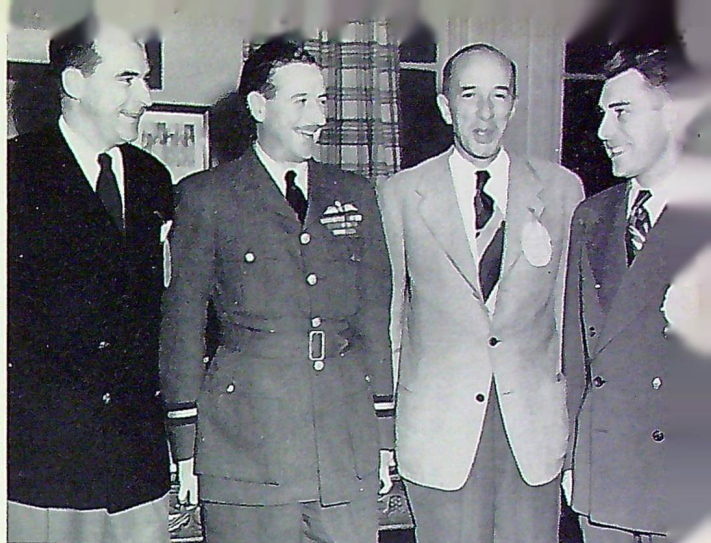
The first public function held under the auspices of No. 417 Wing was a dance on Friday, October 20th, in the auditorium of the Public School, when a good attendance assured the financial success of the affair.

Music was supplied by ten members of the R.C.A.F. Training Command Band who, with the sanction of Training Command, took time off from their leisure moments to support the local Wing — a gesture much appreciated by the Association members and those who enjoyed their playing. If their playing is any indication, residents of Richmond Hill and District are in for a treat sometime next Spring, when the Wing hopes to have the whole band present a concert in the local arena.

Guest of honour at the dance was Reeve J. A. Greene of Richmond Hill, who drew two lucky



No. 426 Wing. Group Capt. F. R. West presents Charter to Mr. R. C. Tremain, Wing President.



No. 404 Wing (p. 34). Left to right: G. Munroe, Air Cdre. L. E. Wray, A. Snetsinger, H. Beaupré

numbers entitling the winners to a double pass to the Richmond Theatre. These were donated by Ned Hill, manager of the theatre and a member of the Wing.

Arrangements were in the hands of Don Murray, who headed the dance committee, Neil McCarthy, Harold Reesor and Stu. Paxton. They were assisted by the Wing secretary, Jean McCarthy.

The wing is at present endeavouring to promote the formation of an Air Cadet Squadron, and is negotiating to this end with representatives of the Lion's Club.

No. 420 (Oshawa) Wing

Although out of the news for some time, No. 420 Wing has been far from out of operations.

Through the generosity of the Directors of the Oshawa Flying Club, the Wing obtained the use of the former Air Force Mess of No. 22 E.F.T.S. as Wing headquarters.

Regular meetings were held during the summer months, when under the guidance of 1st Vice-President Stanley Fraser and the executive, plans were made for renovation of the premises; and the work of these ambitious few grew into a full-scale "Operation Hammer." The Wing hopes to have the modifications completed by the end of November, and is applying for a lounge licence.

Air Cadet Week was celebrated by opening the Wing's club-rooms to the Chadburn Squadron of the Air Cadets of Oshawa. Officers and men of the squadron were received and entertained by the

Wing after an inspection by the Wing's President.

No. 420 Wing is the first to organize a Ladies' Auxiliary. Their willingness to assist in catering problems and in planning social functions has been of very great help. Officers of the Ladies' Auxiliary are: Mrs. C. H. Jenkin, President, Mrs. C. Fournier, Secretary, and Mrs. A. Burr, Treasurer.

No. 421 (Newmarket) Wing

No. 421 Wing, with a membership of twenty-six, reports that a citizen of Newmarket has donated to the Wing a building approximately 20 ft. x 40ft., and a lot has been leased to the Wing by the town of Newmarket at one dollar per year. The Wing is now out to raise funds for furnishings.

No. 426 (Brockville) Wing

Amidst attractively decorated surroundings and in the presence of local dignitaries, R.C.A.F., officials, and approximately 100 ex-airmen and W.D.'s, No. 426 Wing received its charter from a native son of Brockville, Group Captain Frank R. West, on October 18th. Other speakers included His Worship W. F. Reynolds; Judge Donald E. Lewis; Mrs. George T. Fulford, M.P. for Leeds; Mr. Hugh A. Reynolds, M.L.A.; and Air Vice-Marshal G. E. Brookes, C.B., O.B.E., President of the Ontario Group.

"Let us not permit our country to reach a dangerous state of unpreparedness," Group Cap-



No. 301 Wing. Seated: Air Vice-Marshal A. Raymond. Standing (left to right): G. L. Shemilt, H. B. Ripstein, W. J. Campbell, Anita Godin, E. A. H. Charbonneau, G. A. Monty, R. MacLellan

tain West warned his audience. "The best insurance for peace is preparedness," he stated, adding, "We in the R.C.A.F. are doing all within our power and resources to provide Canada with this insurance policy."

Following a short sing-song, three films were shown: "Wasp Wings" (R.C.A.F. Spitfire operations overseas), the "Trenton Gates Ceremonies," and a cartoon on "Jet Propulsion."

No. 301 (Albatross) Wing, Montreal

No. 301 Wing was the first Wing to be formed in Montreal, having been organized and sponsored by the Air Force Veterans' Association, Quebec Branch No. 84 of the Canadian Legion. Now known as No. 301 (Albatross) Wing, it has eighty-six members, and meets on the last Wednesday of each month at the urban headquarters of No. 401 Fighter Squadron. These premises have been made available through the courtesy of the Officer Commanding, Wing Commander J. W. Reid, D.F.C. Mess and other facilities, including the use of a projector, are also available from the squadron.

In October, the 1st Vice-President of the Dominion Command, Air Vice-Marshal Adelard Raymond, C.B.E., one of the Wing's staunchest supporters, was elected Honorary President. Air Vice-Marshal Raymond has invited the Wing to hold the December meeting as his guests at a smoker in the Queen's Hotel.

