The ROUNDEL

-ray tracy-

VOL. I, No. 2
DECEMBER 1948

The ROUNDEL

Issued on the Authority of
THE CHIEF OF THE AIR STAFF

VOL. I, No. 2 DECEMBER 1948

Contents

page

A Christmas Letter 1

ARTICLES

The Second Accurasian Affair 6
The Chaplain in the Regular Service 14
Tips for the Shooter 17
Northern Skytrails: Pt. II 22
The Battle is One: Pt. II 28
The Soviet Air Force: Pt. II 35
A.F.A.R.S. 40
Operation Paperclip 44

REGULAR FEATURES

Accident Prevention: Icing 3
Royal Canadian Air Cadets 10
What's the Score? 20
Aircraft Recognition 34

MISCELLANY

Christmas Customs: No. 1 9
No. 2 16
No. 3 21
No. 4 33
No. 5 39
No. 6 47
No. 7 48
Size of Atom-Powered Aircraft 48

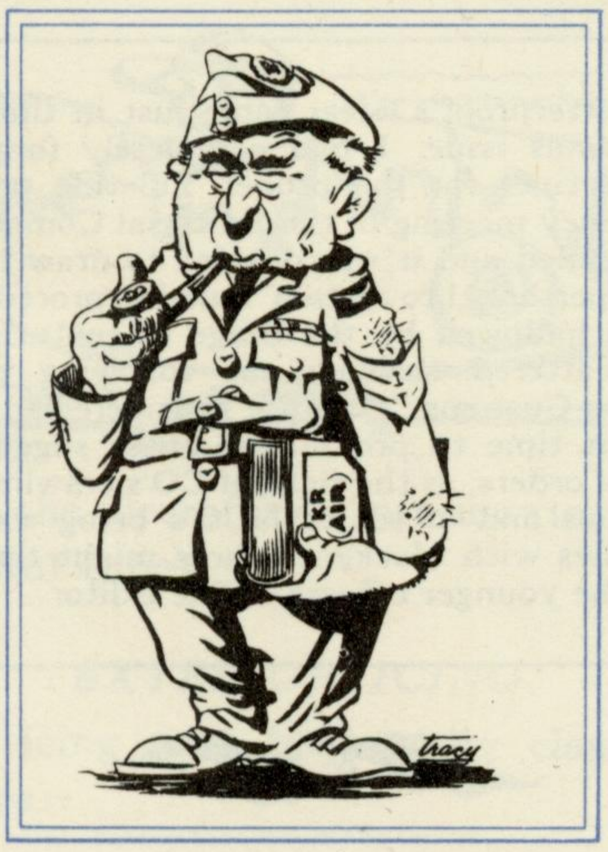
John Griffin Library



DEAR EDITOR:

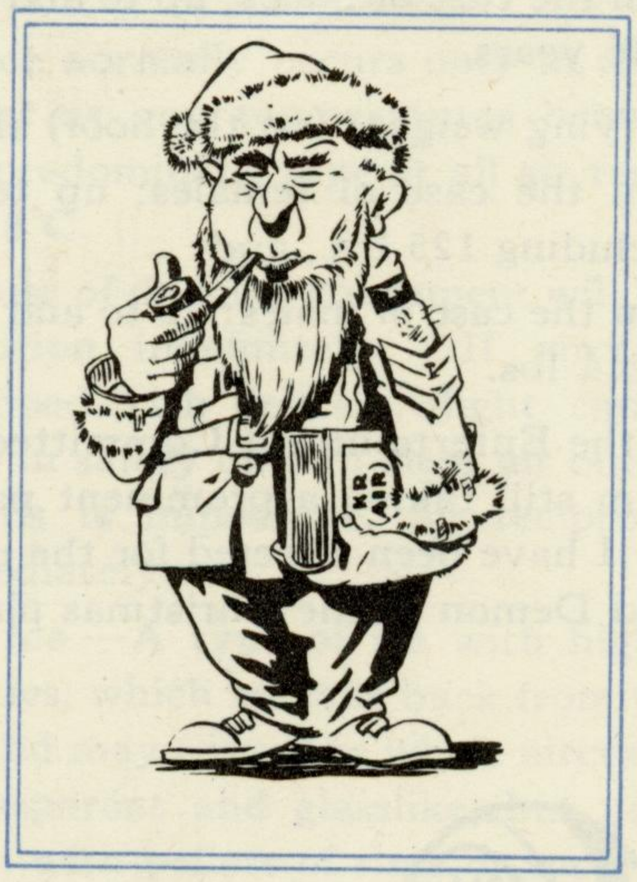
The first issue of "The Roundel" gave me no pleasure at all. However, I hadn't anticipated any, so I was not disappointed. One thing I did appreciate, though, and that was your report of our conversation in your office last month. The boys in the field will at least know that I did my best for them, even if I failed. "You can't beat the Brass," I keep telling them. "All you can do is try to educate it."

tracy isn't too bad when he stops trying to be funny. His one attempt at serious drawing shows a little promise. I refer, of course, to his portrait of me. The only complaint I have is that he makes



. . . *Shatterproof the Critic.*

me look too stern. But I suppose I oughtn't to blame him. He saw Shatterproof the Critic, fighting for the boys in the field. He did not see the gay and laughter-loving Shatterproof that hides behind the rugged exterior. I am therefore sending him a photograph of myself as Santa Claus, taken at the Children's Party last Christ-



. . . *the gay and laughter-loving Shatterproof.*

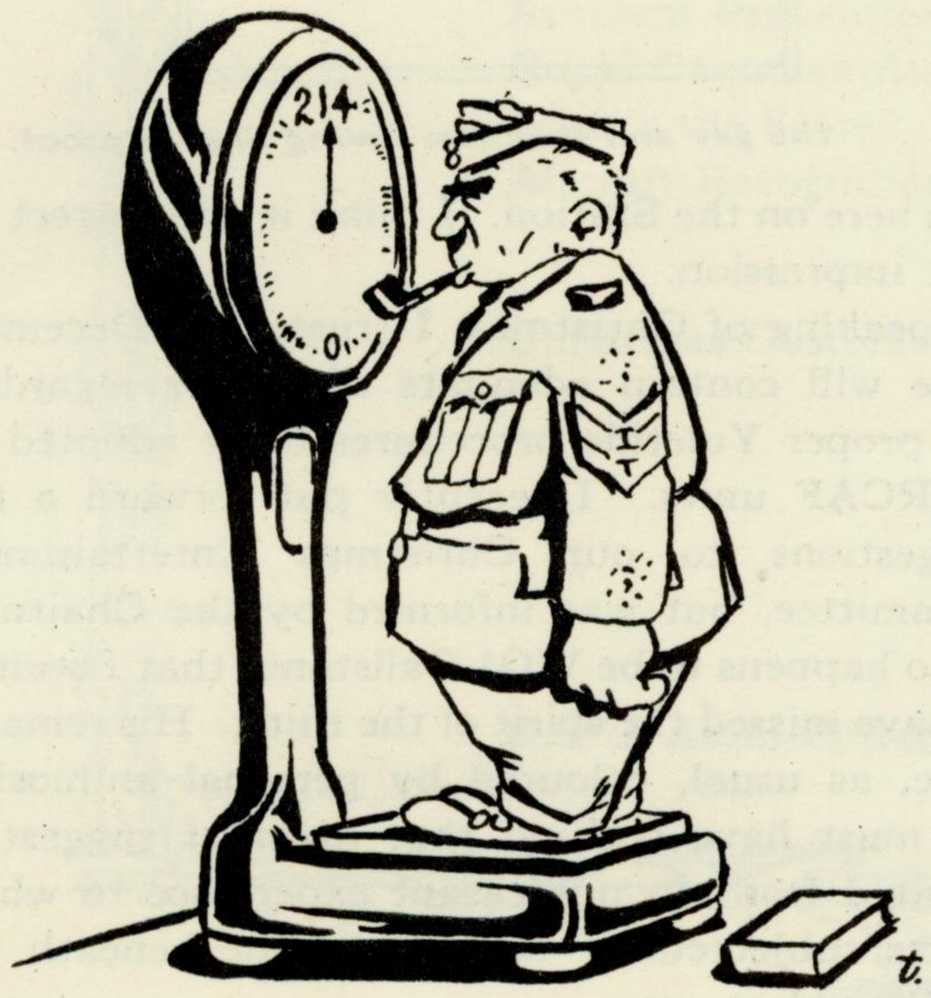
mas here on the Station. I think it will correct his first impression.

Speaking of Christmas, I trust your December issue will contain adequate directives regarding the proper Yuletide procedures to be adopted by all RCAF units. I recently put forward a few suggestions to our Christmas Entertainment Committee, but was informed by the Chairman (who happens to be WO1 Gallstone) that I seemed to have missed the spirit of the thing. His remarks were, as usual, coloured by personal animosity. He must have realized that my first suggestion resulted from an unpleasant experience to which I was subjected by Mrs. Gallstone beneath the mistletoe last year.

For your information, I repeat the suggestion here. I have framed it as an order in case you wish to promulgate it as an amendment to KR (Air).

1. All applicants for mistletoe privileges on RCAF units shall be required, before placing themselves in a hopeful attitude beneath any publicly suspended mistletoe:
   (a) to produce their birth certificates, and
   (b) to weigh in.
2. Qualifying ages shall be:
   (a) in the case of females: up to and including 25 years, and
   (b) in the case of males: up to and including 46 years.
3. Qualifying weights (on the hoof) shall be:
   (a) in the case of females: up to and including 125 lbs., and
   (b) in the case of males: up to and including 214 lbs.

Despite the Entertainment Committee's lack of vision, I am still taking a prominent part in the festivities. I have been selected for the role of the Disgruntled Demon in the Christmas play we are putting on for the children. I make two appearances. The first is in Act One, when I shoot up through the stage amid thunder and lightning and roar out that I've kidnapped Santa Claus. The second comes in Act Three, when Prince Charming (who is really Squadron Leader Bostitch, the S.Ad.O.) runs me thro' the chest with a telescopic sword, lets Santa Claus out of his cage, and kisses the C.O's wife (that is, the Fairy Buttercup) over my bleeding corpse. I shall forward you photographs of the actual performance later.



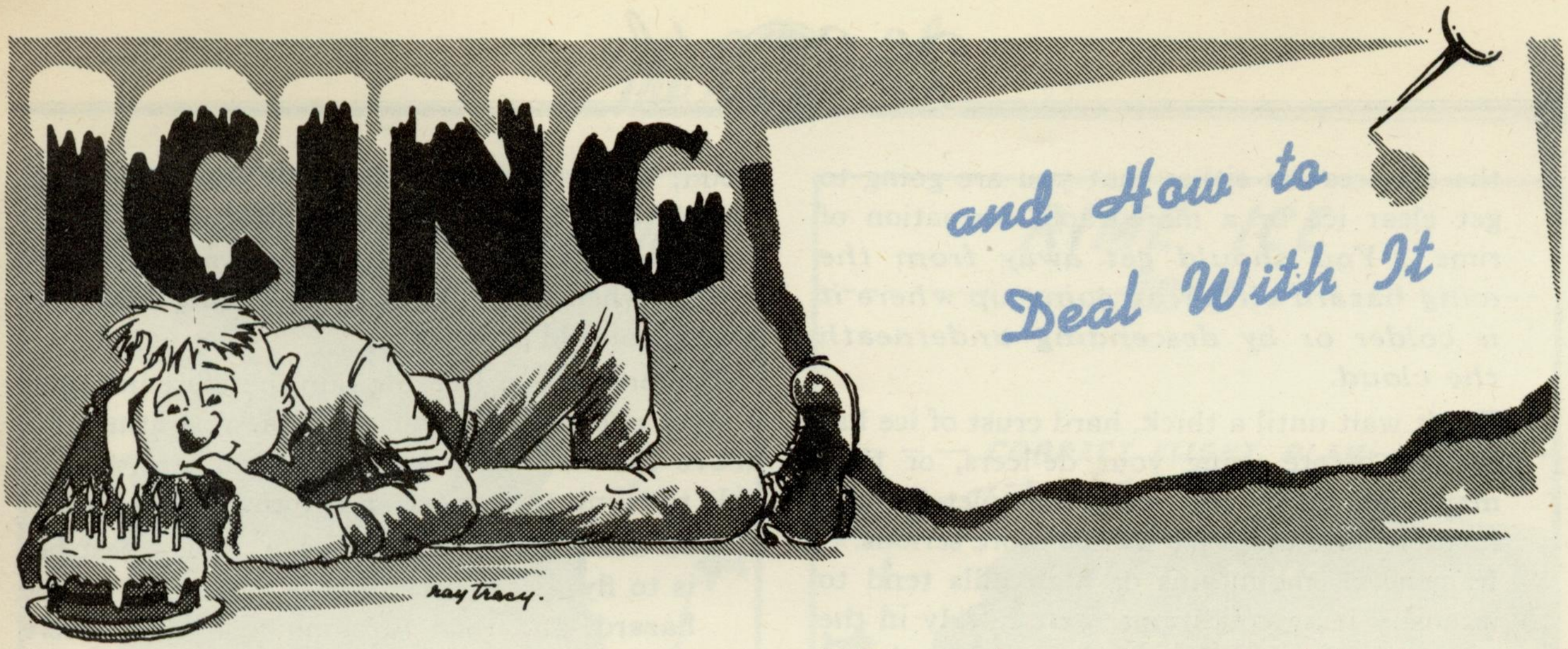
Meanwhile, a Merry Christmas to you and your staff and all your readers (if any), from

Sgt. Shatterproof

P.S. Corporal Spyder has just warned me that WO1 Gallstone is offering free beer for a month to anyone who will spot-weld the sword so that it won't telescope.

Sgt. Shatterproof's letter came just in time to save the Christmas issue. I had completely forgotten all about directives for the proper Yuletide procedures. An emergency meeting of the Editorial Committee was instantly called and it was decided to draw the attention of all personnel to certain Yuletide procedures that have been hallowed by the usage of centuries. These appear, scattered through the following pages, as "Christmas Customs." It is not considered advisable at the present time to promulgate these suggestions in the form of orders, as the sight of CO's crawling around in wolf-skins and of senior NCO's being slaughtered by old ladies with blackened faces might tend to demoralize the younger officers.—The Editor.

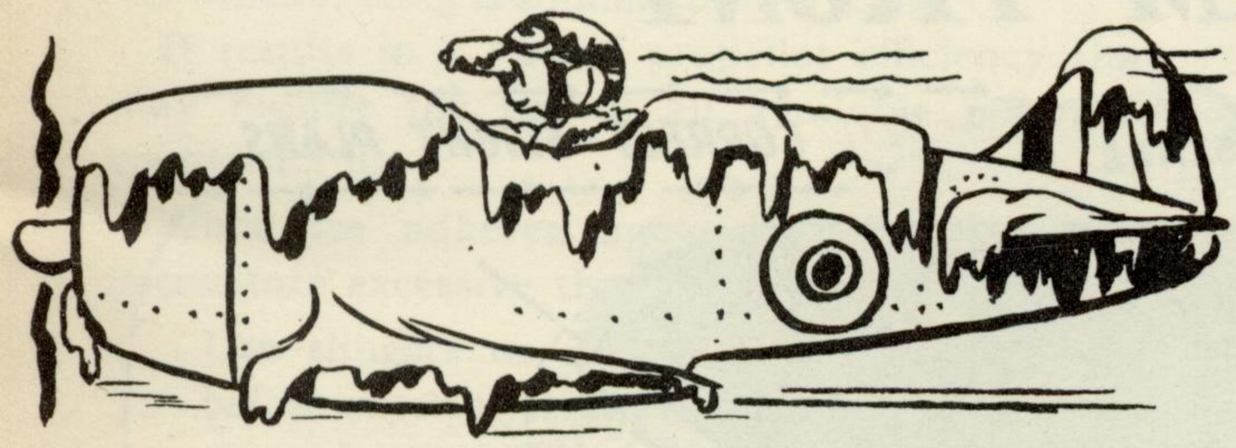
MERRY *Christmas*



WITH THE ONSET OF WINTER the icing hazard again assumes major proportions. The frequency, severity, and extent of icing conditions all show a marked increase over those encountered by the pilot during the months of summer and early fall. Therefore a brief review both of the situations in which icing conditions commonly occur and of the recommended courses of action for each situation, will probably not be untimely.

* * *

Icing may be either exterior (on the exposed surfaces of the aircraft) or interior (in the carburettor or pitot tube).



EXTERIOR ICING

Exterior icing may be broadly classified into three groups:

1 *Frost.*—A light crystalline deposit which accumulates on parked aircraft when an aircraft climbs or descends from a cold layer of air into a warm one.

It shows no noticeable effect on most aircraft in flight, but can be very serious on take-off and must be removed beforehand.

2 *Rime.*—A granular type of ice-like crusted snow, with low adhesive properties. It forms only on the leading edges and is easy to dislodge.

Rime ice normally occurs only in cloud, but it may occur at any temperatures below freezing. It is the predominant type at all air temperatures below −18°C.

The use of de-icing equipment will handle this condition indefinitely. If aircraft is not equipped with de-icers, flight can be continued in safety only in clear air outside cloud. If this is impossible, fly reciprocal course immediately.

3 *Clear Ice.*—A type of ice with high adhesive properties, which spreads back from the leading edges and may cover the whole aircraft. It may be transparent and glasslike, but usually it is opaque, with pellets of rime or snow embedded in it. Clear ice *may* occur in cloud and *always* occurs in freezing rain.

The best insurance against clear ice is to fly where the indicated temperature is above 0°C, or below −18°C. If this is not possible, and clear ice is encountered, *climb or descend through the icing region as quickly as you can.*

Icing in Cloud

In general, the most severe icing conditions in cloud are met with at temperatures near −4°C. The speed with which ice forms always diminishes as temperatures become colder.

If you are flying in smooth air and getting rime ice which your de-icers are taking care of, and the air begins to become turbulent,

the chances are either that you are going to get clear ice or a more rapid formation of rime. *You should get away from the icing hazard either by going up where it is colder or by descending underneath the cloud.*

Don't wait until a thick, hard crust of ice has formed before using your de-icers, or they may not clear the wing completely and further build-up of ice will be more serious.

In general, mountains or high hills tend to intensify icing conditions, particularly in the turbulent cloud on the windward side. Avoid such clouds if at all possible.

If you have to climb or descend through low cloud on take-off or landing, and temperatures are in the icing range, do so as quickly as possible.