Present executive of the Wing, which will hold office until next June, is as follows:

President:	William J. Campbell
1st Vice-President:	Gordon L. Shemilt
2nd Vice-President:	Howard B. Ripstein
Honorary Secretary:	Anita Godin (W.D.'s)
Honorary Treasurer:	Gerard A. Monty
Additional Members:	Frank De B. Walker E. A. H. Charbonneau Robert MacLellan

No. 412 (Air Force Club of Windsor) Wing

No. 412 Wing extends a standing invitation to all ex-Air Force personnel to partake of its hospitality by visiting its club-rooms at 66-80 Tecumseh Road, East, whenever they get a chance. Reproduced on page 32 is a photograph of the painting party at work on the recent redecorating project. The barefooted member is Mr. E. Warren, and the wielder of the paint-roller is Mr. H. Brumpton. Photo was taken by Mr. R. MacDonald (of the MacDonald Studio), who is a member of the Wing.

No. 103 (Cabot) Wing, Sydney, N.S.

At a recent meeting of No. 103 (Cabot) Wing, Sydney, N.S., the following officers were elected for the coming year:

President:	C. N. Earle
Vice-President:	Donald Gillis
Secretary:	George Campbell
Assistant Secretary:	Joy Coombes
Treasurer:	Colin Crane
Bulletin Editor:	S. B. Rhude
Membership:	Donald J. MacDonald
Building:	C. Roy MacDonald
Ways & Means:	E. A. Curtis
Programme:	Claude Dingwall
Entertainment:	William B. Harris
Publicity:	William J. Murray

No. 404 (Kitchener-Waterloo) Wing

No. 404 Wing holds a regular business meeting every month, during which it has a speaker or shows a film (or both). Approximately fifty members turn out for each meeting. The Wing also holds Social and Ladies' Nights which have proved very popular to date.

The October meeting was held in the 24th Field Ambulance Officers' Mess in Kitchener, by kind permission of Lt.-Col. Duff-Wilson. Guest speaker was Air Commodore L. E. Wray, O.B.E.,

A.F.C., Commandant of the R.C.A.F. Staff College in Toronto.

At the time of going to press, the Wing executive has made plans to take an active part in the R.C.A.F. scheme for ex-pilot refresher courses, and it hopes to establish something of this nature at the new airport now under construction at Kossuth.

No. 250 (Saint John) Wing

It was with great regret that we learned of the death last November of Sqn. Ldr. E. L. Fry, a prominent and universally respected citizen of Saint John. In addition to being an active member of No. 250 Wing, he was the commanding officer of No. 171 (Saint John) Squadron of the Air Cadets, having been one of the original officers of the squadron. At the time of his death he had recently been appointed as commanding officer of the first Air Cadet Wing in eastern Canada.

MATERIAL FOR "THE ROUNDEL"

May we again remind all Wings that material for "The Roundel" should be sent to the General Secretary, R.C.A.F. Association, 424 Metcalfe St., Ottawa, Ont.



Sqn. Ldr. E. L. Fry

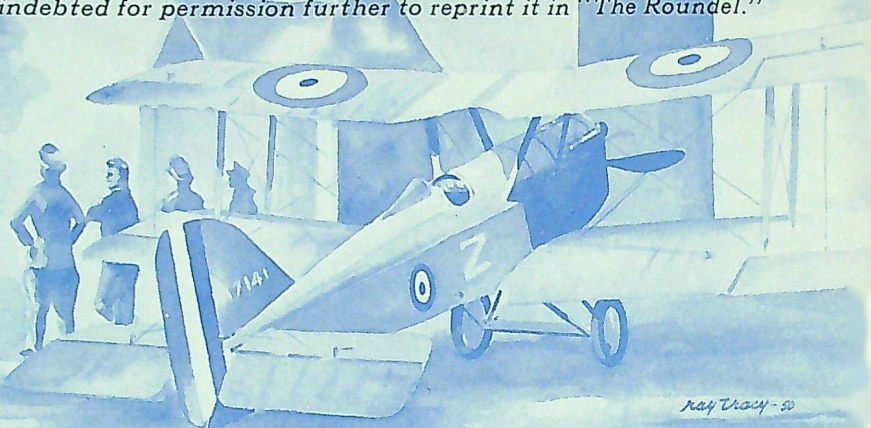
Sending material direct to "The Roundel" may occasion delay in its publication, as the R.C.A.F.A. section of the magazine is put together in Association Headquarters.

Before the Blast . . .

Before we receive the inevitable broadside of protests, let us hasten to assure our readers that the Women's Division of the R.C.A.F. was formed exactly seven years before the date stated on page 46 of our November issue.

Days of Dare and Do: Part I

(Towards the end of the First World War, the Officer Commanding the 19th Wing of the R.F.C. prepared a "Guide to Instructors and Pupils in the Northern Group." This historic document was brought to the attention of "Air Clues" by Air Vice-Marshal Sir Alexander P. Davidson, K.B.E., C.B. (at that time Squadron Leader Training at Northern Group Headquarters, and now Director-General of Organization in the R.A.F.), to whom, as to the Editor of "Air Clues," we are much indebted for permission further to reprint it in "The Roundel." —EDITOR.)



THE OBJECTS OF these notes are:—

1. To set out clearly the principles of flying, omitting as far as possible all controversial matters in order that —

- (a) From the beginning, a Pupil may know the ultimate object of the instruction which he is now receiving.
- (b) A change of instructor may not involve any material alteration in the method of instruction.

2. To give information which applies to flying in general, that is to say, to all types of Aeroplanes, so that a pilot may learn to pass more easily from one type to another.

As the various duties of a pilot increase in number, there is an inevitable decrease in the amount of attention which can be paid to the mere flying of the machine. This tendency makes it important that a Pupil should learn during his

elementary instruction, while his attention is most concentrated on flying, a great many things which in normal or less urgent circumstances would be reserved for his higher training.

The arrangement of these notes is based on the order in which the various problems would occur to a pilot in any individual flight.

RISK

A Government pilot flying a Government machine is not justified in running any risk, unless he has a good prospect of obtaining some advantage for the Government by doing so. The education of a pilot is an advantage to the Government. The amusement of a pilot is not.

USE OF CONTROLS

In using controls, judge the amount necessary entirely by the effect on the machine. Advice from another pilot about the probable behaviour of a

machine should be taken simply as a warning to be prepared. On no account should any action be taken on the strength of such information, unless a movement of the machine shows action to be necessary.

The following are the reasons:—

(1) Conditions vary considerably between one flight and another.

(2) The same fact may make a very different impression on two different persons.

(3) A control movement, which one pilot describes as small, may seem large to another pilot.

(4) Such advice is frequently based upon the inference drawn from a single flight — sometimes the adviser's first flight in that type of machine.

INSPECTION OF AERODROMES

On arrival at an aerodrome, where you will be stationed, walk all over it and note the good and bad parts.

In using a strange aerodrome, it is only necessary to examine the part over which you intend to run, when starting.

PRECAUTIONS BEFORE STARTING

Detailed list of some precautions follows in Appendix "A".

(1) Look over the machine, and see not only what is wrong but what is likely to go wrong. After practice in looking over machines, anything dangerous will catch your eye. Most accidents are due to engine failures, and most engine failures are due to the pilot not anticipating and guarding against the numerous things which may go wrong with the engine, its fitting and connections.

(2) If it is a strange machine, sit in it and look round. The wheels and tail skid are on the ground, and this is the position for landing. Let this attitude of the machine and the appearance of the horizon or surrounding objects soak well into your mind as the position for landing.

Next, have the tail held up in the position which you decide is the best for running along the ground when starting off. This will prevent you from pushing the tail up too much and digging the



The B.E.2C

propellor into the ground if it is a tractor machine with very little clearance.

(3) Move all controls vigorously to their full extent. Control levers are sometimes tied up to prevent the ailerons from flapping in a wind. Pilots have started before now without untying the Control Lever.

(4) Select carefully your direction of starting, and plan out the course of the machine until you will be 200 feet high. These two things should be considered together in a spirit of compromise, and the sole object in preferring one course to another should be to select that course which will allow the smallest possible number of seconds during which the engine can do harm by stopping.

INSTANCES:—

(a) Compromise in starting off: it is always desirable to start off straight into the wind, but if this direction leads you straight over some hard high object, such as aeroplane sheds, when by diverging a little to the right or left you only encounter some less formidable obstacle such as a hedge, it would be good policy to turn slightly to the right or left, sacrificing the advantage of starting accurately into the wind in order to fly over the better ground.

(b) Reducing number of seconds during which engine can do harm by stopping.

Turns sharp enough to need a heavy bank near the ground are generally agreed

to be undesirable, but if by going straight on you would be forced to fly straight over a mile of trees or barbed wire, it would be better to do a sharp turn to avoid that country, because during your turn you would only be in danger for one second, whereas by flying straight on, you would be in danger for sixty seconds.

Always take all the room for starting that you can get. Accidents due to the laziness of the pilot in only taxiing half way across the aerodrome instead of to the extreme edge are as inexcusable as the wanton destruction of an aeroplane with a hatchet.

(5) Start the engine always using the following drill without any variation:—

Mechanic (before touching propellor)

“Switch off.”

Pilot

“Switch off.”

Mechanic prepares engine for starting.

Mechanic

“Contact.”

Pilot

“Contact.”

The expression “switch on” must never be used as it causes accidents by being confused with “switch off.”

Remember that under R.F.C. standing orders, if an accident occurs to a mechanic swinging a propellor, the person in charge of the switch is assumed to be entirely to blame unless he can prove that he is not.

Run the engine at full power long enough to make certain that it is in good order, but not one second longer than it is necessary to be sure of this.

Remove all power from propellor by throttle or switch and hold hand up high and wave it from side to side as a signal for the chocks to be removed. If you wish the machine turned, hold hand up high and give it a horizontal circular motion in the direction in which you wish the machine to turn.

Assist with your rudder.

When you wish to taxi with Mechanics on the wings, point in the direction in which you wish to go and assist with your rudder.

When you wish the Mechanics to let go, again remove all power from the propellor, and repeat the signal for removing the chocks.

Do not vary these signals or invent private signs on your own account.

Unless all pilots do the same, it is impossible for Mechanics to know what is wanted.

Remember that you have, or should have, two Mechanics, one on each wing.

Remember that it is essential that they should both know what you want done.

Remember that the only time when they can both see your hand at once is when your hand is above your head.

When the machine is at rest in the right place, and pointing in the right direction, turn the engine full on and look straight ahead.

The machine must go straight.

The machine must go level while it is on the ground.

The only method which affords any hope of securing these two points is to fix the eyes on some object in front as far away as possible.

Directly you look inside the machine, something must go wrong. Imagine yourself driving a car down Piccadilly, if you had to look inside the car whenever you wished to change gear, put on the brake or open the throttle.

Only the very best pilots can take a machine successfully off the ground without looking where they are going. Only the worst pilots ever try to do it.

FLYING NEAR THE GROUND

Note that in this section, the word “Drift” means sideways movement of the machine through the air. It has no reference to movement over the ground.

GENERAL PRINCIPLES

(1) As long as you are near the ground, it will be necessary to assume absolute control over the machine and check at once any tendency it may show to do anything which you do not want done.

A machine is built to be best under control when the air is passing over its lifting and controlling surfaces in a line parallel with the fore and aft

centre line of the machine. Therefore, to have the machine under most perfect control, the pilot must fly without drift in relation to the air, which again means that each little change of direction must be accompanied by its appropriate bank, however small.

Sharp turns needing heavy banks should be avoided near the ground when possible, not because the bank itself is dangerous, but because the pilot may make a mistake.

If a sharp turn low down is necessary, a fairly heavy bank will be far safer than a flat turn with much drift, for the reason that a machine drifting is only partially under control.

FLYING OVER 500 FEET UP

There is no difficulty about this. Everybody does it differently, and it doesn't much matter how, provided that no attempt is made to indulge in fighting practice or stunts of any kind under 3,000 feet.

LANDING

In landing, there are two dangers to the machine:—

- (a) The horizontal surface of the ground will hurt it if its vertical velocity is too great.
- (b) The hedge or other hard object in front will hurt it if its horizontal velocity is too great.

It is easy to avoid the danger (a) if the horizontal velocity is so great as to make the danger (b) very great.

It is difficult to avoid the danger (a) if the horizontal velocity is so small as to make the danger (b) disappear.

At the same time, the undercarriage is built to counteract the danger (a) to a certain extent, but the front of the machine is not built to meet the danger (b).

Therefore, there are two points on which a landing should be judged:—

- (x) The actual contact with the ground.
- (y) The distance covered in the last fifty feet of descent, until machine comes to rest.

Of these (y) is more important than (x), so that a slow landing with bad contact is better (as a training for Service conditions) than a fast landing with good contact.