Icing in Freezing Rain

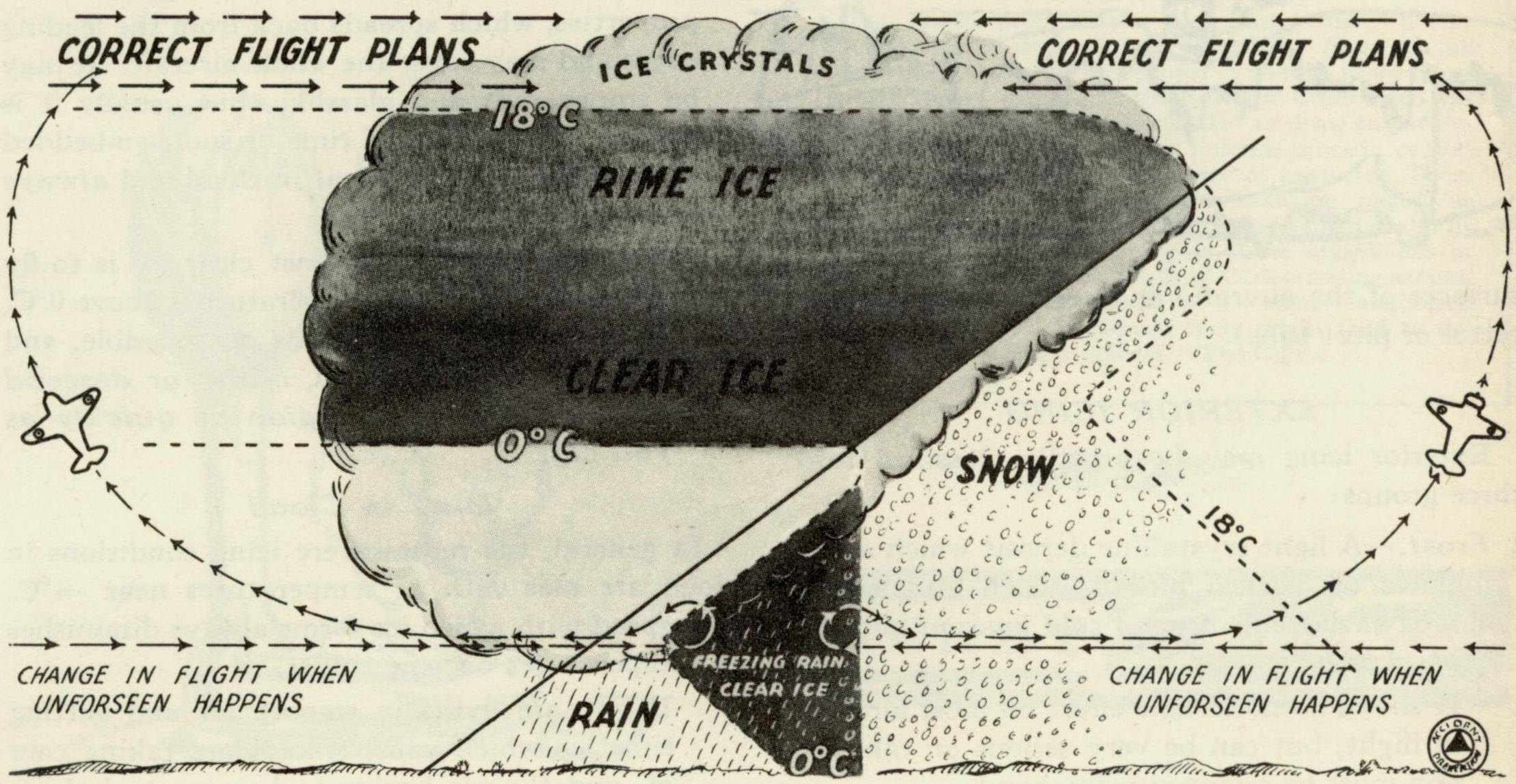
This condition gives the most dangerous of all icing conditions. It results from rain falling from cloud, where the temperature is above freezing, into a layer of sub-freezing temperatures. This condition is associated with some warm fronts in winter, when warm moist air is flowing aloft over a wedge of cold polar air.

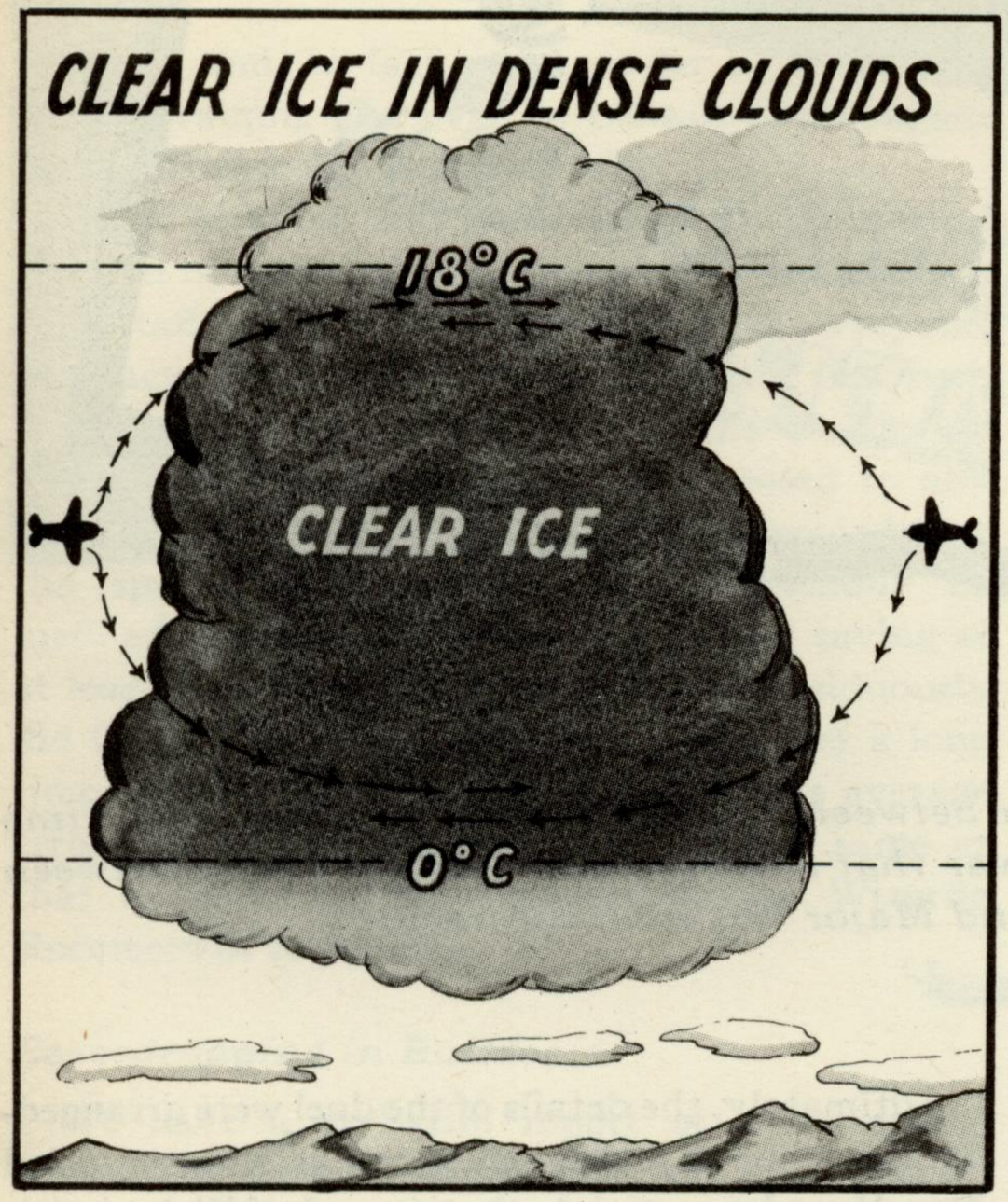
The presence of freezing rain therefore indicates a layer above you within which temperatures are above the freezing point. But you may not be able to climb to this region before ice is excessive.

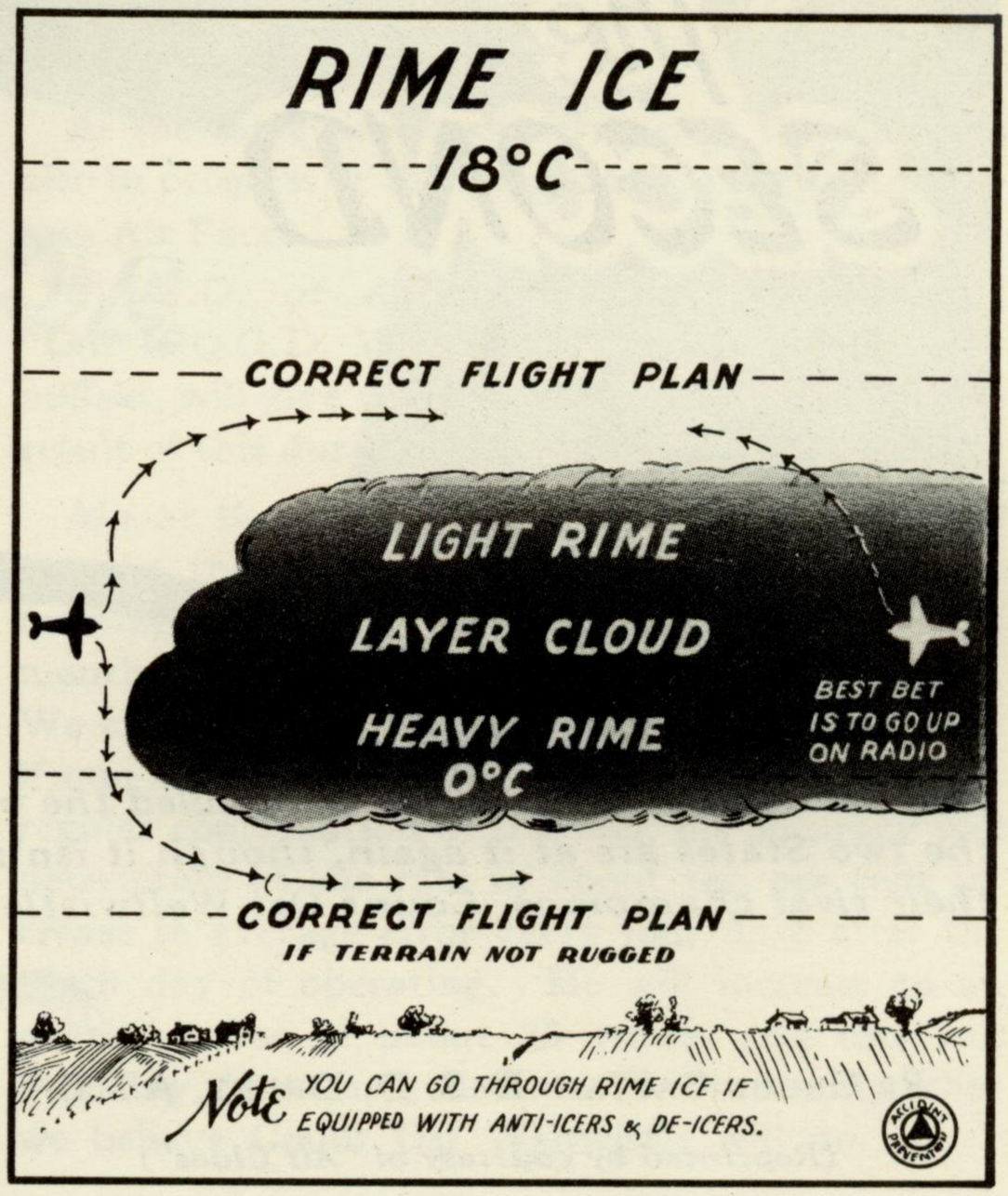
In dealing with freezing rain, your safest bet is to fly a reciprocal course to get out of the hazard, and then to climb to a level where the indicated air temperature is below −18°C before continuing your flight. *Do not descend,* for you cannot avoid the freezing rain condition at a lower level.

In flying the reciprocal course and in climbing to a level where temperatures are below −18°C, you may or may not, depending on your position with respect to the freezing rain hazard, pass through the region where temperatures are above freezing.

ICE IN WARM FRONT







Propellor Icing

Propellor icing is similar to wing icing.

It results in a loss of propellor efficiency that may require the use of all available power to counteract it.

When ice adheres unevenly, vibration may necessitate excessive throttling back.

Use slingers or other anti-icing equipment before entering icing conditions, and continue using them until out of icing zone.

If not equipped with anti-icing equipment, a change in pitch or rpm may loosen ice.

INTERIOR ICING

Carburettor Icing

Carburettor icing, unlike the other types, does not depend on visible moisture (cloud or rain) in the atmosphere, nor is it necessarily associated with air temperatures below freezing. It may form when outside temperatures are as much as 20°C above freezing, and in clear air, if the humidity is high.

Carburettor icing is occurring when boost drops despite a constant throttle setting and steady rpm.

Apply carburettor heat (even at the expense of loss of power) until loss of boost is overcome. Then reduce heat to a value where constant boost can be maintained.

Always try to anticipate carburettor icing. Be ready to take off all heat in an emergency.

Pitot Heat

Turn on the heat in the pitot tube whenever you anticipate ice in the slightest degree. This is a very inexpensive form of life insurance.



The SECOND ACCURASIAN AFFAIR

Last month our contributor chronicled the war between Accurasia and Bulldozia. This time the two States are at it again, though it isn't war that's the trouble—merely a duel between their rival champions, Count Ost Weltwistle and Major Wizardo Roceteero:

By GROUP CAPTAIN E. S. D. DRURY, A.F.C.

(Reprinted by courtesy of "Air Clues")

AFTER THE EVENTS described in the *First Accurasian Affair,* a state of apparent peace was preserved between Accurasia and Bulldozia. This outwardly friendly atmosphere, however, masked an inwardly smouldering fire, particularly in the heart of Count Ost Weltwistle of Bulldozia, who harboured a very vicious grudge against Major Wizardo Roceteero of Accurasia, who, it will be remembered, had made him appear in a rather unfavourable light.

Returning from his prune plantation one evening, it is reported, Weltwistle was accosted by the Crown Prince, who said to him, "Oh, boy! Did Roceteero give you the works last year, or did he? Why don't you give him a good clobbering for the honour of Bulldozia?" (or words to that effect). Stung to the quick by this remark, and unable to make a suitable reply, Weltwistle decided that he would either have to commit hari-kari or challenge Roceteero to a duel. As the former alternative did not appeal to him, he had to adopt the second, although this was not very palatable either.

Ultimately, the details of the duel were arranged. It was to be a rocket firing competition umpired by a Very Impartial Authority and, if Weltwistle's efforts had borne fruit, it would have been conducted according to the highest traditions of Bulldozian Sportsmanship—which, in fact, would have meant that practically no holds whatever were barred. Each contestant was to be allotted six rockets per day of the same type, to be fired from the same type of aircraft at a maximum rate of three sorties per day, in one pair per sortie. The duel was to last without stopping for 21 days, during which time a maximum of 126 rockets would be fired. The targets were to consist of large dummy tanks and the winner would be the pilot who, by the end of the time, had scored the greatest number of direct hits. A tank would be assumed to be destroyed by a direct hit, and conditions were such that—as described in the *First Accurasian Affair*—a 25-yard average error would mean, on the average, one tank probably destroyed per three sorties.

The Bulldozian weapons staff

Owing to the interest of the Crown Prince, Count Ost Weltwistle took this affair rather

seriously and, in fact, went so far as to go into special training and even to consult the weapons staff at Bulldozian headquarters.

It will be noted that Bulldozia had now followed the lead of Accurasia and had a small cell on their Air Staff dealing with problems of weapons, accuracy, effect, and training. The fact that such a cell existed was mainly due to the Bulldozian Treasury who, although bitterly opposed to any increase in establishment, had wisely decided that the spending of money may occasionally be justified if such expenditure results in a saving of at least twice the outlay, or more. So assiduously did Count Ost Weltwistle train that, after a long time without leave, he eventually got his average error down to 25 yards, which was the same as that achieved at the time by Major Wizardo Roceteero of Accurasia.

Eavesdropping in Bulldozia

We have a verbatim report of a conference which was held at Bulldozian Air Force Headquarters to discuss the duel just before it happened.

S.A.S.O. of Bulldozia (Baron Bombasti): "Now, Count; by what means do you propose to lay this fellow Roceteero low?"

Count Ost Weltwistle: "I shall be right in there punching, Baron, each day. I have had special training and can easily maintain three sorties per day for 21 days. I know I can average at least a 25-yard error. After all, I have had no leave now for nearly three weeks. So I shall operate continuously at maximum effort, and, in the unlikely event of that failing, I know an Accurasian armourer whom I think I can bribe."

Bulldozian Weapons Staff Officer: "That would mean a probable score of 21 tanks in the 21 days. We think that Roceteero can do as well as that, my Baron. Would it not be better if the Count did a little regular training and took an occasional rest, or if he tried to . . . "

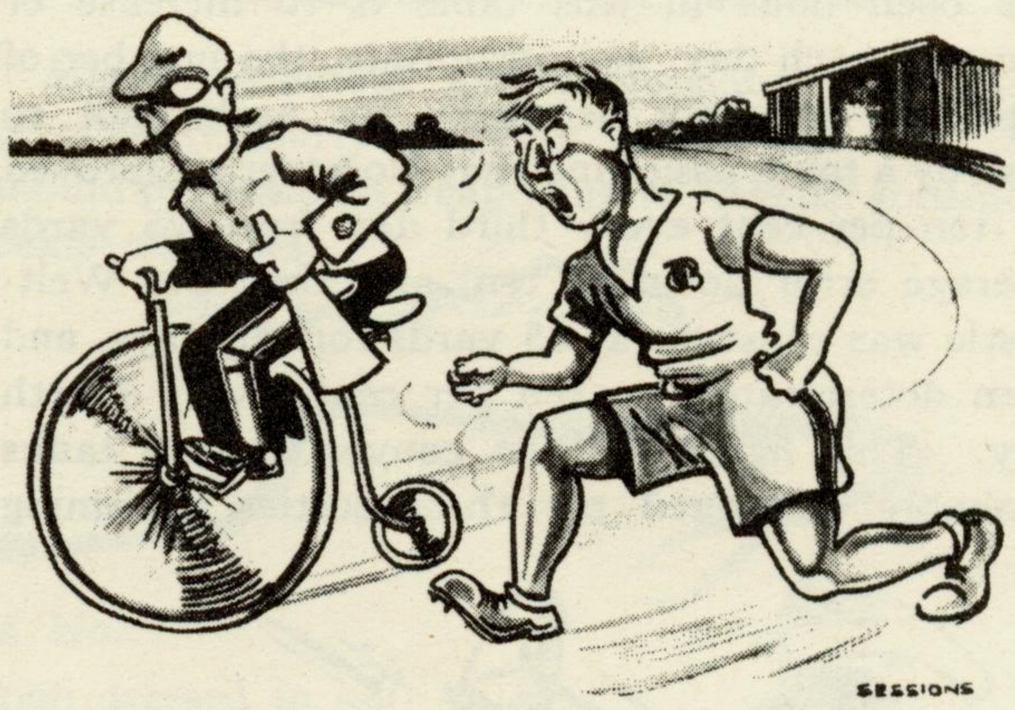
S.A.S.O.: "Silence! ignorant newcomer. Continuous maximum efforts are the clues. See that everything is laid on. The conference is terminated."

Action in Accurasia

At the same time a conference on the duel was also in progress at the headquarters of the Accurasian Air Force.

S.A.S.O. of Accurasia (Col. H. Sapiens): "Our H.Q.G.D. Weapons Officer, Major Weaponoffski, will give us his assessment of the probable result of this duel."

Major Weaponoffski: "My Colonel, we know exactly the capabilities of Roceteero from his training. Here are his results over the last three months. They are of truly formidable consistency. We know from careful observation and trials that if our man tries to operate continuously without regular continuation of training, his accuracy will deteriorate at the rate of about ten per cent increase in average error every four days after the tenth day of operating. He will increase to an average error of about 35 yards, and this will probably then stay constant. This is exactly what we believe Count Ost Weltwistle will do.



. . . Roceteero continued his training . . .

"On the other hand, if our pilot operates only every third day, we believe that his accuracy will improve by ten per cent every third day, down to a figure of average error of about ten yards, after which—provided training is continued—it will stay consistent. We therefore recommend that Major Roceteero takes things easily, continues his training, and rests for one day in three. Even though he fires two-thirds of the rocket allowance

on training and only one-third in the competition, he is still likely to do better in the long run than his opponent. He ought, in fact, to beat him by a handsome margin by the twenty-first day according to our estimates, although he might have to give up one day's training towards the end of the time to make sure of a good lead."

S.A.S.O.: "What are your opinions, Roceteero?"

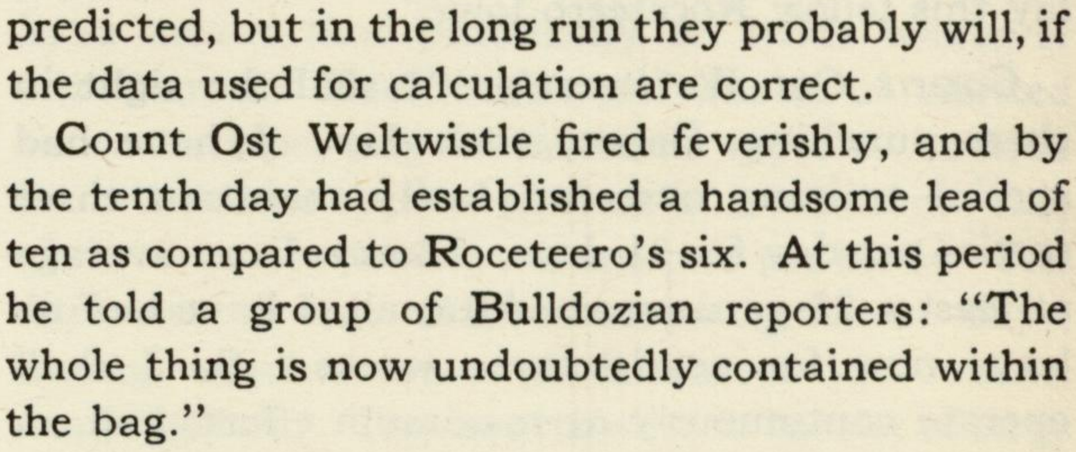
Roceteero: "My Colonel, I could not possibly find myself in more complete and cordial agreement."

S.A.S.O.: "Good luck, then, and high probabilities. Let me know what may be cooking."

Counting the probables

Now the probable score sheet of this competition, as estimated by the Accurasian Weapons staff, is shown in Table One and as events turned out this is almost exactly the way things did go. The estimate has been checked, and is a correct forecast based on the assumptions about the two pilots and the square-of-accuracy law. All that has been done in this table is to increase or decrease each day, as appropriate, the number of attempts probably necessary for each pilot to destroy a tank, assuming that Roceteero improved by ten per cent every third day from 25 yards average error down to ten, and that Ost Weltwistle was constant at 25 yards for ten days, and then deteriorated by ten per cent. every fourth day. This figure is then converted into tanks probably destroyed per three sorties, assuming that the starting accuracy would mean one tank per three sorties, or six rockets.

The cumulative totals of tanks destroyed are given to the nearest whole number, allowing Weltwistle three sorties per day and Roceteero three sorties every third day. As was emphasized in the *First Accurasian Affair,* we must not



"The whole thing is now undoubtedly contained within the bag."
—Count Ost Weltwistle to the Bulldozian press.

expect an isolated event to turn out exactly as predicted, but in the long run they probably will, if the data used for calculation are correct.

Count Ost Weltwistle fired feverishly, and by the tenth day had established a handsome lead of ten as compared to Roceteero's six. At this period he told a group of Bulldozian reporters: "The whole thing is now undoubtedly contained within the bag."

Roceteero in a statement to the Accurasian press said, "I admit that Count Ost Weltwistle is a little better than he was in the war, but he has a lot to learn. I cannot bring myself to take him very seriously."

By the nineteenth day the strain had begun to tell, and Weltwistle was definitely worried. Roceteero continued his regular training and resting, and went on achieving consistent results because of this. By the twenty-first day Roceteero had caught up and overtaken Weltwistle and finished a clear six tanks ahead of him without any apparent difficulty.

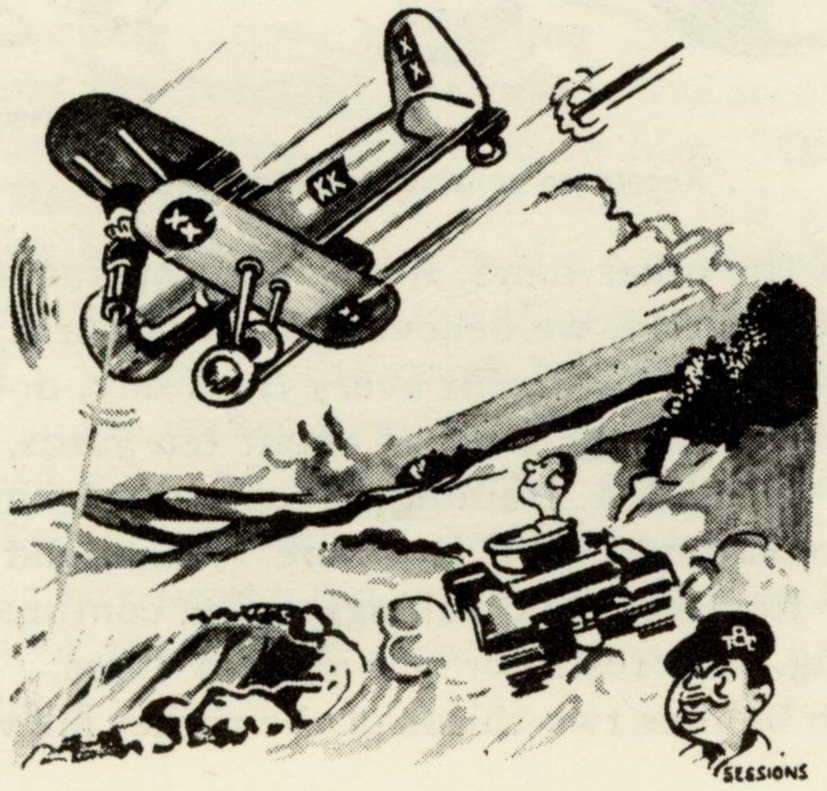


TABLE ONE

Day	Major Wizardo Roceteero: Average Error yards	Enemy tanks destroyed on day	Cumulative total: tanks destroyed	Rockets fired per day	Count Ost Weltwistle: Average Error yards	Enemy tanks destroyed on day	Cumulative total: tanks destroyed	Rockets fired per day
1	25	1	1	6	25	1	1	6
2	Training		—	12	25	1	2	6
3	Resting		—	—	25	1	3	6
4	22·5	1·2	2	6	25	1	4	6
5	Training		—	12	25	1	5	6
6	Resting		—	—	25	1	6	6
7	20	1·6	4	6	25	1	7	6
8	Training		—	12	25	1	8	6
9	Resting		—	—	25	1	9	6
10	17·5	2·0	6	6	25	1	10	6
11	Training		—	12	27·5	0·83	11	6
12	Resting		—	—	27·5	0·83	12	6
13	15	2·8	9	6	27·5	0·83	13	6
14	Training		—	12	27·5	0·83	14	6
15	Resting		—	—	30	0·7	15	6
16	12·5	4·0	13	6	30	0·7	16	6
17	Training		—	12	30	0·7	16	6
18	Resting		—	—	30	0·7	17	6
19	10	6·25	19	6	32·5	0·6	18	6
20	Resting		—	—	32·5	0·6	18	6
21	10	6·25	[25]	6	32·5	0·6	[19]	6
	Total Training R/P			72				0
	Total Operational R/P			48				126
				120				126

On the same day, with all seemingly lost, Weltwistle, through underground sources, attempted to bribe an Accurasian armourer with a half share in a prune plantation to desert to Bulldozia, after having misaligned Roceteero's sight to the tune of five or ten degrees. Instead of doing this, the armourer very correctly replied to the Count with a rude word and, having consulted the *President's Regulations and Accurasian Air Orders*, reported the matter to the Most Superior Authority, in duplicate, through the usual channels, in an astoundingly airman-like manner. For his devotion to duty he subsequently received the Order of St. Swordfish, first class (with oak leaf but without knots).

What will happen next in Accurasia nobody can tell.

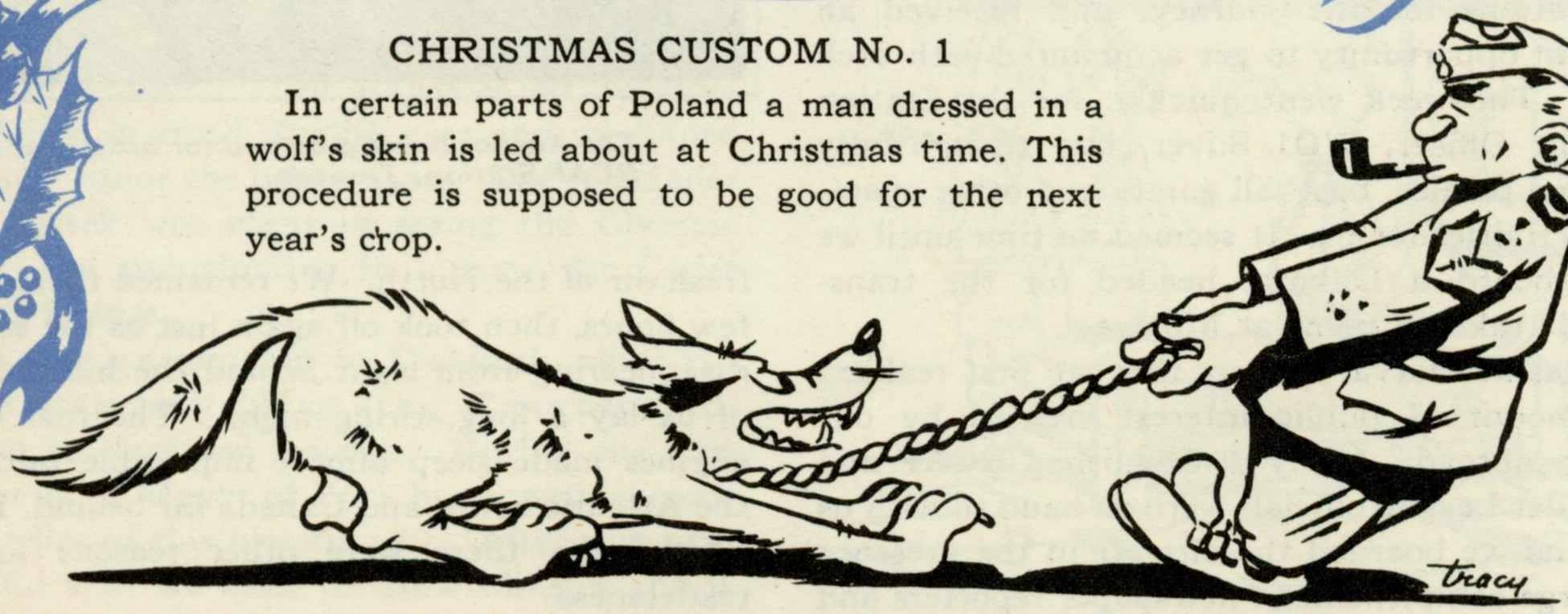


. . Weltwistle was accosted by the Crown Prince . .

Moral: Amateur and professional sportsmen practise regularly however good they are. So should professional weapon users. Again: accuracy beats numbers.

CHRISTMAS CUSTOM No. 1

In certain parts of Poland a man dressed in a wolf's skin is led about at Christmas time. This procedure is supposed to be good for the next year's crop.



MY TRIP TO BRITAIN



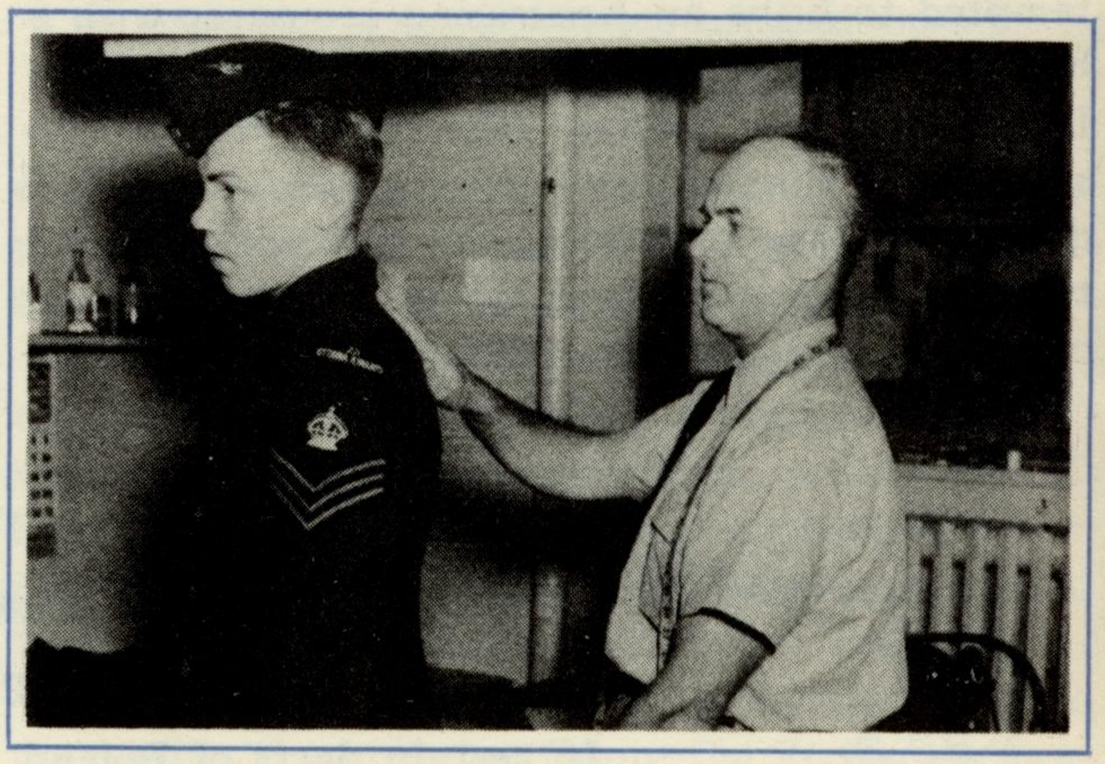
By AIR CADET F/SGT. GORDON KILGER,
211 (Ottawa Kiwanis) Squadron

A thrilling moment in the lives of 25 young Air Cadets came on August 4, 1948, when they climbed aboard an RCAF "North Star" at Dorval Airport, Montreal. Minutes later they were in the air, bound for three weeks of sightseeing and entertainment in the United Kingdom. One of the cadets was 17-year-old F/Sgt. Gordon Kilger, of Ottawa, who has written for "The Roundel" this account of his experiences overseas. His trip was part of the international exchange programme, sponsored in Canada by the RCAF and the Air Cadet League, which was described in the November issue of "The Roundel." The plan is aimed at promoting understanding and goodwill between young men in different parts of the world as well as providing a reward for outstanding senior cadets.

WE WERE 25 Royal Canadian Air Cadets chosen to represent the Dominion in the second annual overseas exchange between the Air Training Corps of Great Britain and the Air Cadet League of Canada. Our assembly point was RCAF Station, Trenton. There we stayed one week, during which time we brushed up on our drill, made last-minute preparations for the journey, and received an excellent opportunity to get acquainted with each other. The week went quickly, for the Station Warrant Officer, WO1 Silver, had thoughtfully arranged picnics, baseball games and other spare-time activities for us. It seemed no time until we were aboard a Dakota, headed for the trans-Atlantic take-off point at Montreal.

It was at Dorval Airport that we first realized the amount of public interest created by our journey abroad. Many distinguished RCAF and Air Cadet League officials were on hand to wish us well, and we boarded the aircraft in the presence of a large complement of newspaper reporters and photographers. Our supervisory officers were W C W. F. M. Newson, D.S.O., D.F.C. and Mr. Eric M. Duggan. These gentlemen were later to make our trip even more enjoyable by reason of their understanding and patience with us.

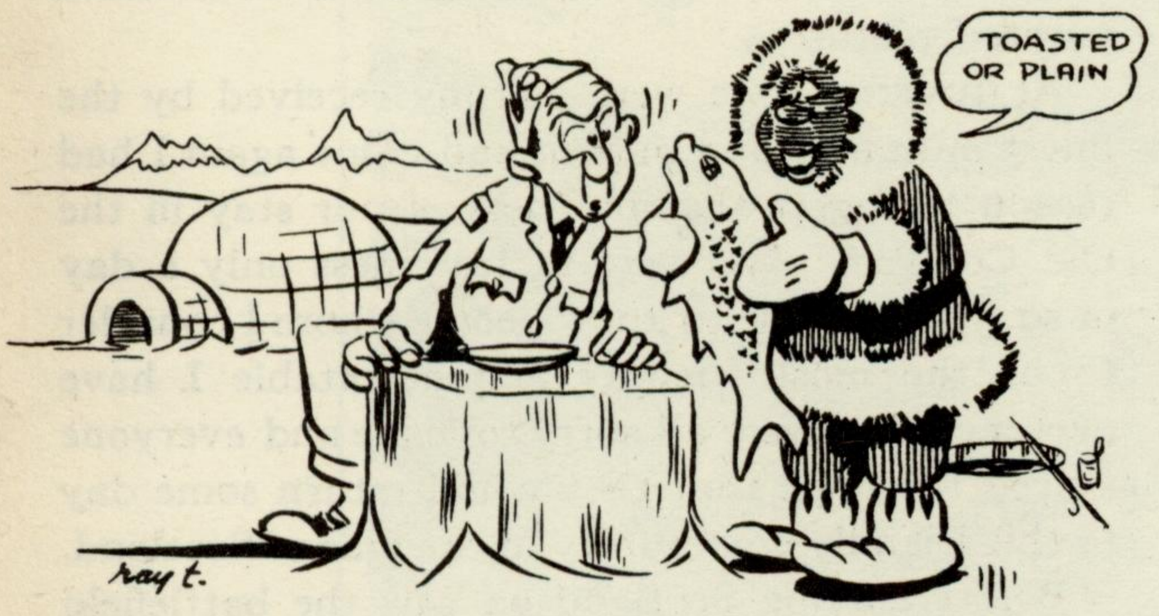
The four mighty engines of the "North Star" roared into life and the airfield soon slipped away from under us. Our first stop was at Goose Bay where many of us felt for the first time the cold,



The Author being groomed for his trip at RCAF Station, Trenton.

fresh air of the North. We remained there only a few hours, then took off again just as the sun was disappearing from sight behind the hills. Ahead of us lay a long, tiring night. The roar of the engines made sleep almost impossible but, with the Atlantic below and Canada far behind, I must admit that there were other reasons for our restlessness.

Shortly after dawn we felt ourselves slowly descending from the windswept heights. A few minutes later there was a bump and we had landed safely in Iceland, where a welcome breakfast awaited us. The final lap of our eastward



journey—from Iceland to England—covered the longest six hours I have yet experienced. The heavens around us were overcast, which gave us no opportunity to see the great mass of water below. However, when we hit the coast the clouds began to break up and we were thrilled to observe below the matchless beauty of the English countryside in summer.