Therefore, landing down wind or in any way except in that which will produce the slowest landing allowed by the skill of the pilot, and the weather conditions, is a bad fault.

This, of course, is only a statement of the broad principle of landing. There will be many more aspects to be considered later in examining the means by which the objects demanded by the principle are to be attained under different conditions.

FLYING: PARTICULAR CASES

THE EFFECTS OF MOMENTUM

(1) ON LANDING. — A machine landing has momentum greater or smaller according to the strength of the wind in which it is flying.

When a machine has stopped on the ground, it is at rest, and therefore has no momentum.

The problem of landing, therefore, is to dissipate or destroy the momentum of the machine with the least possible shock to the machine itself.

When a machine is on the ground, any momentum which it may have can only be lost in friction of the wheels and tail skid, and a very small amount of air resistance.

When a machine has been flattened out for landing, the momentum has to provide the power for its support in the air until it touches the ground. Therefore, the way to make a machine run the shortest possible distance on landing is to hold it off the ground as long as possible, after flattening out.

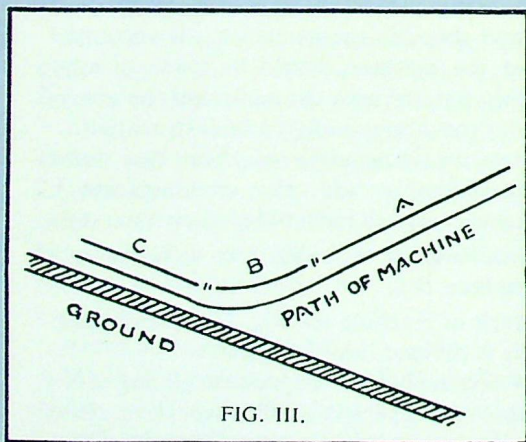
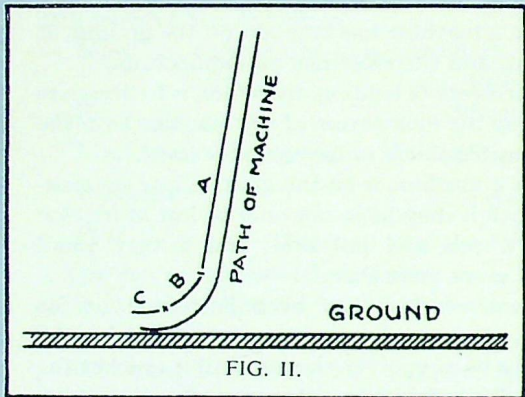
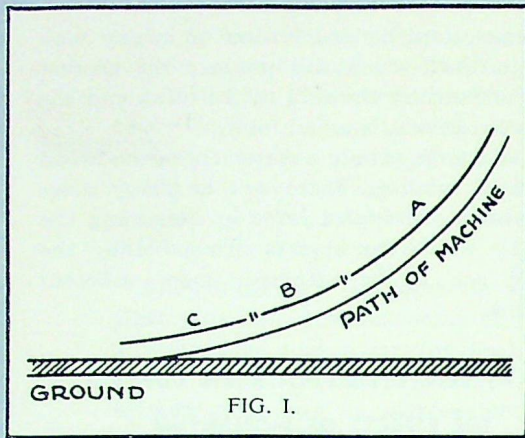
To avoid shock to the machine, it is also necessary that the machine should be made to move very nearly parallel with the surface of the ground just before the two actually come into contact.

The relative importance of these two points varies considerably with the circumstances of landing, and cases will have to be taken separately.

- (a) Landing in a calm on a horizontal surface.

For track of machine see Fig. I. on next page. The glide is divided into three parts:—

- (a) Which should be the slowest gliding speed, which gives perfect control over the machine with a slight margin for bumps. Obviously



a good speed for this is five miles an hour faster than the slowest climbing speed of the machine.

- (b) The part during which the machine changes its speed from one which gives good control to one which will only just hold the machine in the air.
- (c) The part where the speed of the machine becomes too small to support the machine, and the machine comes on to the ground out of control of the pilot.

When the last speed is reached, the wheels and tail skid should be about $\frac{1}{2}$ inch off the ground. This will be to all intents and purposes a perfect landing, and will cause the machine to come to rest after the shortest possible run for a given strength of wind.

(b) Landing on a horizontal surface in a strong wind.

See Figure II.

Owing to the fact that the wind is strong, the momentum of the machine is very small.

The period A of normal glide is therefore continued right down to the ground.

The period B, during which in other cases the surplus momentum is absorbed, in this case practically does not exist.

At the last period C, the machine is flattened out and the wind acting against the inertia of the machine (instead of against the momentum as in other cases) provides the support necessary to check the descent for a moment before the machine touches the ground.

(c) Landing up hill in a calm.

See Figure III.

The chief point to notice in this case is that in order to move parallel with the ground, the machine has actually to rise in the air. Greater momentum must therefore be kept in the machine for flattening out than would be the case if the ground were level.

The pilot has his choice of two ways of doing this:—

Either he can make the normal glide A faster than usual, or he can make the period B short, as when landing against a strong wind.

(d) Landing down hill.

See Figure IV.

The chief point to notice about this case is that slow air speed is essential if the run is to be kept within reason. In this respect the pilot is enabled to take greater liberties than he would if the ground were horizontal because it is not necessary for the machine to have enough momentum to move horizontally when it is flattened out.

Further, in the event of a misjudgment, the shock of a slight pancake is lessened by the ground sloping away in the direction on which the machine is moving.

Various combinations of wind and ground may occur, but in each case, the method of dealing with the situation becomes perfectly obvious if considered on the above principles.

THE EFFECTS OF MOMENTUM

(2) ON TURNING.—When a machine is flying against a wind equal to its own speed, it is actually standing still and has no momentum.

If the machine turns round, and travels down the same wind, its speed will then be twice its own air speed. Its momentum will then be very great. Therefore, if a machine flying against the wind, turns round to fly down wind, it must acquire momentum during the turn.

Momentum cannot be imparted to an aeroplane instantly. The engine and the wind will need a certain definite time in each case according to circumstances in which to act upon the machine and produce momentum in it. Therefore, if the turn be completed in less time than this, the machine will for some time be travelling through the air at less than its proper air speed, and must drop. Therefore, a turn down wind should be made slowly to allow the wind and engine time enough in which to produce in the machine the momentum which it must have, when flying properly in the new direction.