We flew south down the coast then turned inland to reach Northolt Airport near London. Our aircraft circled the field like an eagle preparing to come to rest.

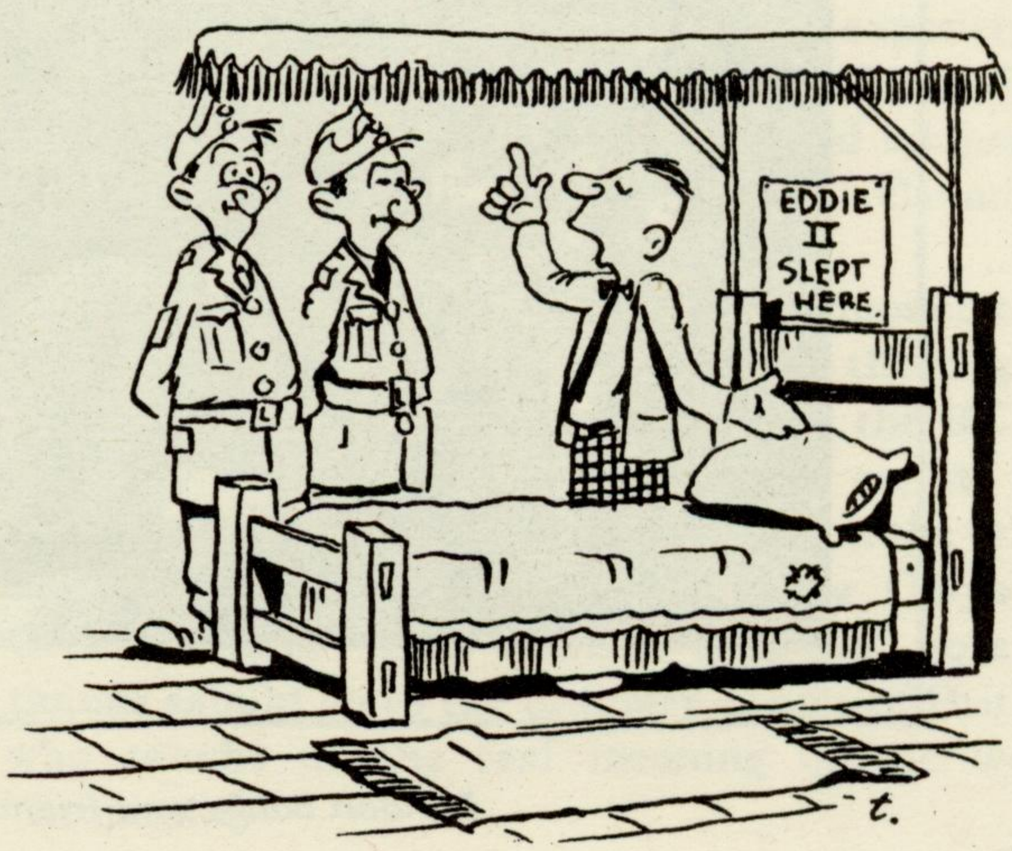
* * *

We were greeted by high-ranking RAF officials, and after introductions and many a hearty handshake, our tour of the U.K. began. The day after our arrival we were surprised and highly pleased to see the Royal Family as they left for a holiday in Scotland. Their Majesties left Buckingham Palace in small English cars and we "lined the route" inside the palace gates. The remainder of that week was spent in seeing the Olympic Games, and participating in a huge Air Cadet Rally at Halton.

Next day we motored to Dishforth, since the weather was not suitable for flying. From Dishforth we went to York for the day. During our visit with the Lord Mayor of York he showed us some of the relics of this historic city. After this very delightful visit we went to York Minster and it was at this point that I realized how short our stay really was. In the few hours we had toured the Minster, we were able to see only a very small part of that immense and beautiful building. From York Minster we visited Welbeck Abbey which is the home of the Duke of Portland. He is an elderly gentleman and very friendly, who made us feel completely at home. His estate, by the way, consists of 18,000 acres, a riding school, stables, farm land and orchards. This was the only place where I saw any remains of what I considered feudal times.

After Dishforth we visited one of the famous "Butlin's Holiday Camps." These camps, we discovered, are rapidly becoming a British institution. The camp itself was like a little community; it had stores, shops, a swimming pool, game rooms, and everything else that it takes to make an amusement park complete. It goes without saying that we had a pretty wonderful time at Butlin's.

After a brief visit with the Lord Mayor of Scarborough we flew to Scotland and there spent the most enjoyable days of our trip. A highlight of our five days in Scotland was an interesting tour of Edinburgh. We were taken through the famous Edinburgh castle, and saw the smallest and oldest chapel in Scotland. Another castle included in our Edinburgh itinerary was "Holyroodhouse Palace." Here we were shown rooms and furniture used many years ago by royalty.



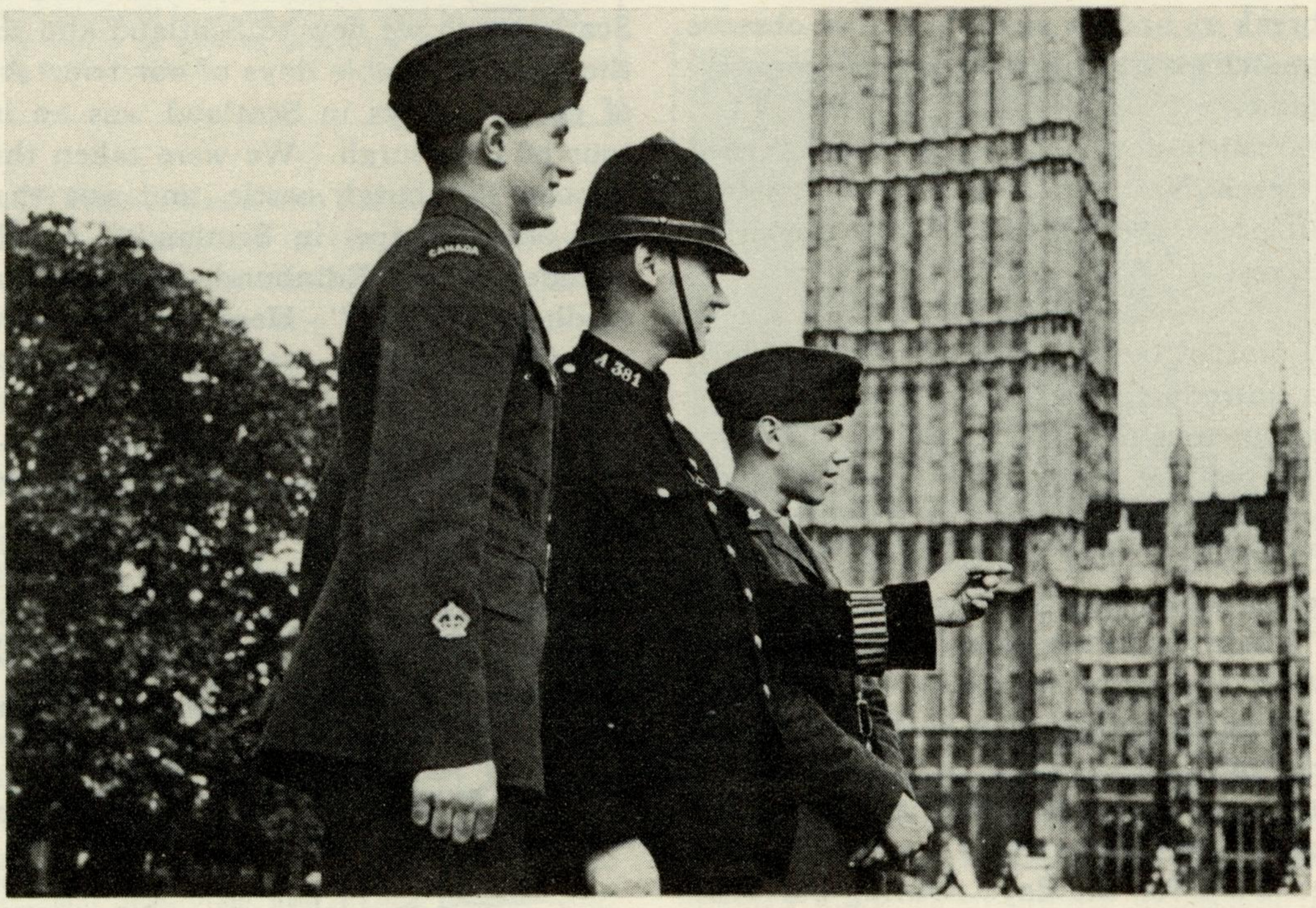
Some of the furniture had been copied, but most of the pieces were in their original state. That night we went to a theatre and saw "A Waltz Dream." It was a highly amusing performance and served to mark the close of a near-perfect day.

From Edinburgh we travelled by coach to Glasgow. Our stay at Glasgow was a brief one, consisting mainly of a very interesting tour of the Clyde Paper Co. On continuing our trip, we left Glasgow by train and then crossed Wemyss Bay by steamer. Our destination was Rothesay, a picturesque Scottish island. While at Rothesay we were received by the Lord Provost who showed us a site which bears the name "Canada," after which we travelled around the island.

The following day, our extensive travels led us to Inverness in the Scottish Highlands. Enroute to Inverness we passed by Loch Ness, but to our regret the much-publicized sea monster failed to appear. However, the journey through the Highlands had its own rewards. The cadets from British Columbia, for instance, were reminded of home; the rest of us were struck by the beauty of the surrounding hills with their tumbling streams and little waterfalls. It was like a continuous painted picture.

At Inverness we were warmly received by the finest military band in Scotland. One again I had reason to regret the shortness of our stay in the Old Country. We were in Inverness only a day or so, yet we came to know people whom I consider to be the most friendly and hospitable I have ever met. We were all sorry to leave and everyone voiced the hope that they could return some day to this friendly community in the hills of Scotland.

Before leaving Scotland we saw the battlefield of Killiecrankie. Here, many years ago, a great deal of blood had been shed in civil war.



London bobby and friends outside Parliament Buildings.



Cadets at Dorval.

Our next stop was in the south of England. We flew to Thorney Island from where we made a side junket to the Portsmouth dockyards. The two ships visited were Nelson's H.M.S. "Victory" and H.M.S. "Illustrious," a World War II aircraft carrier. Immediately following this educational visit we went to Fleetsland Royal Naval Aircraft Repair Yard. There the Navy scraps and repairs all types of aircraft. I still find it hard to believe that such extensive repairs can be carried out on damaged aircraft, even if I did see it "with my own eyes."

We then returned to Halton, approximately 30 miles outside London. This large station, which houses the R.A.F. Apprentices School, was "home" to us for the remainder of our stay. Each day we journeyed into London and each evening we returned, our minds still full of the sights for which London is known throughout the world.

We saw the docks on the Thames, and passed under Tower Pier. We spent hours inside the "Daily Mail" plant, observing modern newspaper methods. Later we visited the Houses of Parliament, Canada House, and Fighter Command H.Q., Stanmore. In short, we did everything that tourists hope to do—and try to do—when they reach London. Our final evening was no exception. We went to the Strand Theatre where the brilliant musical comedy, "Cage me a Peacock," was playing to a packed house. It was an appropriate finale to a memorable three weeks.

The return journey to Canada was somewhat more comfortable than the eastward flight had been. For one thing, the Atlantic no longer held any terrors for us; for another, we had a good night's rest at Goose Bay. Nevertheless, the 25 Air Cadets who stepped from the plane at Dorval on August 27 were a tired group. Yet they were immensely thrilled and happy, for they had just completed one of the most enriching experiences ever offered to Canadian youth. They had received an almost unbelievable reward for just a few years of faithful service in Royal Canadian Air Cadet squadrons.

Looking back, I find it virtually impossible to thank all those who made my trip so thoroughly enjoyable. The Air Cadet League and the RCAF certainly deserve a large share of the credit; the same applies to our host organizations on the other side—the RAF and the Air Training Corps of Great Britain. And I think a special vote of thanks should go to the ordinary people of Britain who taught us the real meaning of the word "hospitality."

THE CHAPLAIN IN THE REGULAR SERVICE

(Prepared under the direction of the Principle Chaplains)

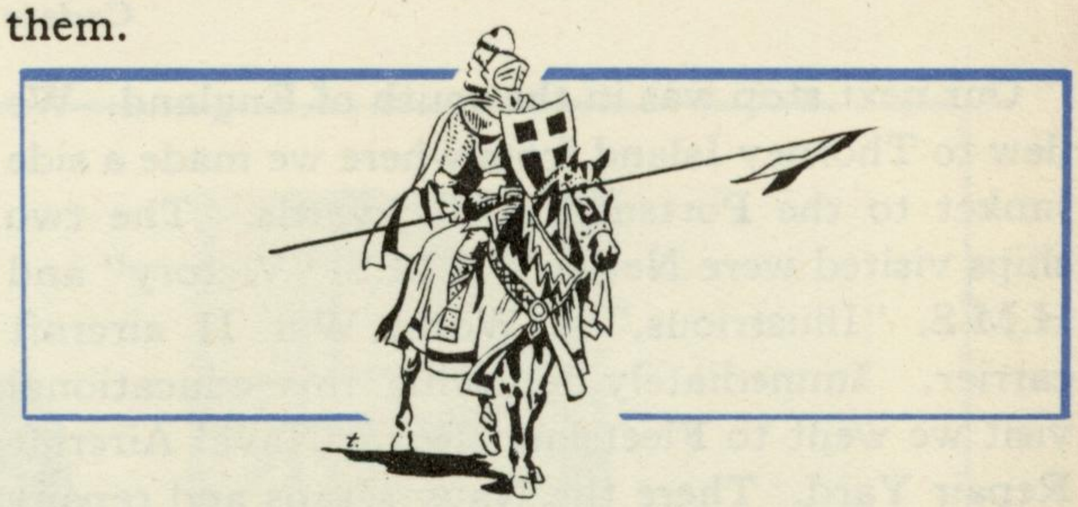
"You know, before the War we didn't have any Padres."

THAT IS PROBABLY one of the most frequent remarks heard by Chaplains today from the older Permanent Force personnel. There seems to be a general impression that, by bringing Chaplains on to full-time strength, the Services have made a radical innovation. In a sense—a Canadian sense—that is true. There are now full-time Chaplains in the Canadian Armed Forces. They are an integral part of the organization, and despite their being a bit of a novelty, they have already been very much accepted by men in uniform of all ranks.

The interesting thing, however, is that Chaplains in the military sense are really anything but a novelty. They are, in fact, quite an ancient institution.

Take for instance the word "Chaplain" itself. It goes back to an old Latin word "capellanus," which in turn has a traditional background. St. Martin, who later became Bishop of Tours, entered the Army as a teen-aged lad. He was posted to Amiens, where one day he met a beggar near the city gates. Having compassion on the beggar, he presented him with half his cloak, which was the outer garment of his uniform. The portion that he kept he wore as a cape. After his death in the year 400, this cape (capella) was regarded as a sacred relic, and became a talisman carried into many a battle by the various kings of France. When not so employed, the relic was kept within a tent called a "capella." This tent was used as a church, and the custodians of the capella who conducted the services in these portable chapels were called "cappellani. . ." which became "chapelains" in the old French.

The Council of Ratisbonne, in 742, made provision for the appointment of Chaplains in the military services. Later they were attached to the personal retinue of the Emperor. Again, they are to be found in the Crusades, and later still they became officers of the respective military Orders, taking the high rank to which knighthood entitled them.



It is a curious fact that there has been scarcely any army at any period that has completely ignored its religion. Even the pagan Romans, Greeks, and Egyptians sought through their oracles and augurs to divine the outcome of battles that had not as yet been joined. Joshua led his assault on Jericho by sending ahead of his forces the Arc of the Covenant, borne aloft by the priests of the Temple. The Crusaders fought with holy abandon, convinced they were fulfilling the wishes of Heaven. Out of all this history there gradually emerged a concept of individual character, with the emphasis on its moral and spiritual worth. The Chaplain's task, therefore, became much clearer, in that his real purpose lay in assisting the development of the spirit, in fostering the ideal of honourable and loving manhood.

We could go on with innumerable examples to throw light on the background of the Chaplaincy



Principle Chaplains Wing Commander L. A. Costello (left) and Wing Commander R. M. Frayne (right) officiating at RCAF children's Christmas party, Ottawa.

Service, but it is already apparent that long before this continent was discovered Chaplains went out to battle with the armies of the Old World. It is interesting to note, in this connection, the official opinion of the United States War Department, as expressed in the Technical Manual on 'The Chaplain', which states that "centuries of experience show the necessity of the deliberate and systematic cultivation of spiritual forces and moral character in the Services." From this historic *aperçu* of the Chaplaincy Service and the very concise remark in the American Manual, the place of the Chaplain in the Regular Service becomes increasingly clear.

From one war to another, almost from one year to another, military forces change. Their equipment rapidly becomes obsolete. Tactics are constantly being reviewed and overhauled, and last but not least there is the constant danger that thinking will become obsolete. The brains of 1918 had to be discarded in 1940. But although thinking changes with the times, and although equipment has run the gamut from the bow and



Chaplains on duty, near St. Donat, Quebec.

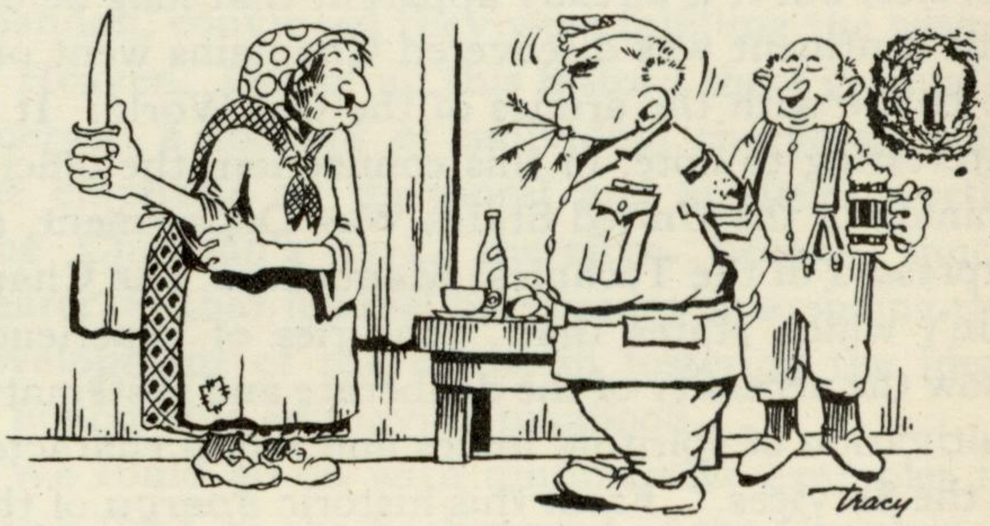
arrow to the atomic bomb, there remains one thing that is essential to any Service. It is unchangeable across the years and is as vital today as it was at Waterloo and Trafalgar, Alamein and Normandy. It is the belief of the warrior in his cause as being the cause of righteousness. This conviction—call it morale, spiritual strength, or what you will—finds its roots in the depths of men's souls. With it, "The Few" can rise to stem the tide of insurmountable odds. Without it, the pages of history are too often darkened by such names as Tannenberg, Sedan, and Singapore.

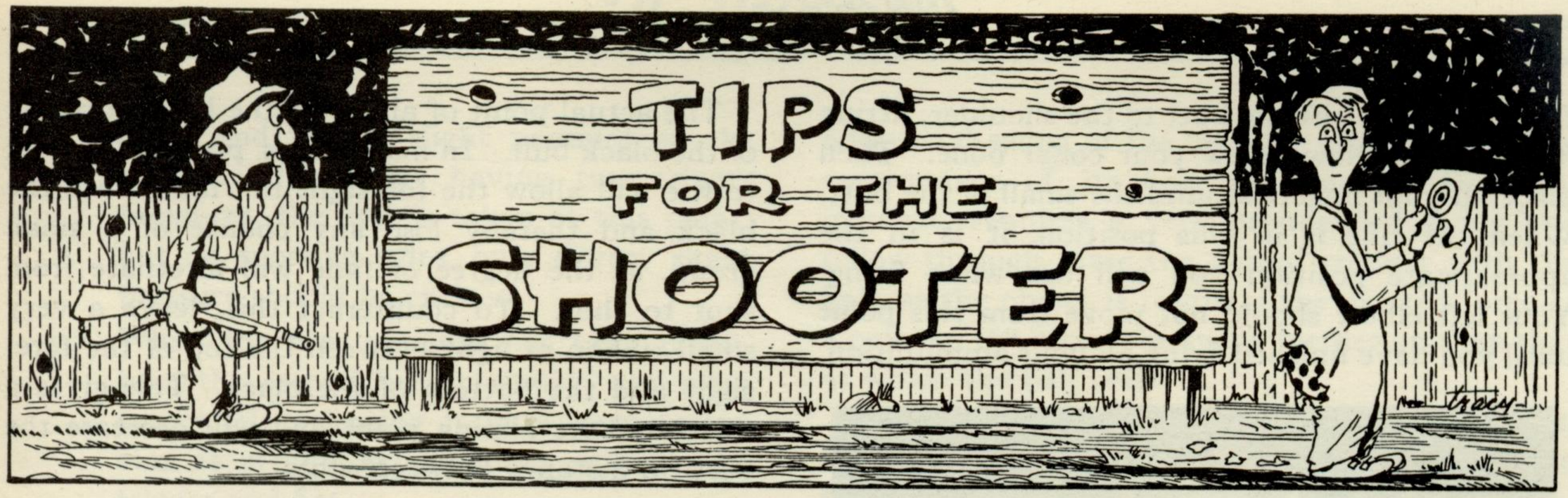
In the Regular Service, the Chaplain's duty is primarily to foster justice in the minds of his men—firm justice. A sense of jealous vigilance must be theirs, for what is worse than injustice if not the sorry spectacle of Justice without her sword? It is one thing to be right. It is another to know you are right.

It has often been said that the next war will be the great battle for men's souls. There can be no denying that this is indicative of the depth of the motives that will go into the next fray, if it should come. Therein lies the terrible responsibility of the Chaplain. His task is to be the custodian of those very souls that will be in the foreground of the battle. It is a difficult task, and often unappreciated by those with whom he must labor the most. But for his God and his Country he continues ceaselessly to cultivate and foster those spiritual forces that will stand us in good stead when the hour of stress is upon us.

CHRISTMAS CUSTOM No. 2

A Christmas custom, which is still observed in Sweden, prescribes that a man be wrapped up in a skin and carry a few wisps of straw in his mouth, so that the projecting straws look like the bristles of a boar. A knife is brought, and an old woman, with her face blackened by soot or burnt cork, pretends to sacrifice him. (Also good for the crops.)





By LAC C. M. G. BELL

(LAC Bell's "Tips for the Shooter" have been found to be of considerable value by members of No. 10 R.D.'s Rifle Club. They are published here in the belief that they will prove of equal interest to members of other Rifle Clubs throughout the Service.—Editor)

Introduction

THERE ARE CERTAIN POINTS about target shooting with which every aspirant to the title of "Expert" must be thoroughly familiar. It is the intention of the present article to acquaint shooters with these points and to remind them that no amount of reading or listening—and subsequent disregard of what they have read or heard—can ever help them. These rules are simple, yet each is equally important in helping you, the rifleman, to improve your scoring.

READ THEM

REMEMBER THEM

PRACTISE THEM

Once you have learned and fully understand the following steps by which you must progress, you will find by experimentation that you have little habits that may help you or hinder you. These must be, respectively, either developed or overcome.

The following points must be your foundation for this sport. They are the basic factors in every rifleman's ability to shoot. Learn them and then experiment with them to suit yourself—but not until you have them so firmly entrenched in your mind that every time you pick up a rifle you can picture them clearly and easily.

The Actual Handling of Your Rifle

Handle your rifle as the inanimate object it is.

YOU ARE MASTER OF YOUR RIFLE: NEVER LET IT GET THE BEST OF YOU.

If you are "gun-shy," you must overcome that failing by constantly reminding yourself that you *are* the master of the weapon, that it will do only what you want it to do, and that its potentialities depend upon your own resourcefulness.

Body Placement

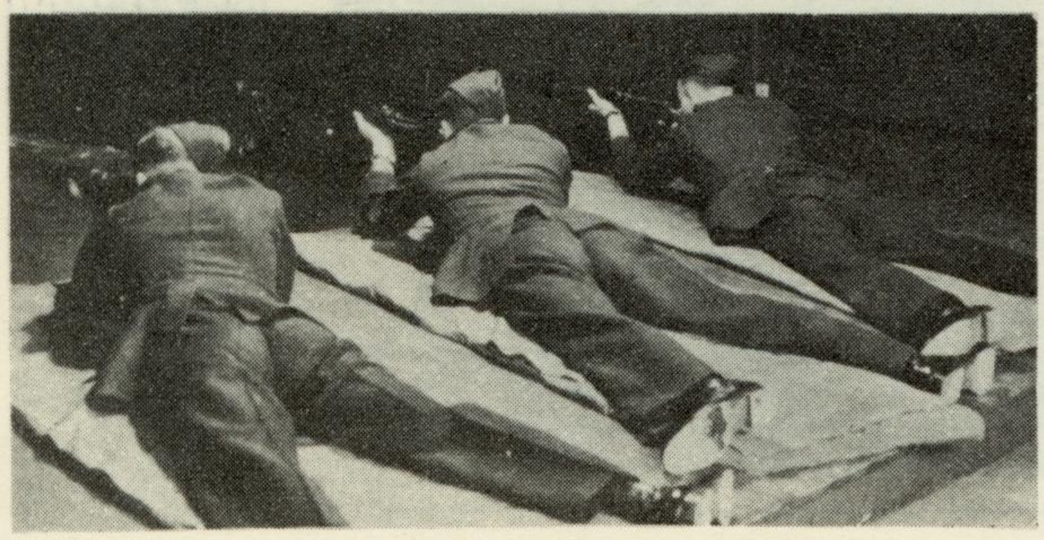
Before picking up your rifle, lie facing directly towards the target. Place your left elbow in a comfortable position in front of you and, using it as an *unmoving* pivot point, swing your body and legs to the left. (It you squeeze the trigger with your left hand, you will of course pivot on your right elbow and swing your body to the right). The angle of the swing should be approximately 30°.

This is the position in which you should fire in order to get the best results.

Holding

After you have reached a comfortable position, lift your rifle and place it on your left hand (which still has not moved from its original position), with the point of balance directly over the centre of

the left palm. Lift the butt to the shoulder, fitting it into the hollow below your collar bone. Then place all your fingers around the small of the butt. When the rifle is in this position, it is in the approximate position you will use when firing. Your left elbow should not move from this point until you have finished firing all your ammunition.



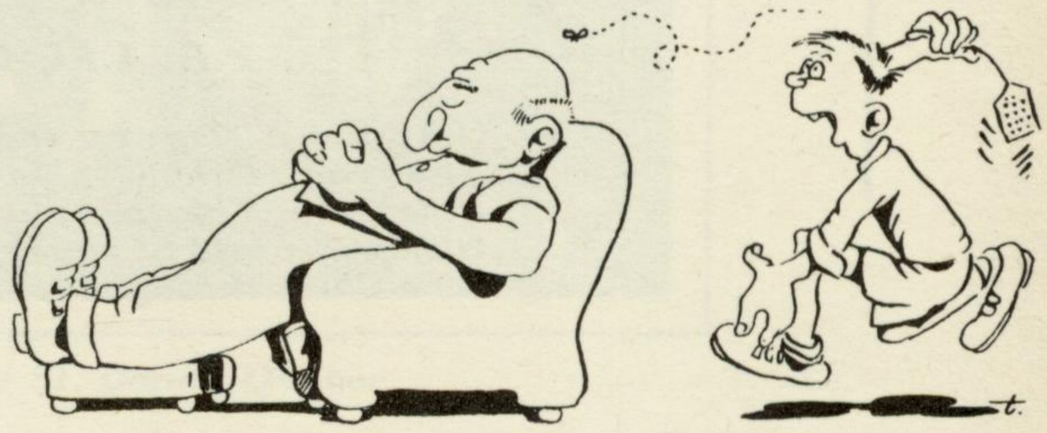
Aiming

The Army Training Manual on rifle shooting gives the following definition of aiming.

"Close the disengaged eye and look through the aperture at the target, aligning the foresight on the bottom centre of the black and in the centre of the aperture, keeping the sights upright at all times."

In clarification of this, let us see what constitutes a good aim. If you look through the small aperture you will see that around the edges there is a hazy fringe and, in the exact centre, a small portion through which everything looks clear. This can be better demonstrated by looking through a small hole formed by crooking the index finger inside your thumb. Look through this and notice the small clear centre that appears. This small clear centre is called the "Optical Centre." The eye, which always focuses thro' the centre of any small opening through which it must see, automatically picks out this clear portion. Consequently, do not try to get the foresight and target in the centre of the rear sight. The eye will pick out the centre. All *you* have to do is get a clear picture of the foresight—and the only place where a clear picture can be obtained is in the absolute centre of the aperture. When we speak of "clear definition", we mean a clear picture of the target and foresight.

The actual point of aim is at the bottom centre of the black bull. In many cases, persons learning to fire will allow the foresight to "fade" into the black and thereby lose any chance of a small group, as the degree of fade will alternate from shot to shot. To counteract this, leave a very small ribbon of light between the top of the foresight and the bottom of the black. This gives a more definite aiming point and will decrease the vertical distance between shots.



Many people have the habit of trying to catch the target "on the fly," i.e. when the sight is running past the target. This is a very bad habit—yet regrettably prevalent. If you have it, and if you feel yourself tensing up as you try harder and harder to stop the wavering and get a shot away, let the rifle down to the mattress and, after taking a few relaxing breaths, lift it up again and take another aim.

HASTE DOES NOT GO HAND IN HAND WITH GOOD SHOOTING. BE DELIBERATE.

Breathing

Take aim through your sight, then inhale and exhale slowly several times.

You will notice that your foresight moves up and down the target—*up* when you exhale and *down* when you inhale. If a person were to fire in the middle of a breath, it can be readily seen that the round would be thrown high or low. To combat this, there is a sequence through which one must pass before each round is fired. It consists of two complete inhalations and exhalations.

1. The first breath is a relaxing breath and should be let out with a slightly audible sigh. This ensures that all air is expelled. Then start to steady the rifle on its aiming

mark and take a slight pressure on the trigger. (On rifles having two trigger pressures, the first is taken at this point; but on sporting rifles, only a very slight pressure should be exerted.

2. When the first pressure has been taken, take the second breath slowly, and after completely releasing it (still keeping the aim as steady as possible), squeeze the trigger and fire.

Squeezing

Many people think that, providing all other factors have been properly observed, it is enough just to squeeze or pull the trigger to ensure that the round will go into the aiming mark. As you have been told in the preceding paragraphs, however, each point is as important as any of the others in promoting a *good* shot. If even one is overlooked, the result will be a *bad* shot.

When the time comes to squeeze the trigger, *every* finger of the hand, and not only the index finger, must participate in the action. *The whole hand must squeeze at the same time.* A sudden wrench or pull at the trigger, if pronounced enough, is liable to pull your shot completely off the target. Watch this point carefully, and think of it every time you squeeze the trigger.

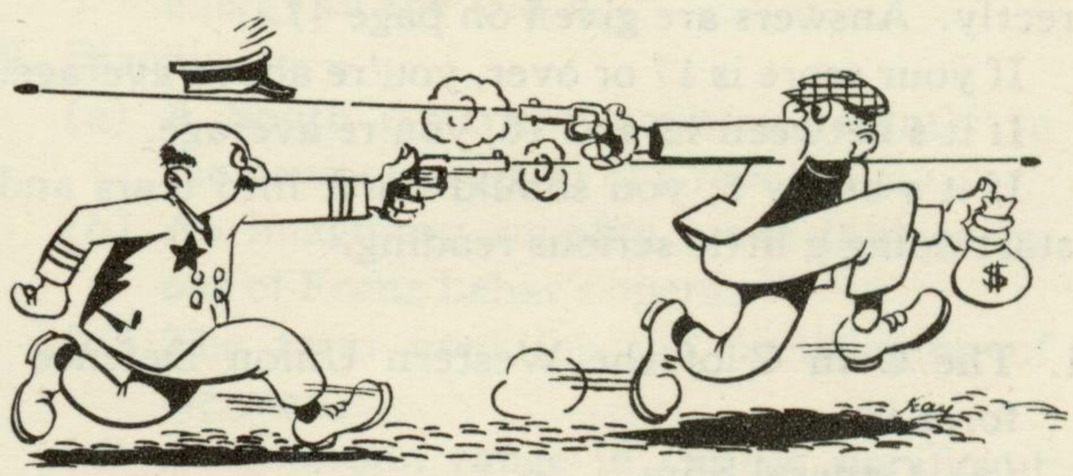
Follow Through

In all sports connected with the movement of the body and the attainment of extra pressure or distance, the term "follow-through" means the additional swing of the body or appendage in the continuance of its first movement. Golf, for instance, requires a very pronounced swing and follow-through after the actual contact with the ball, as the object is to direct the exerted force at a point in the arc of the swing further on than that at which the ball rests.



What connection has follow-through, you ask, in a sport where one of the first essentials is no movement whatsoever?

Oddly enough, it has a very close connection. *Constant pressure should be exerted right through the actual report of the discharged round.* More otherwise perfect shots have been ruined by slight movement while the round is



moving down the barrel than have ever entered the bullseye.

Never anticipate the discharge of your weapon. You should never know when it is going to fire.

Sight Picture

It is important that every time you aim you have the same sight picture. This will make your group tighter and reduce the prevalency of those "orphans" that ruin a good score.

Conclusion

In conclusion, may it be pointed out again that only you yourself can help the outcome of your targets. Upon the observation and remembrance of the foregoing simple rules depends the perfection you wish to obtain.

What's the Score?



Score one point for every tick you place correctly. Answers are given on page 47.

If your score is 17 or over, you're above average.

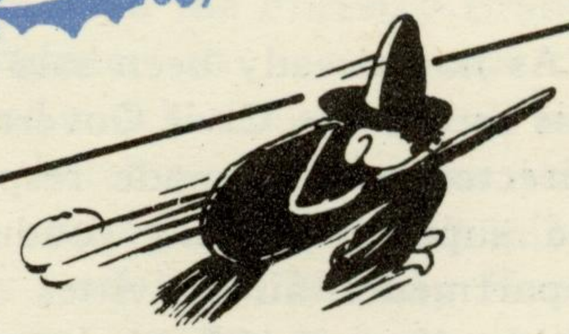
If it's between 13 and 16, you're average.

If it's below 5, you should burst into tears and start doing a little serious reading.

1. The C in C of the Western Union Defence force is:
   (*a*) General Slim
   (*b*) General DeGaulle
   (*c*) General Clay
   (*d*) General Montgomery
2. One of the following countries is not a member of the Western Union Defence Pact.
   (*a*) Sweden
   (*b*) Holland
   (*c*) France
   (*d*) Great Britain
3. When the UN mediator for Palestine was assassinated, who was appointed as his successor?
   (*a*) Dr. Weizman
   (*b*) Count Bernadotte
   (*c*) Dr. Bunche
   (*d*) Dr. Salazar
4. What independent Indian State was invaded by the Dominion of India recently?
   (*a*) Baluchistan
   (*b*) Afghanistan
   (*c*) Pakistan
   (*d*) Hyderabad
5. Who won the World Series?
   (*a*) Brooklyn Dodgers
   (*b*) New York Yankees
   (*c*) Cleveland Indians
   (*d*) Philadelphia Athletics
6. Which Eastern European country, previously Soviet-dominated, recently split with the Cominform?
   (*a*) Bulgaria
   (*b*) Yugoslavia
   (*c*) Albania
   (*d*) Rumania
7. Who was the first president of the Republic of South Korea?
   (*a*) Dr. Sun Yat Sen
   (*b*) Dr. Rhee
   (*c*) Marshal Chiang Kai Chek
   (*d*) Colonel Sik Nin Chow
8. Settlement of the disposition of three Italian Colonies in Africa is still pending. Two of these colonies are Eritrea and Somaliland, the third is:—
   (*a*) Tunisia
   (*b*) Tripolitania
   (*c*) Abyssinia
   (*d*) Libya
9. What prominent member of the Politburo died during 1948?
   (*a*) Sokolovsky
   (*b*) Salazar
   (*c*) Zhukov
   (*d*) Zhdanov

10. In which one of the following foreign countries does the RCAF have no Air Attaché representation?
    (*a*) Poland
    (*b*) Argentina
    (*c*) Sweden
    (*d*) Czechoslovakia
11. Who is the leader of the National Progressive Conservative party?
    (*a*) St. Laurent
    (*b*) Kennedy
    (*c*) Drew
    (*d*) Ferguson
12. Which province recently voted "wet"?
    (*a*) Labrador
    (*b*) Newfoundland
    (*c*) Prince Edward Island
    (*d*) Nova Scotia
13. In what area of Northern Canada were two islands recently discovered?
    (*a*) Frobisher Bay
    (*b*) Melville Sound
    (*c*) Foxe Basin
    (*d*) Gulf of Boothia
14. Who is the Dictator of Portugal?
    (*a*) Juan Peron
    (*b*) Dr. Salazar
    (*c*) Pedro Gonzales
    (*d*) Francisco Franco
15. Which country has the largest Communist Party on a per capita basis?
    (*a*) USSR
    (*b*) France
    (*c*) Italy
    (*d*) Yugoslavia
16. To which one of the following countries does the word "Benelux" not refer?
    (*a*) Belgium
    (*b*) Czechoslovakia
    (*c*) Luxembourg
    (*d*) Netherlands
17. If you were the pilot of a Tiger Moth with the President of a friendly power as your passenger, and he suddenly jumped over the side of the aircraft without a parachute, which of the following actions would you carry out first?
    (*a*) Sing the deceased's National Anthem
    (*b*) Return to base
    (*c*) Trim the aircraft
    (*d*) Salute
18. Syngman Rhee is:—
    (*a*) An international waterway under dispute in the Balkans.
    (*b*) The scene of recent heavy fighting in Palestine.
    (*c*) The president of Southern Korea.
    (*d*) The recently appointed head of atomic energy in the U.S.A.
19. Bizonia is:—
    (*a*) A South American country recently in the news on account of a revolution.
    (*b*) An imaginary country made famous by one of Franz Lehar's operas.
    (*c*) The term used for the partitioning of Germany.
    (*d*) A mountain range in Greece significant in guerilla warfare.
20. Sengierite is:—
    (*a*) A new flux for welding aircraft metals.
    (*b*) A uranium-bearing mineral.
    (*c*) A recently discovered antidote for yellow fever.
    (*d*) A material used for strengthening plastics.