The opposite turn, from down wind to up wind is, of course, a simple matter. It is only a question of using or losing energy, in which there is no difficulty at any time. It is, however, quite possible to climb several feet on a turn in this direction, without making any extra demands upon the engine.

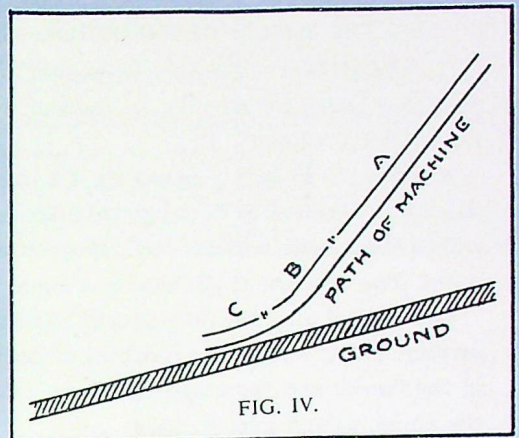


FIG. IV.

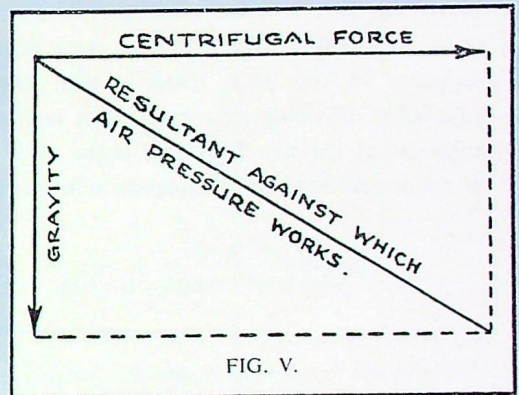


FIG. V.

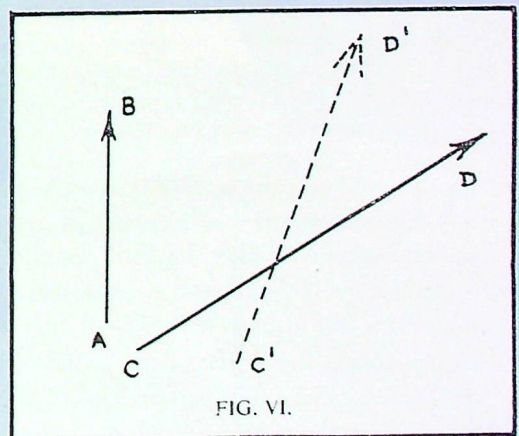


FIG. VI.

THE EFFECTS OF MOMENTUM

(3) ON PITOT TUBES.—In a pitot tube, a reading is given by air pressure working against the weight of a liquid.

If the machine gets a bump up, the inertia of the liquid is added to its weight and the reading will become lower without any change in the air speed. The opposite is the case in a bump down.

In a banked turn, the force against which the air pressure has to work is the resultant of the weight of the liquid, and the centrifugal force acting on the liquid, as in Figure V.

This resultant must be greater than the weight alone. Therefore, on a banked turn, the same air speed will give a lower reading on a pitot tube than it would if the machine were travelling straight. In this way, many a pilot has been accused of climbing on a turn when he has been innocent of the sin. The same is the explanation of the stupid habit of putting the nose down on a

turn, much affected by pilots who fly with their eyes glued to the pitot tube.

THE EFFECTS OF MOMENTUM

(4) ON STABLE MACHINES (B.E.2 C., etc.).—A stable machine is so constructed that, if left to itself, it will always turn so that the air is passing straight over its surfaces from front to back of the machine. It will not willingly drift sideways through the air. This is to say, that if it is flying along and a gust strikes it from the right it will turn to the right in order that it may get its head straight into the relative wind in which it is flying. Similarly, if it is turned with too little bank so that it drifts outwards, and the rudder is put in a central position while the machine is still drifting, the machine will try to turn back towards the direction in which it was originally flying.

See Figure VI.

MANNERS CUSHION life's relationships. Some one has said that courtesy is like an air cushion: there is nothing in it, but it certainly eases the strain. One of the greatest assets a man or woman can have is charm, and charm cannot exist without good manners. By manners we do not mean the mechanical following of certain rules of etiquette. Nor do we mean the kind of external politeness for

which "back stabbers" are known. We have in mind, rather, the practice of consideration for others. In this sense, manners are closely related to moral attitudes.

"For manners are not idle, but the fruit of loyal nature and of noble mind."

(Chaplain James A. Mayo, in "The Lowry Airmen")

Nuclear Weapons

By Lt. Col. A. W. Betts, Corps of Engineers, U.S. Army

(The Editor of "The Military Engineer," the Journal of the Society of American Military Engineers, has kindly given us permission to reprint this article from the March-April 1949 issue of that publication. Though it was written nearly two years ago, we have yet to read a more concise exposition of the subject for the non-scientific reader.—EDITOR)

IN SPITE of the fertile imagination of the cartoonist who pictures the atomic bomb as a tiny box which can be carried in a handbag, it is highly improbable that a bomb of the present basic type can ever be made arbitrarily small. To understand this and appreciate the reasons for it, one must know in general what makes the bomb explode and the meaning of critical mass.

ATOMIC STRUCTURE AND ASSEMBLY

First the general structure of the atom and relative size of its components must be visualized.* The atom is made up largely of space, not mass. To help visualize the relative amount of space in an atom, picture a magnified atom with a 1-inch diameter sphere fixed in space representing its nucleus (Figure 1). At a distance of approximately 5,000 inches from this central mass, or about one-twelfth of a mile in radius, picture a spherical envelope of surrounding electrons. Between the central mass or nucleus and the envelope of electrons there is nothing but space. If you assume that this particular atom is adjacent to another similar one, this will place 10,000 inches of space, or about one-sixth of a mile, between the two nuclei of about 1 inch diameter each. Of course this is an extreme magnification of an atom which actually is only about one ten millionth of an inch in diameter but the relative size of the nucleus to the envelope of electrons is the same.