CHRISTMAS CUSTOM No. 3.

Every Christmas Eve until not very long ago, witches used to ride on baking-forks or three-legged horses over Central Germany. If, however, any keen-sighted character below could shout up at one of them and call her by name, she would certainly die within the year. (Not so good for the witches.)

Northern SKYTRAILS

PART TWO

The Story of the Work of the RCAF in Canada's Arctic and Sub-Arctic

By FLT. LT. E. P. WOOD, D.F.C.

2: EARLY SUB-ARCTIC OPERATIONS

Introduction

The purpose of this article is to give some slight general idea of the earliest years of the Air Force's sub-arctic* operations. Although, perhaps, it is not until we reach the year 1927 that our story takes on a more adventurous quality (with the Hudson Strait Expedition), none the less, if we pause to consider the comparative novelty of the work to those engaged upon it, their constant (and unrecorded) need for improvisation, and the limitations of both equipment and personnel, the period of 1920 to 1926 is not without interest.

*The limits of the arctic and sub-arctic regions, as shown on our map, are those laid down by Trewartha in 1937.

* *

As has already been said in the first article of this series, the Civil Government Air Operations Directorate was made responsible, in 1920, for the supervision and conduct of federal inter-departmental air activities. These activities were highly diversified in their natures. They eventually included:

forest fire patrols
reconnaissance
fisheries patrols
rust control dusting
aeroplane testing
photography
customs preventive service
treaty payment flights
air mail investigations
experimental work
transportation of government personnel

Between the years 1920 to 1931 inclusive, the C.G.A.O. Directorate was responsible for 54,638 hours of actual flying. By far the greatest portion of the work was done for the Department of the Interior, with totals of 24,408 hours for forest patrols, 15,783 hours for aerial photography and topographical surveys, and 1,068 hours for geodetic survey.

The forest areas patrolled for fire detection were surprisingly extensive. For several of the early years the patrolled territory covered about 34,000,000 acres annually, and in 1929 and 1930 this area had increased to no less than 92,000,000 acres.

High River

One of the first bases used for forest patrols was Morley, in Alberta, which began operations in September 1920. Early the following year the base was moved to a better site at High River, whence the aircraft patrolled and photographed over a "beat" that extended from the Canadian border to north of Edmonton.

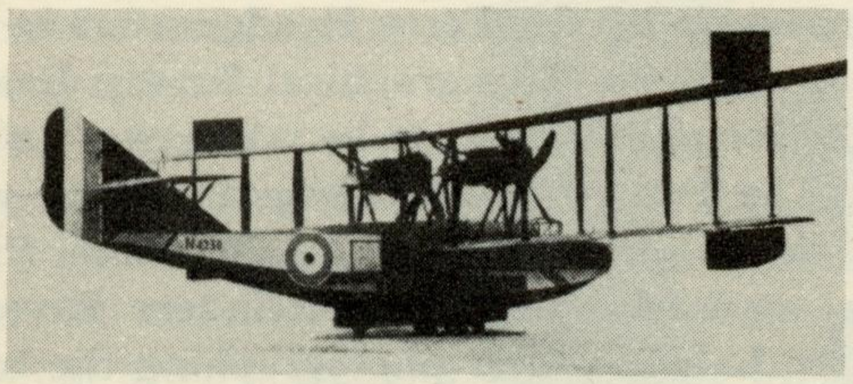
Roberval

At the request of the Quebec government, a base was opened at Roberval, on the shores of Lake St. John, in July 1920. Forest protection and survey patrols were flown from this base through three seasons, ending with the freeze-up late in October 1922. Thereafter the work was taken over by a commercial company under contract with the

provincial government. Surveys carried out by the CAF between 1920 and 1922 extended as far north as Mistassini, and included detached operations over the Natashquan River, opposite Anticosti Island, and in the St. Marguerite River area, north of Seven Islands.

Victoria Beach

This air base, on the southern shore of Lake Winnipeg, was established in 1921 at the request of the Department of the Interior for the purpose



F. 3

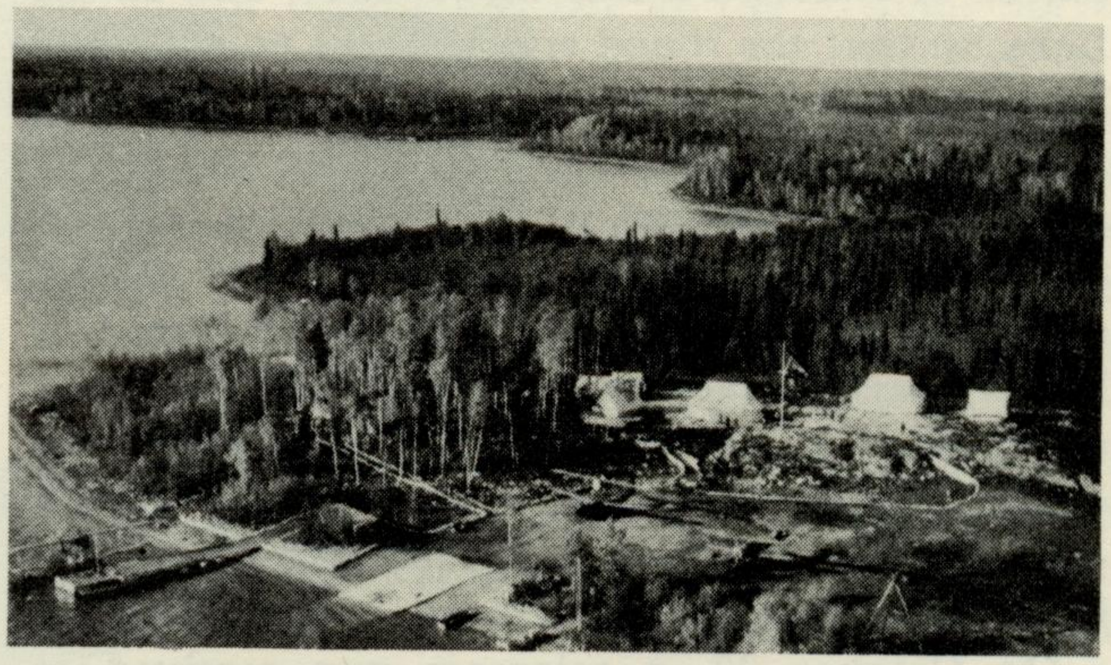
of protecting forest reserves in Manitoba. The territory covered included the whole area around Lakes Winnipeg and Winnipegosis, as far as the eastern boundary of the Province. Minor operations included photography on the Winnipeg River for the Water Powers Branch, and also the conveyance of survey parties and their supplies in the district east of Lake Winnipeg. Needless to say, air coverage swiftly became very popular with the District Forestry officer, who was thereby enabled to dispense with the services of a large number of canoe-borne personnel.

During the winter months the machines and personnel, together with those from Norway House and The Pas, were withdrawn to the city of Winnipeg, where facilities for the overhaul and conditioning of aircraft had been arranged. As soon as weather permitted, the operating stations were opened. The machines were sent by rail to Victoria Beach, erected there and flown to the other bases as required.

Operations continued from Victoria Beach until 1926, when the base was moved to Lac du Bonnet, some miles to the south-east.

Norway House and The Pas

Meanwhile, the success of the forest patrols in southern Manitoba had led to the establishment of two sub-bases farther north at Norway House and The Pas. Work from these bases began in 1922, extending fire protection into districts far remote from civilization. The next year, in addition to forest patrols, the base at The Pas performed an important photographic operation for the Topographical Survey Branch, with a member of the Branch acting as camera operator and navigator under decidedly difficult mechanical and meteorological conditions. In 1925 the location of the base at The Pas was shifted to nearby Cormorant Lake.



Cormorant Lake

From Norway House—or rather, from the District Forester's Headquarters on nearby Forestry Island, whence the aircraft operated—the first forestry patrol of the 1923 season was carried out on June 14th. In all, twenty forest fires were located from the air and handled under direction of the District Ranger at Norway House. During the latter part of the season the Forestry Branch detailed a forest engineer to accompany the machine on patrol, and much valuable work was done in forest type sketching. The area thus mapped amounted to approximately 2,500 miles. The flying on forestry work from Norway House during the 1923 season totalled to almost 76 hours, excluding a minor task of establishing a cache of provisions at Cross Lake for a Geological Survey party.

Indian Affairs

Another duty of the Air Force in those days was to assist the Dept. of Indian Affairs. This work began in 1922, when 21 flights were made for

Indian Agents paying treaty money on two agencies in Manitoba. A typical example of these flights is provided by the story of one carried out in July 1924.

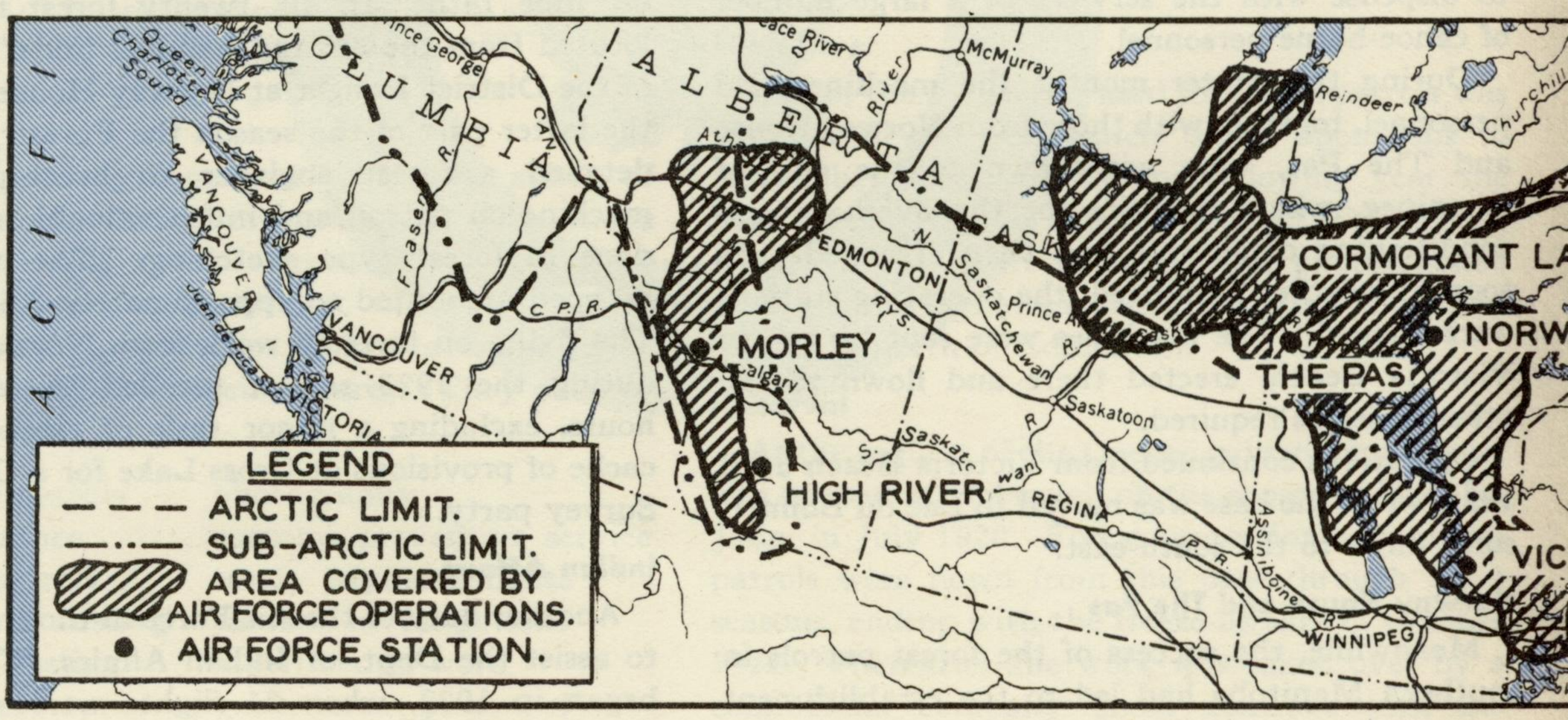
The party, consisting of the Indian Agent, a doctor, the pilot and the mechanic, proceeded to Cross Lake from Norway House. While the Indian Agent was paying treaty money, the pilot and mechanic assisted the doctor in vaccinating the Indians. On the following day, the work having been completed, the party returned to Norway House. Caches of gasoline had been placed at Oxford House, God's Lake, and Island Lake, so that the round trip to these points could be made without returning to the base. On July 31 a flight was made to Oxford House and treaty money paid there; but while attempting to leave for God's Lake, engine trouble developed shortly after take-off and the flying boat was forced to land. Since the damage to the engine proved to be so serious that they could not proceed, the party carried out the remaining part of the journey by canoe rather than wait for a second aircraft to be brought from Norway House.

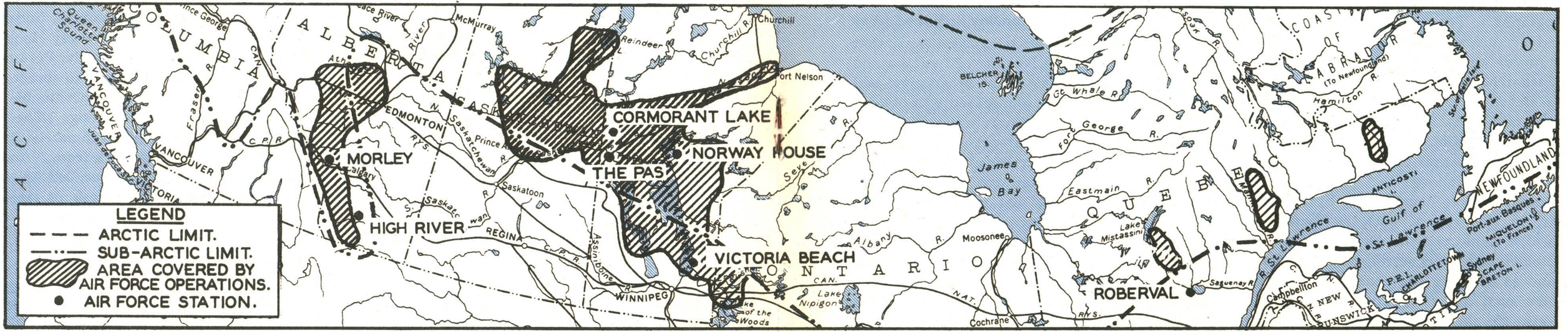
On October 20, a telegram was received at Victoria Beach from Air Headquarters in Ottawa, stating that diphtheria had broken out in the Norway House district and asking if a flight could be made to that area. All aircraft had been withdrawn from the northern base ten days previously owing to the approach of the freeze-up. Twenty minutes after receiving the telegram, an aircraft was on its way to Selkirk to procure the antitoxin, and another was standing by ready to transport it to Norway House. Delivery was made there, after a flight of 320 miles, within six hours of the receipt of the headquarters wire.

Churchill River Survey, 1924

The operation order for this ambitious project was drawn up by Air Force Headquarters in conjunction with the Topographical Survey Branch. It called for photographs to be taken over an area "from The Pas to Pukkatawagon, thence west, along the Churchill River to Reindeer River, thence northerly along the Reindeer River to Reindeer Lake." After photographing the whole of Reindeer Lake, a return flight was to be made to "the Churchill River, and thence westerly to the Stanley Mission, and from the Stanley Mission to Ile-à-la-Crosse." A direct course was then to be taken to Prince Albert, and the Saskatchewan River followed to The Pas.

The journey in all was to cover some 2,500 miles and approximately 1,500 photographs were to be taken, which would give a plottable area of 15,000 square miles. If possible, a Dominion land surveyor from the Topographical Survey was to





CIVIL OPERATIONS OF THE AIR FORCE UP TO AND INCLUDING 1926.



Vickers Viking

be carried as navigator and to direct the taking of photographs.

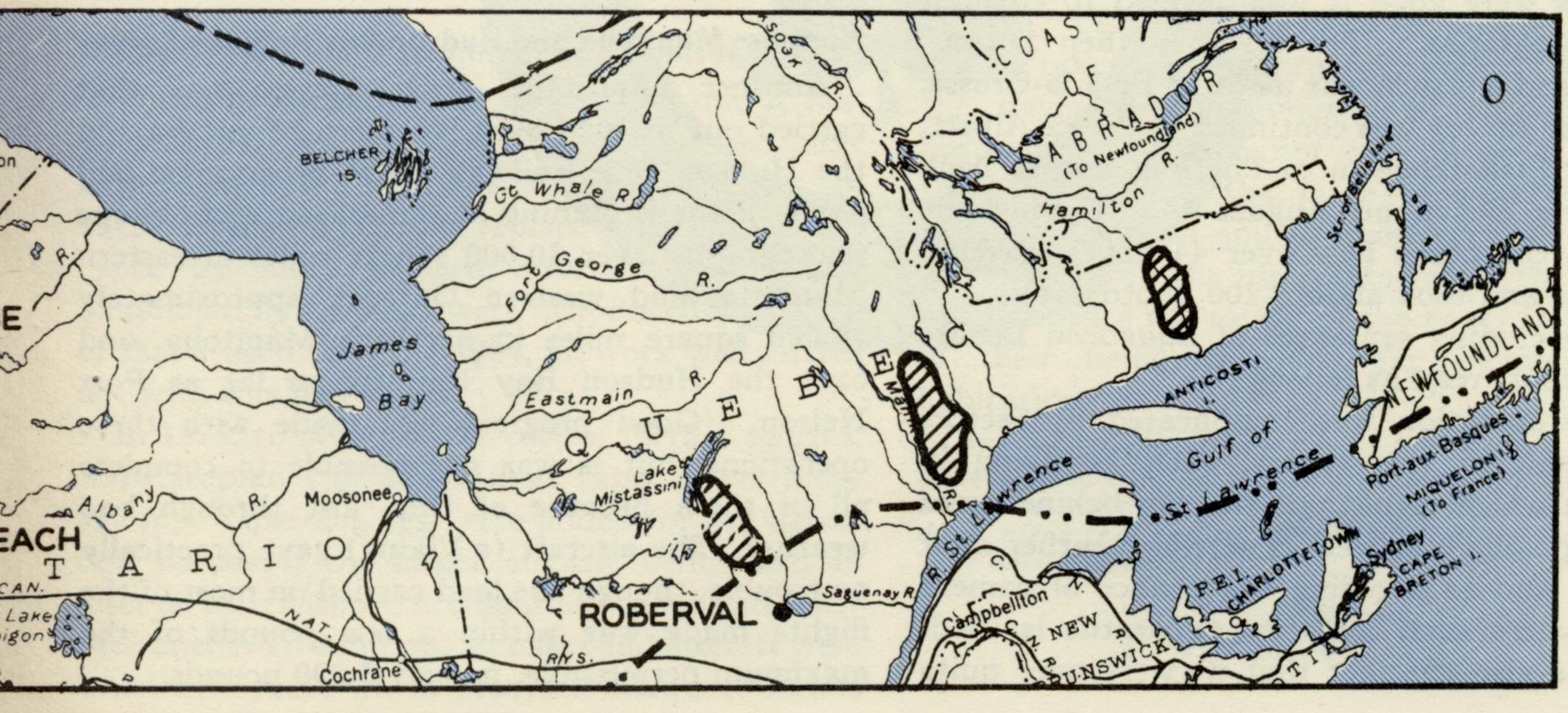
The aircraft, a Vickers Viking flown by Squadron Leader B. D. Hobbs, D.S.O., D.F.C., left Victoria Beach at 4:20 in the afternoon of July 18th and arrived at The Pas at 8:10 the same evening, after a flight of 325 miles. On July 21 the survey party flew to Pukkatawagon, taking photographs along the way until clouds intervened. The next hop, two days later, was to Rabbit River on Reindeer Lake.

(The following account of the trip is a paraphrase of Squadron Leader Hobbs' report.)

On arrival at Reindeer Lake the next day, a few circuits made before landing showed that, while Reindeer Lake was a very large body of water, its formation as shown on the existing maps was entirely misleading. The first impression of all the members of the crew was that it would be very difficult on the next flight to decide on the actual shore line. The whole district is a mass of intricate waterways spreading in all directions, and the lake itself is dotted with islands and everywhere indented with deep bays.

From July 23, and until the morning of August 1, the aircraft operated on Reindeer Lake. Most of the work was carried out from Rabbit River, where fuel was available, but as the operation called for a network of photographs of the whole lake district, a flight was made on July 27 to the settlement of Du Brochet at the extreme north end of the lake.

Continued interference by weather while the party was in the Reindeer Lake district afforded its members an opportunity to study the country and its inhabitants, and several trips were made by canoe through the numerous rivers and lakes in the district. Food, of which there was no shortage, consisted mostly of bacon and canned goods, with bannock to replace bread. There was little meat available but plenty of fish. Moose meat was extremely scarce. The residents attributed this to the absence of flies that year: the moose were not driven to the water. Since the Indian does not leave his canoe, but always hunts by paddling in the waterways, little meat was obtained. The large herds, numbering thousands,



of caribou and reindeer, which roam the district during the winter, had all moved north to their summer grazing grounds in the "barren lands" by the time of the party's arrival.

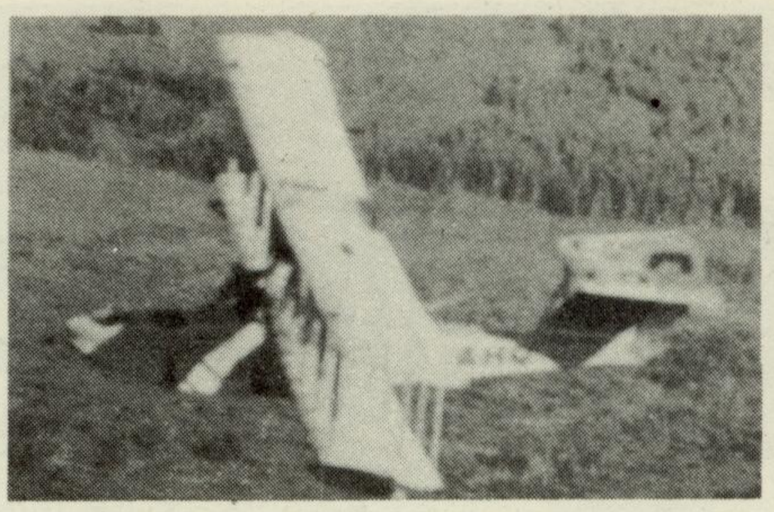
With the exception of a few white people in charge of Hudson Bay and Révillon Frères posts, and a few independent white trappers and traders, the inhabitants of the country were all Indians.

The effect of the seaplane on the Indians was very similar to that noticed in other parts of the country where operations had previously been carried out for the first time. They would run into their huts or wigwams when the aircraft was landing, and its take-off always seemed to be the signal for them to make an appearance dressed in the most brilliant colours. They would sit staring at the anchored machine for hours at a time; and when it moved slightly in the wind, they would all get up and move back, gradually creeping forward until it moved again.

From Rabbit River the Viking flew to Pelican Narrows where it was detained for a week by bad weather. On August 9, it got through to Stanley Mission, where further difficulties caused another delay. On August 11 conditions were again favourable and the machine got away easily. The Churchill River was followed to Ile-à-la-Crosse, and the flight continued slightly past the lake to a point on the Beaver River. This portion of the flight was not included in the programme, but as conditions were good it was decided to cover it with photographs. The weather then became overcast and a return was made to Ile-à-la-Crosse. Thence the survey was continued to Prince Albert, down the Saskatchewan to The Pas, and so back to Victoria Beach on August 14. During the operation the party flew over 44 hours, covered 2810 miles and took about 1700 photographs.

The concluding sentences of Squadron Leader Hobb's report read as follows:

"...the operation was complicated by factors not stressed in this report, such as flying in directions which would put the sun behind us as much as possible, as well as getting weather clear of clouds and so avoiding the chance of camera trouble where such intricate apparatus is used. There was also the fact that we were over quite



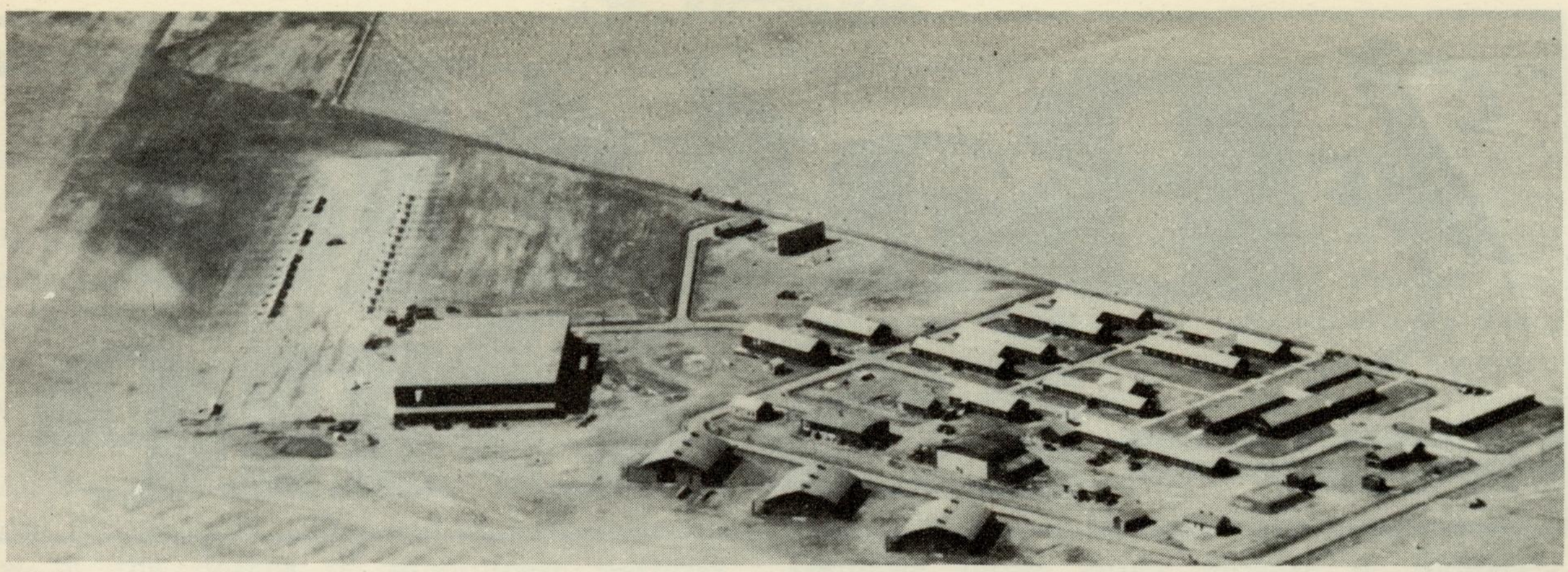
H.S.2L

unknown country where landings had to be made on unfamiliar water, with the added difficulty of getting altitude quickly in spite of a heavy load, in order that we could start photographing as soon as possible. That these, and many other adverse conditions, were safely overcome on the first really long expedition for exploratory survey, gives assurance that . . . even longer journeys may be planned with every prospect of success . . . provided the necessary fuel depots can be laid. I also consider that the operation fulfilled all the requirements of the Topographical Survey of Canada, as shown in the operation order."

The official Report of Civil Aviation for 1924, in describing this flight, commented: "It is certainly the greatest ever undertaken for aerial survey; and, when considered in the light of practical results, is one of the most brilliant achievements in the history of flying."

Northern Manitoba and Hudson Bay Railway Survey

Another important aerial survey was that carried out in 1926 over Northern Manitoba and the Hudson Bay Railway. The programme laid down in the beginning of the season was oblique photography over 30,000 square miles in eastern Manitoba and western Ontario, approximately 20,000 square miles in northern Manitoba, and over the Hudson Bay Railway as far as Port Nelson. Good progress was made with these operations, but is was not possible to complete all of them because of time lost through bad weather. The aircraft (a Viking) gave practically no trouble, though the load carried on most of the flights made was within a few pounds of the maximum permissible, namely 5,800 pounds.



High River

The Viking reached Cormorant Lake, on the Hudson's Bay line, on the 17th September, and from that date continued its photographic flights. With the aid of continuous favourable photographic weather, it covered the area of approximately 24,000 square miles by October 5. The base was then moved to Norway House. Unfortunately, the weather changed and only one more photographic day was obtained before indications of the approaching freeze-up at Norway House forced a move southward to Winnipegosis on October 13. From there further photographic flights were made for two or three days, when cold weather and heavy snowfalls forced the abandonment of the operations, and a return was made to Lac du Bonnet and finally to the Red River at Winnipeg.

Aircraft Types and Personnel Compromises

Flying in the sub-arctic was carried out at first on H.S. 2L. flying boats, with one or two large twin-engined F.3's for fire suppression work. In 1923, steps were taken to replace these obsolescent types by more modern aircraft, and Viking amphibian flying boats were introduced in the fall of that season. During 1924, all work was carried out with this new type.

In 1925, to decrease the cost of further patrols, Avro seaplanes of single float type, powered by 210 h.p. Viper engines, were added for fire detection purposes, the larger aircraft being held in reserve to transport fire-fighting crews and their equipment. In addition, all bases and aircraft were fitted with radio which provided adequate means of communication between the forest and Air Service headquarters at Winnipeg and the three operating bases at Victoria Beach, Norway House, and Cormorant Lake, and from them to aircraft in flight.

Even now, when flying in unsettled districts where engine or other failure may mean a forced landing many miles from civilization, it is necessary to carry an emergency outfit. The equipment cannot be reduced without risk. Twenty-five years ago, however, the officer in charge of any operation such as those few mentioned above, frequently had to make a choice between adequate emergency equipment and a full crew of four—pilot, navigator, photographer, and mechanic. Usually he chose the former, reducing his crew to three and training the mechanic to operate the camera. (The results, when we study the photographs taken, were suprisingly good.) As regards the navigator, Dominion land surveyors were customarily carried—not only in order to guide the aircraft over the maze of waterways from station to station and to make survey notes that would assist in the interpretation of the pictures, but to ensure the safety of the party in the event of their being stranded far beyond human habitation.

In the next issue of "The Roundel" Flt. Lt. Wood begins to describe the actual experiences of individuals, several of them still serving officers, whose work was all done after the period which has been referred to as "the earliest years."

The Battle is One

By Lt. Col. G. M. C. Sprung, M.C.

In this issue Lt. Col. Sprung concludes his presentation of the case for an Armed Forces General Staff.

ICEBERG

Perhaps the most interesting example of operational co-ordination of naval, ground and air forces to be found in the entire course of the Second World War is the capture of OKINAWA by the Americans in the Spring of 1945 (operation "Iceberg"). Okinawa lies some 350 miles south-west of the southernmost island of Japan, and it was considered essential to all three services as an advance base for carrying the war to the Japanese homeland.

The problem of Okinawa differed in one essential respect from the other two operations we have considered. Throughout the whole operation the navy was much more than a transport and escort service for the army and the air force. Whereas Dragoon and Overlord had continental settings, the Okinawa operation was oceanic. At any time a fleet action might have to be fought with the Japanese Navy in order to make the landings possible. (In the event, one such action was fought.) Close support from carrier aircraft was predominant in the early stages, and naval gunfire could and did give effective support until the last day of fighting ashore. Furthermore, one of the primary objects of the undertaking was to provide a floating naval base from which to close in on Japan.

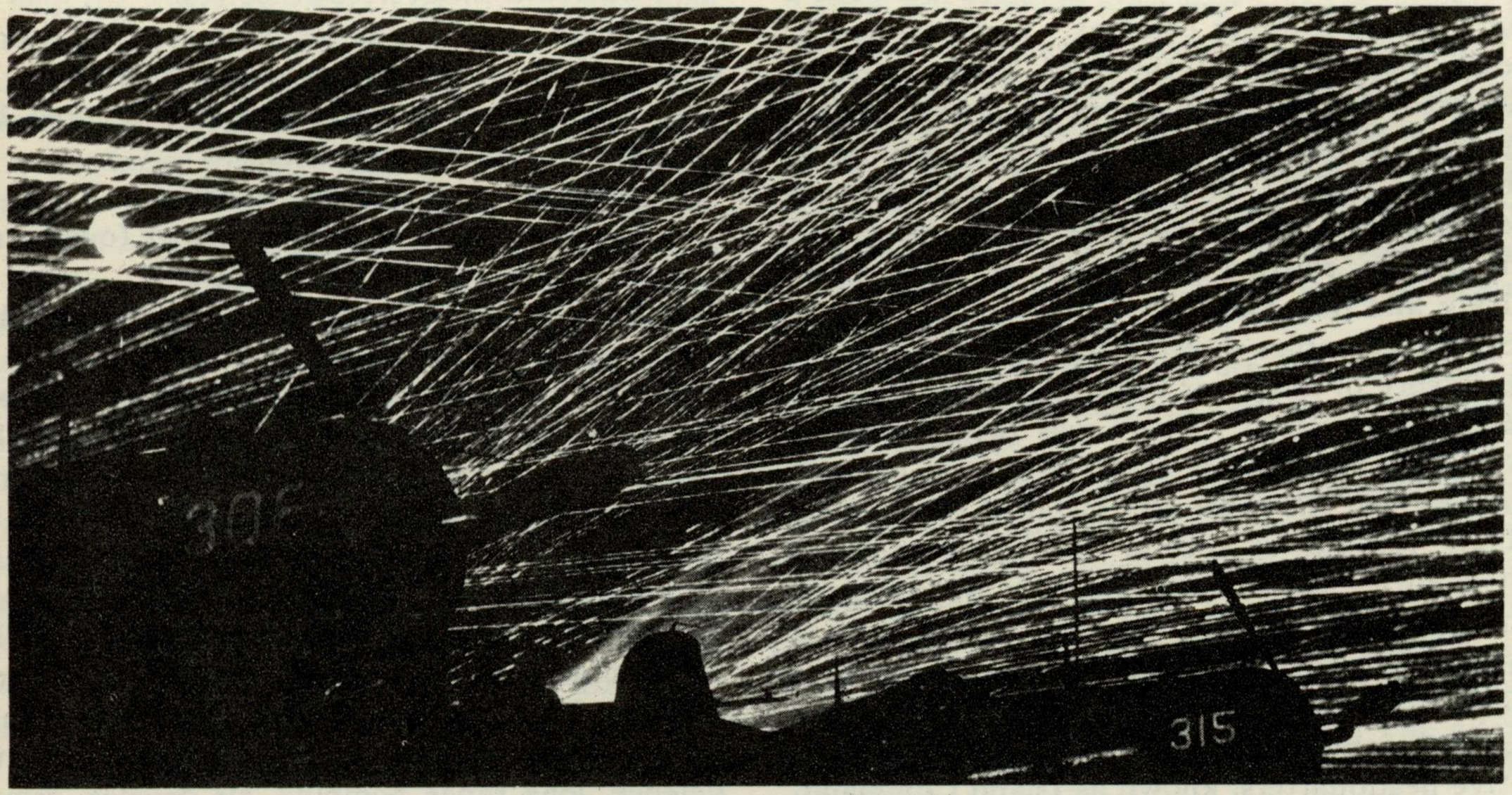
As might be expected from this basic difference, the command organization for Okinawa was not the same as that employed in the Mediterranean and in North West Europe. The theatre commander (C. in C. Pacific Ocean Areas) was Admiral Nimitz. He appointed Admiral Spruance as Commander of the Western Pacific Task Forces, with overall responsibility for the operation. Admiral Spruance in turn organized his forces in such a way that Vice Admiral Turner was commander of the Expeditionary Force, with Lieutenant General Buckner commanding the Expeditionary Troops (eventually to become the Tenth Army). This latter arrangement was not merely nominal (as it was in the case of Dragoon), for nearly seven weeks of fighting ashore passed before the general became responsible for the battle.

Although in the nature of things the staff problems which arose before and during Iceberg were not different in kind from those mentioned in connection with Dragoon, several of them were different enough in degree to justify our attention at this point.

The impact of the total intelligence picture and the estimated rate of progress of the battle had a particularly direct effect on the outline administrative plan. This arose from the intention to create on Okinawa an enormous base for all three services. It was essential to push the development of airfields ashore and of floating naval repair and supply facilities as swiftly as the progressing battle would permit. When we bear in mind from what widely scattered and distant ports—literally from all quarters of the Pacific—the equipment, supplies and technicians were being drawn, the

need for closely co-ordinated intelligence and administrative planning becomes very clear indeed. It is not surprising, then, to find that the basic intelligence for all services was produced by Admiral Nimitz's staff. This was not a purely naval staff, but, integrated to some extent, it represented a joint or armed forces staff. The administrative planning likewise was guided by quite detailed orders from Nimitz's "Q" or supply staff (again interservice). This simply had to be, in view of the dozens of subordinate agencies involved. For navy, air and army there were the subordinate formation supply staffs, there were the supply and procurement staffs in Washington, and from the West Coast, reaching out in an intricate pattern across the length and breadth of the Pacific, there were the innumerable base areas, material commands, and dumps and depots of all kinds. To get ships loading with the right men and supplies, so that whatever their port of origin they would arrive off Okinawa at the right juncture in the battle, demanded armed forces staff work of high efficiency.

The control of air support required careful handling during all phases of the operation. Before airfields could be repaired or constructed ashore, the preponderant direct support came from carrier aircraft of the Expeditionary Force. This was true also of the other forms of air operations: fighter direction, anti-submarine patrols, and air-sea rescue. There were, of course, a number of land based air forces from the Philippines, China and the Marianas, supporting the Okinawa forces either directly or indirectly. While these latter units were not under command of Admiral Turner, he did exercise control over all aircraft operating against targets in the objective area through the Air Support Control Unit in his flagship. The tactical air force assumed more and more importance as the battle progressed on land, but, although there was an air commander, he was throughout a component of the joint forces engaged at Okinawa and took his direction from the joint commander. For six or seven weeks this was Admiral Turner, and for the final phase was the commander of the Tenth Army.