The most important component of the atom is its nucleus which is made up of protons, each of which carries a positive charge; and neutrons, which are without charge. The other component of an atom is its surrounding envelope of electrons which has little or nothing to contribute to the understanding of a critical mass. Each electron

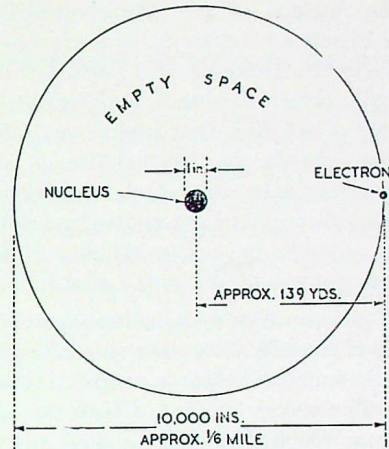


Fig. 1.
Diagram of an atom of hydrogen
(magnified 2,540,000,000 times).

carries a negative charge. For every electron in the envelope of a given atom, there is a corresponding proton in its nucleus. Since the protons and electrons are of equal and opposite charge, lack of charge of an atom can only be achieved by having equal numbers of each.

It was the discovery of neutrons, and the fact that a lack of charge made them most useful as bullets, for bombarding the nuclei of atoms, that led to the eventual discovery that these bullets can create fission or splitting of the nuclei of atoms of certain elements. These elements are referred to as active materials. Uranium 235 and plutonium are such materials.

Going back to the picture of the structure of an atom, multiply the number of these atoms to imagine an unlimited volume of mass of active material basically composed of so little mass but of so much space. This should indicate how diffi-

*See "Technical Aspects of Atomic Power," by Col. Lynn W. Pine in *The Military Engineer* for March 1946.



The under-water explosion at Bikini (1)

cult it would be for a stray neutron bullet to strike the nucleus of any one of these atoms. Since the distance between nuclei is approximately 10,000 times the diameter of a particular nucleus in a single layer of atoms, comparison of the relative areas will show that a neutron would have about one chance in 100,000,000 of directly striking a nucleus. In other words, a neutron would have to pass through the space filled by 100,000,000 atoms in order to have a probability of directly hitting the nucleus of one of the atoms.

It is this basic concept which accounts for the fact that a considerable mass of active material must be assembled before a nuclear explosion is possible. The energy release of such an explosion comes from the fission of individual atoms that have been struck by a neutron and split into fission fragments, which are merely radioactive isotopes of elements near the middle of the periodic table. In the process of this splitting, more than one neutron is released for each one used in fission. These neutrons in turn fly off and strike other atoms, creating further fission. If, on the average, at least one neutron released in each fission creates a new fission, then a chain reaction will occur.

There are reasons, such as the capture of neutrons in impurities without fission, and the escape of neutrons from the mass of active material, that reduce the assurance that at least one neutron from each fission will create a new fission. It is apparent that a considerable mass of atoms must be present to minimize the escape of the neutrons from the active material to assure the continuance of the reaction. As a mass of active material is built up, a point is reached where the multiplication rate of neutrons (a measure of the number of neutrons being developed by fission for each neutron that induces fission) reaches one and above which point the multiplication rate

begins to increase rapidly. From the point of view of a nuclear reactor, or so-called pile, it is the mass that must be developed before sustained nuclear reaction occurs. From a weapon standpoint, this is only the beginning. More than such a critical mass is needed for the atomic weapon. Obviously, the larger the mass, the greater the percentage of atoms in that mass that will be struck by neutrons released in its interior. The weight and general size of a critical mass of plutonium or U-235 can not be disclosed at this time. It is a mass of some magnitude (between 1 and 100 kg. according to the Smyth Report).

This leads to the question: How is a nuclear weapon made? Following the suppositions advanced by the Smyth Report and other releases on the subject, the least cumbersome mechanism imaginable and perhaps the most absurd would be to have a suicide volunteer clap together two subcritical masses that would create something over a critical mass. Not the least among many reasons why such a solution is absurd is the fact that stray neutrons, always available from cosmic ray background, would start the fission process when the system is just entered and before the material has reached the most advantageous state of assembly. As a result then, the assembled masses would reach a very high heat, expand and lose their shape, thus permitting escape of neutrons and causing a shut down of the chain reaction before an appreciable explosion could be developed. This is called the problem of predetonation, that is, the detonation takes place before the geometry of the critical mass is in the shape desired by the bomb designers.

It should be pointed out that the time factors to be considered are in the order of a small fraction of a second, and whatever assembly methods are devised to create a critical mass must be so rapid that the assembly from just critical to the desired



The under-water explosion at Bikini (2)

supercritical condition can be completed in a time interval of that order. It is apparent, therefore, that a mechanism of considerable complication must be developed if two very heavy pieces of material are to be brought together in so brief a time interval.

A possible solution of the assembly problem is to place two subcritical masses of active material at opposite ends of a tube with a propellant behind one of the masses. Upon firing the propellant charge, the masses would be brought together with tremendous velocity. The masses are arranged so that when they are assembled in a supercritical arrangement, they are surrounded by a dense tamper or neutron reflector. The tamper turns back into the active material neutrons near the surface which might escape without creating fission. It should be quite possible to make a bomb in this fashion once detonation timing and problems akin thereto have been conquered.

Obviously, the solution or solutions developed by the scientists at Los Alamos may not be disclosed. The procedure suggested should indicate that the bomb is not a simple device that can be delivered by a bazooka or jeep-mounted rocket launcher.

It should not be presumed, however, that it is not within the realm of development possibility to decrease the size and weight of the present bomb; moreover, it is not beyond the realm of possibility to increase its present size. The nature of our delivery problem must dictate whether we design a larger bomb in order to increase its yield or a smaller bomb with decreased yield in order to simplify its delivery. The scientists are capable of solving the problem in either way, but they are not in a position to know what balance should be established between the expenditure of very scarce and valuable active material and the bomb's adaptability to a particular form of

delivery. This question can be answered only at the highest policy level.

UTILIZATION OF NUCLEAR WEAPONS

Further consideration of the nature of the weapon raises a second point of interest. Can it ever be made simple enough and be produced in such quantities that these weapons can be issued to each echelon in the field army? Though some day this point may be reached, it certainly can not be done today. In the first place, active material, plutonium or U-235, is an extremely scarce and expensive item. Because of the difficulties of production and because of the not unlimited supply of uranium ore from which these materials are produced, it can be stated with reasonable assurance that these bombs will not be abundant and cheap in the foreseeable future. Only the highest levels of command should decide when and where to use them.

Nuclear weapons involve materials and sciences with which the average officer, enlisted man, or technically trained individual is not very familiar. Such weapons are neither simple nor inexpensive. Therefore, it is highly probable that these weapons will be issued only to specially trained units. The time necessary to train officer and enlisted personnel is appreciable, and such key personnel must have an extensive technical background. In time of war, it may be possible to shorten the length of this training period by our ability to bring in scientific personnel of considerable civilian experience for this work.

The design problems connected with nuclear weapons are complicated by the obvious need for accurate fusing and firing. The time of the detonation (and assembly) must be extremely exact to assure explosion at the exact altitude computed to produce maximum effect on a particular target. Since the weapon is dropped from a very high

altitude in order to permit the delivering airplane to avoid destruction, there are many complications that enter into these problems. These complications are sufficiently serious to demand a team of considerable educational background plus a long training period in this particular operation. We must minimize the possibility of dropping a dud, not only because of the danger inherent to its falling intact into the hands of the enemy, but also because of the value of the active material.

PROTECTION AGAINST NUCLEAR WEAPONS

A third point of concern to military personnel is the nature of the protection we can afford troops and civilian populations against attack by nuclear weapons. No specific means of protection are known to have been developed to date. Obviously, dispersal of remunerative targets* is the best defence against a weapon of so great a potential destructive power, but the sort of dispersion that would be effective would be highly impractical in many of our major industrial communities. In Japan, there were almost no survivors in a radius of about a half a mile of the explosion and, in a radius of about a mile, only those who had considerable protection survived. Many casualties were caused outside the mile radius by fire and falling debris.

A possible means of protection might be to go underground with our strategically important industries, but here again the time and expense involved in such a procedure appear beyond our capability at the present time. Moreover, there is no assurance that a nuclear weapon could not be made to penetrate 40 to 50 feet underground, which would probably make untenable any structure that did not have several hundred feet of earth covering, or comparable structural protection.

It is apparent that the best means of protection against this weapon is to prevent its delivery. Here also prospects are discouraging. It should be possible to develop long-range rockets, or pilotless aircraft, which might have nuclear warheads. It must be remembered that during World War II

no V-2 rocket was shot down by our forces. Furthermore, it appears possible to deliver this weapon by means of saboteurs carrying the bomb in small pieces and assembling it in some strategic centre. Such possibilities give some appreciation of the problem involved in defence against attack by nuclear weapons.

Military medical personnel are presently being trained to deal with the physiological and psychological effects of radiation. They will not be able to prevent the initial damage that would be accomplished by a successfully delivered atomic bomb, but this education, together with proper organization of our cities, should make it possible to reduce the complete disorganization that was present in Hiroshima and Nagasaki, which resulted in a considerable loss of life not directly caused by the blast itself. For example, in both of those cities fire-fighting apparatus was almost completely immobilized by the destruction caused by the bomb. It would appear sensible in the future to locate fire-fighting equipment on the outskirts of a city so that it would not be destroyed by the initial blast. It might also be possible to develop some means of fighting major fires from the air when streets are completely blocked by debris. Planning to cope with the catastrophic effects of nuclear weapons will require a great deal more thought than has been given to disaster control and relief in the past.

Our people should be informed of the nature and extent of residual radiation present after an explosion so that they will realize whether it may or may not be advisable to evacuate the target area. Personnel of the civilian defence organization should have available radiation detectors, such as the Geiger counter and similar equipment, and should be instructed in their use. These problems of protection must be solved, and thought should be given to them at the earliest possible time. Plans should be developed now that can be implemented prior to attack.

FUTURE DEVELOPMENTS

A fourth point of general interest is the possibility in the future that nuclear weapons may be

*See "Industrial Vulnerability to Bombing" by Maj. Gen. C. F. Robinson in *The Military Engineer* for January-February, 1949.

developed in other shapes and for other purposes than that of a bomb.

It will not always be easy to deliver atomic bombs. They do not lend themselves readily to delivery by massed aircraft, unless the mass is sent in at a very great altitude, because of the danger of losing some of the aircraft in the turbulence created by the bomb. Moreover, it should be remembered that our forces had complete control of the air over Japan when the bombs were delivered that ended the war. It is highly improbable that such complete control of the air will be ours in the early stages of a future war — when we should be most interested in making the bomb effective. This leads to the conclusion that every effort should be made to develop either a rocket or a guided missile to carry the nuclear warhead. For defensive purposes, the possibility should be investigated of using this warhead in an anti-aircraft rocket which, if successful, might make massed bombing raids a thing of the past, and might itself be a specific defense against the atomic bomb.

The results of the second bombing at Bikini have demonstrated the remarkable efficacy of an underwater explosion of a nuclear weapon. It is not unreasonable to suppose that it should be possible to deliver the weapon to the enemy's harbors by means of a submarine, controlled by a crew who could escape before a time mechanism set off the bomb. A well-placed bomb in some of the more congested harbors might deny the use of that harbor for a period long enough to be decisive in any particular operation. It is also possible, if the targets are sufficiently remunerative, to place this bomb in a controlled mine, although the successful use of the weapon in this fashion is not easy to foresee. It can only be assumed that the problems involved in the use of nuclear weapons are being investigated by the various development agencies concerned. The purpose here is merely to point out that thinking should not be limited to the idea that this tremendous release of energy is only available for use as an aerial bomb.

POWER BY NUCLEAR ENERGY

Though authoritative quarters do not foresee immediate development of nuclear energy for

power purposes, it will some day be available, and if the installations needing power can be sufficiently large, this potential use may not be too far in the future. The use of this power for such things as rockets, airplanes, or automobiles, however, is sufficiently far in the future that it need not be of immediate concern. It may be feasible in a relatively short time to develop power sources for battleships or to develop underground central power plants for the production of electricity that would insure unlimited sources of energy in a future war.

The pessimism in this field grows out of two factors which can readily be understood. The first is that fission products formed in an atomic pile do not go anywhere; they remain in the pile and before very long begin to interfere with the fission process. Since they are highly radioactive, the chemical process of removal of this material from the active material that makes the pile work is not a simple matter, and much research will be necessary before this problem can be considered solved. The second factor, a more immediate deterrent to power development, is the fact that there is no known material that will stop neutrons and gamma rays in a very short distance. Present atomic piles are surrounded by concrete masses many feet thick and weighing many tons. Obviously, the power developed in the pile is not sufficiently colossal to overcome this handicap in developing power for a vehicle of reasonable size.

SUMMARY

It is emphasized first that because of the necessity for assembling a critical mass in a time interval of the order of a small fraction of a second, it is highly improbable that a nuclear weapon can be developed which will be small enough to be man handled. Second, the methods of detonation and the fusing problems of the bomb are sufficiently complicated to demand a level of training higher than that previously required of members of the Armed Forces. Third, there is at present no adequate protection against the bomb short of preventing its delivery. Fourth, nuclear weapons have not reached their maximum size in the present

type bomb, and new types may come into being which will be considerably more powerful than present models; moreover, they are not confined to bombs but, subject to size, may be made as war-

heads for almost any type of delivery in use today in modern armies; and last, that the development of nuclear power for military vehicles is not "just around the corner."

Letters to the Editor ★ ★ ★

"SOMETHING ON ACCOUNTS"

Dear Sir:

I notice in your October issue that "Something on Accounts" is credited to Cpl. Labonté. If this wasn't written by ex-Flt. Sgt. Eric Nichol while P.R.O. at Trenton, I'll eat my old wedgie! As a matter of fact, I still treasure the complete article written by Eric: your extract is only about half of it. Couldn't more of his articles be reprinted?

Charles D. Lundy (R.C.A.F.A.)

(We gave the author's name as it appeared in "Wings Over Greenwood," the weekly organ of R.C.A.F. Station Greenwood. No doubt its editor will clear up the mystery in these columns.—EDITOR)

CATERPILLAR IN DISTRESS

Dear Sir:

Can you please advise me how to secure a replacement for my Caterpillar Pin, which I have lost? I still have the card issued with the pin: it is signed by L. L. Irwin, Hon. Secretary, European Division.

I would also like very much to extend my very best wishes to all former members of No. 414 Squadron, of which I was a member during '42-'44.

L. F. May (R.C.A.F.A.)

(Mr. May should write to Irvin Air Chute Ltd., Fort Erie North, Ont.—EDITOR)

R.C.A.F. PIPE BANDS

Dear Sir:

I have just read the article in the October issue re the Edmonton Band, and I think the author made a pretty big statement in his final sentence!

I admit that I have not heard the Edmonton band, but I have heard the two Reserve bands mentioned in your preface and I have also heard the Rockcliffe band. The Reserve bands are good: what they lack in volume they make up for with show. The Rockcliffe band lacks neither volume nor show.

Here is an outfit that started almost from scratch and can now turn out with ten good pipers and five or six first-rate drummers. The drummers are a pleasure to watch. Their time is perfect and their sticks move with a perfection that would make the Guards sit up and take notice.

These men are all tradesmen and give their own time to forming a band that any Station would be proud to call its own — but do the poor chaps get kilts? No!

This then, Sir, is an appeal through you to the mighty Shatterproof (who, by the way, is the only man I have ever seen able to play the bagpipes and smoke a pipe at the same time) to confront the Brass and see that Stations which are forming pipe bands to not have to beg, borrow and steal to outfit them — as we at Sydney did during the war and as still appears to be universally necessary.

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



P/O PRUNE

Dear Sir:

I would like to add my comments on the re-printing of articles concerning P/O Prune. How about reprinting Prune's ancestry as published in the book "Prune's Progress"? Also how about the Historical Section digging up some facts about 45 Group, R.A.F. Transport Command. There were a great number of R.C.A.F. aircrew serving in this independent air force.

Ivon Gwynn (R.C.A.F.A.)

(We received a letter recently from Mr. Anthony Armstrong, Prune's creator. Being about to re-publish "Prune's Progress" together with a sequel, he is naturally unable to extend us reprint rights prior to the new volume's appearance. He hopes, however, to be able to give us the green light later.—EDITOR)

Answers to "What's the Score?"

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

Coastal Command War Record Book

AT THE CLOSE of the Second World War personnel of the R.A.F. Coastal Command subscribed about £1,600 to produce a book which would commemorate and record for posterity the work of the Command during the war years. The volume has now been completed and is on permanent display in the hall of the Mess at Coastal Command Headquarters.

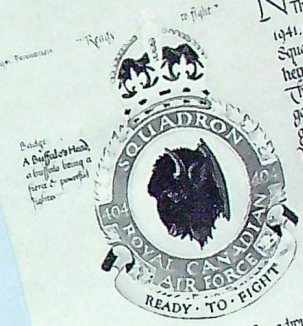
"Coastal Command War Record Book" is beautifully bound in blue leather, tooled in gold and silver, and contains 90 leaves of vellum, lettered and illuminated by hand. Each of the 83 squadrons which served in the Command has a two page opening, giving a brief sketch of its history, a list of bases from which it operated, the names of commanding officers, and a summary of awards gained. Squadron badges are emblazoned in burnished gold and colours.

The R.C.A.F. is represented in the War Record Book by seven squadrons — Nos. 162, 404, 407, 413, 415, 422 and 423. A typical page is reproduced here.

Former members of the R.C.A.F. (or other) squadrons in Coastal Command who wish to obtain photographic reproductions of their unit's pages in "Coastal Command War Record Book" may order them from:

Command Intelligence Officer,
Headquarters Coastal Command,
R.A.F. Eastbury Park,
Northwood, Middlesex,
England.

404 Number Four Hundred & Four Squadron Royal Canadian Air Force



No. 404 Squadron formed at Thornby Island on 15th April, 1941, as a Fighter and Anti-shipping Squadron, equipped with Blenheim aircraft.

The majority of the operations engaged in by the Squadron were against enemy shipping along the Norwegian coast, but the Squadron also flew against German convoys off the Dutch coast and in the Bay of Biscay.

On 11th and 12th December, 1941, an aircraft of No. 404 Squadron escorted a party of Commando and Naval vessels to Vaage.

From July, 1942, the Squadron carried out a continuous succession of attacks against enemy shipping, first off the Norwegian coast, and finally a period of attacks against convoys off the Dutch coast, and finally back to attacks along the Norwegian coast. On the afternoon of 'D' Day three enemy destroyers were sighted heading for the Channel. With an escort of Beaufighters the Squadron attacked the destroyers at night, and all three were hit. One was left burning fiercely, with thick black smoke pouring from it, and another was left smoking. Early the next morning while it was still dark, a second attacking force was dispatched, and another destroyer was set alight and destroyed. The Navy had a turn the next day, and left a destroyer

The price is 4s. 10d. (71c.), postage included for the set of two pages. Postal orders should be made payable to "Coastal Command Cent Fund." The photographs are 8½" by 6½" in size.

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