Flak defences on Okinawa.

The intricacy of the problem of closely and skillfully integrating tactical air into the land air battle becomes especially clear if we consider the circumstances in which the battle on Okinawa was fought.

The commanders of ground units had three forms of supporting fire upon which they could call: artillery, naval bombardment, and air. Air support could be either carrier or land based. The problem of co-ordinating these forms of support without overlapping waste, and yet in a way that would guarantee the most effective support for the required task, was met by an arrangement called the Target Information Centre. At each divisional and corps headquarters as well as at army, under the direction of the artillery commander, a small staff screened incoming requests for support from front units and allotted that form which appeared appropriate. If the Japs were holed up in caves, air attack—perhaps with the fearsome Napom—might be best; if gullies needed searching, formation artillery could do it; if the target given required destruction, the heavy naval shell could be used.

Yet even these interservice decisions were but a small part of a larger complex. Someone had to decide the priority of the land battle itself as compared with fighter interception, strikes against Japanese naval units, air-sea rescue and anti-submarine patrol. A multiplicity of commands operating in a restricted area might have had difficulty in shifting the point of main effort quickly and purposefully.

Special examples showing the day to day interdependence of navy, air force and army could be dealt with in detail. There was the decision to employ an army division to capture an offshore island so that the radar sets installed there would obviate the use of several destroyers on radar picket duty. On 7 April naval air was diverted from support of the land battle to deal with a Japanese naval force which had put to sea in a suicide attempt to disrupt the operation. There was the establishment of an interservice administrative headquarters, known as Island Command, which took over behind the advancing forces all service installations ashore, whatever their colour of uniform. There were these and many other vital decisions which demonstrate the degree to which each service depends upon the other, and which make quite clear the essential oneness of the battle.

WHAT IT ALL ADDS UP TO

Now, having recalled a few interservice problems from the recent war (and before your editor tells me I have done quite enough talking for an Army Type), I want to refer to my original question:

What is the type of co-operation in battle towards which our armed forces should strive to evolve?

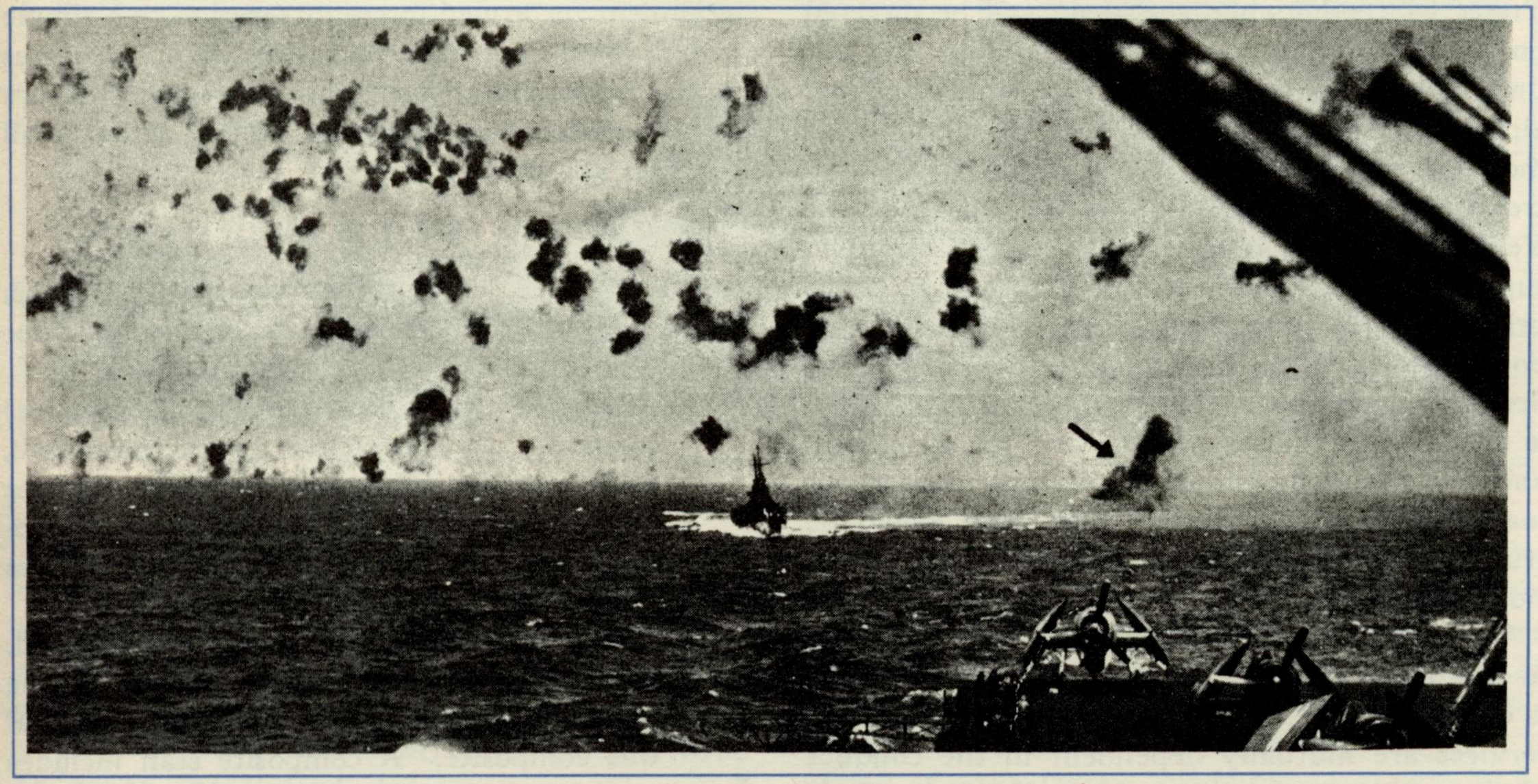
We would have to agree, before this question could be thoroughly answered, on the types of battle which would be fought by Canadian forces if a war should occur in the next few years. In the interests of brevity let me make two assumptions.

1. We must be prepared for defensive action in our own country.
2. All services would share in operations conducted from overseas theatres.

On these assumptions the main types of operation in which we would be engaged might be:

1. Air defence in home territory secured by navy/army air dispositions.
2. Navy/air anti-submarine defence.
3. Navy/army/air opposed landings (overseas).
4. Army/air campaigns.
5. Long range bombing from bases secured by navy/army/air action.

Clearly the staff organization for each of these types of operations will need to be specially designed for the purpose. No two will be the same. The theatre headquarters staff, however, will be basic, and most of the other types will be formed as required within the theatre. A Far Eastern Theatre might be decided upon, for example, responsible for the Japanese Islands, China and Eastern Siberia. The theatre staff would face problems growing out of navy/air anti-submarine defence, long range bombing, air defence, army/air campaigns, as well as intricate interservice



Kamikaze plane goes into sea after missing USS Pasadena. Note flak.

supply and personnel problems. The strategic objects of the fighting must at all times dictate the allotment of forces to the various tasks. At times heavy bombers may be needed tactically to help the Army forward to territory from which the heavy bombers can strike more effectively. At times the Army may have to divert forces to secure better ports for the Navy, and again naval air may have to leave anti-submarine work to engage in fighter defence activities. The characteristic of all these types of decisions is that units of one service are employed to achieve objectives which are primarily of benefit to another service and which in the end redound to the good of all.

Can there be any doubt but that all weapons of all services are in the theatre to further the strategic aims of the commander? Can there be any doubt but that the theatre staff must grasp the commander's intentions as a single endeavour? And can there be any doubt but that staff authority must be so pyramided that one directive applies automatically and with equal validity to all services and all forces involved in shaping their diverse concerns toward the single common goal? Finally, may I suggest that, ideally and in the long view, such smooth staff work is best achieved by an armed forces staff?

True, our training must first make it feasible to permit, for example, a naval officer to be chief of a supply staff responsible for all naval, air and army supply problems within the theatre, or for an air officer to head a staff responsible for all naval, air and army operations in the theatre. But assuming the training could be accomplished, is the notion of an armed forces staff at theatre headquarters too fantastic?

Within the theatre there are the other subordinate types of interservice operation. Consider as one example the army/air inland campaign. This is surely one battle. Air supremacy in the battle area is stated to be the first objective of the tactical air forces. From the point of view of the campaign as a whole, local air supremacy means that tactical air can get on with its other main tasks, namely, isolation of the battlefield and direct fire support of ground troops. The allotment of strength to these tasks should be made with a view to furthering the ground/air battle.

Times will come when the army will be directed on to difficult and, from the army point of view, unsuitable objectives in order to secure needed airfields. The air force may be directed to allot more strength to the direct support of army troops than, from an air point of view, is wise. Yet on the whole it may be the right thing. If supplies run short it must be decided what priorities to accord aviation gasoline, tank fuel, bombs, and artillery shells. A supply staff with a firm grasp of the land/air campaign as one thing, is one way to guarantee objective yet purposeful and far-seeing decisions in matters concerning maintenance of the forces. The same would be true of an army/air staff responsible for operational questions.

The principle which would have to be observed in organizing the staff structure of joint operations is quite simple. Wherever forces of two or more services are mutually dependent in the conduct of operations, but only on the level where this is true, there should be unified command and an armed forces staff. Once command and staff have been unified (e.g. at theatre level), all subordinate headquarters should be interservice in composition (to suit the forces under command) down to the level where a self-contained formation of one service is operating without a permanent allotment of units from another service. A long range bomber force represents a genuine unilateral undertaking (under an armed forces headquarters at the theatre level). A naval force operating independently of land based air is likewise unilateral. Such air and naval forces would be technically and tactically under the direction of their own service. In land/air campaigns, command and staff should be unified down the chain of command as far as formations of the two services are in permanent association. This level will vary from theatre to theatre. In North Africa it would have been D.A.F./Eighth Army. In North West Europe it probably would have been 84 Group/ First Canadian Army (though one could argue that the more appropriate level would have been 2nd T.A.F./21 Army Group).

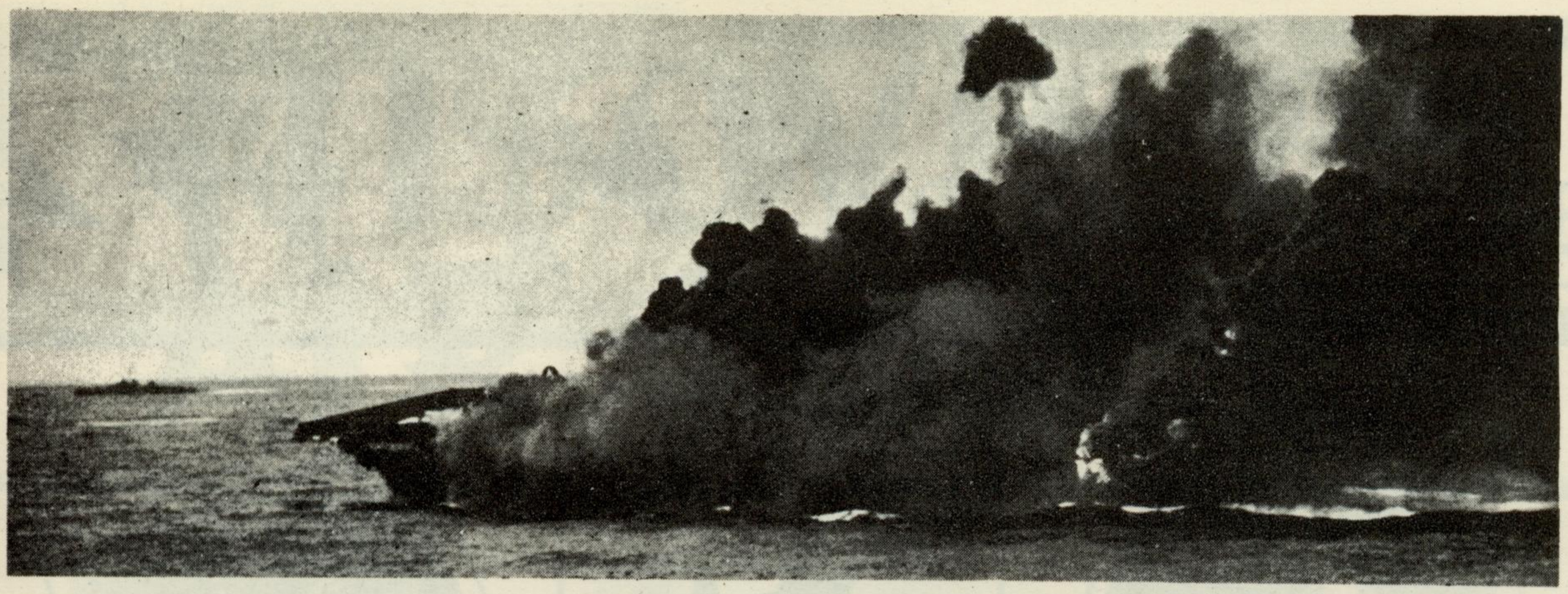
In quoting examples from the recent war, it could be objected, we are exposing the whole argument for armed forces integration to a simple but devastating counter argument: our operations in the recent war, despite the unintegrated nature of the staffs, were successful. What, then, is all the fuss about?

THE FUSS, AS I SEE IT, IS ABOUT EFFICIENCY

There appear to be three main methods which can be applied to interservice problems, and three corresponding levels of efficiency.

1. There is the conference (or committee) method. At conferences or in committee, each member represents his own superior and is usually bound by instructions. Agreement depends upon "give and take." This is the least efficient method.
2. There is, secondly, the composite method. The Germans favoured it, and after the tactical air commander departed, SHAEF was composite. A composite staff includes sections from the various services, but each section remains responsible solely for matters concerning its own service. This, so far as the staff work is concerned is clearly nothing but a conference made permanent.
3. Thirdly, there is the true armed forces staff. Such a staff is composed of functional sections or branches, e.g. intelligence, operations, supply, personnel, each of which deals with its own kind of problem for all the services involved and each section or branch is composed of a due proportion of navy, air and army officers as the forces under command render appropriate.

In my view, the armed forces staff represents the highest level of efficiency. We may have need of efficiency in the future. The recent war was fought out of an economy of plenty. We had such rich quantities of men and material that we could afford the less provocative method of command by conference and liaison. Should we, in the future, ever reach our limit in human and material resources, I feel sure that the more efficient method of single command and unified staffs, with its more stringent and economical allocation of forces and supplies, will commend itself to our better judgment.



USS Hancock struck by Kamikaze plane.

But supposing the theoretical soundness of the argument for an armed forces staff were conceded, can one agree that the whole notion is practicable? That is to say, can one officer in the period of his service learn enough about the navy, the army and the air force to make intelligent decisions, on the staff and command level, affecting all three services?

This question deserves a very thorough examination on its own merits. I can do no more at the present time than record my personal belief that, in the case of selected officers, it should be possible to grasp the principles of employment of the main arms and craft of the three services together with their internal organization and supply problems. This would admittedly be a training programme of a very great scope. It might prove unavoidable to have two branches in an Armed Forces Staff Corps, one operational and one administrative. One thing, however, seems to me worth noting: the present form of inter-service staff training is not intended to produce the armed forces staff officer. Much more than six months is necessary for that. The present courses do turn out officers well oriented in the affairs of all services and trained to the level necessary for what I have called composite staff work. A period of several years would be required to train even the most gifted officer for the full range of armed forces staff responsibilities.

THE PROBLEM RESTATED

And now I have said my piece. I know that in these few pages I have merely sung a song, and have not faced up to the difficulties and objections which lie on every hand. I thought perhaps, with your editor's indulgence, that a little song might brighten our dreary days.

But on this one fundamental I feel I can fairly insist: the starting point of our thinking cannot be "how do we co-ordinate the existing services," but must be "how do we co-ordinate our weapons for battle."

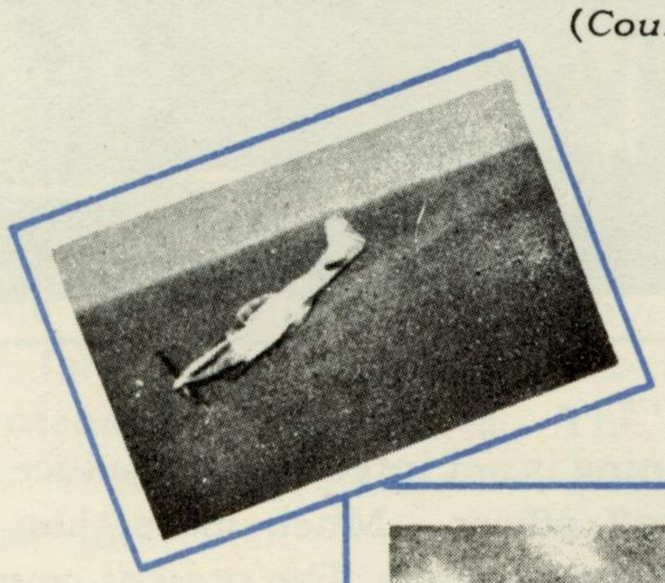
CHRISTMAS CUSTOM No. 4

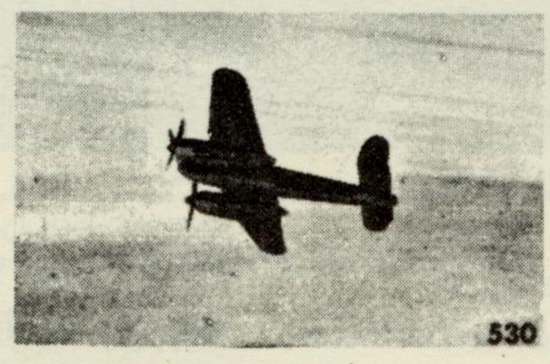
On Boxing Day, in Western Bohemia, young men go about beating the girls with willow branches. While they do so, they recite bits of verse pointing out that it's all for the good of the victims' health. The girls, in recognition of the service done them, usually reward the young men with brandy, cakes, or cash. (Good for the young men.)

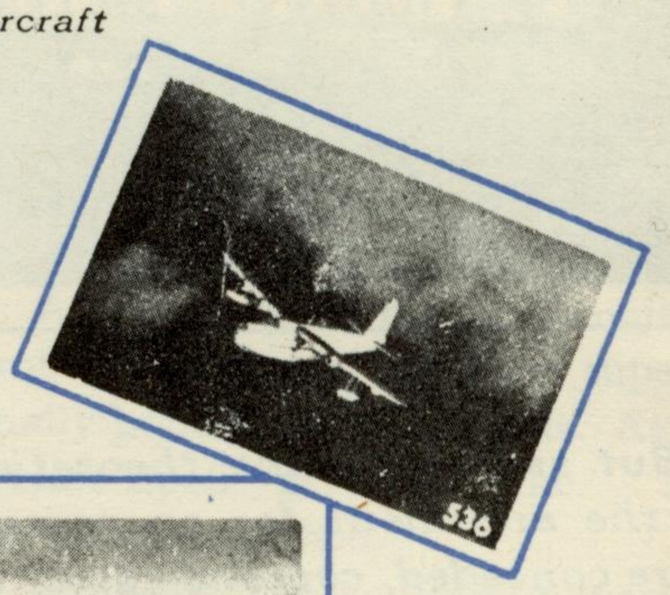


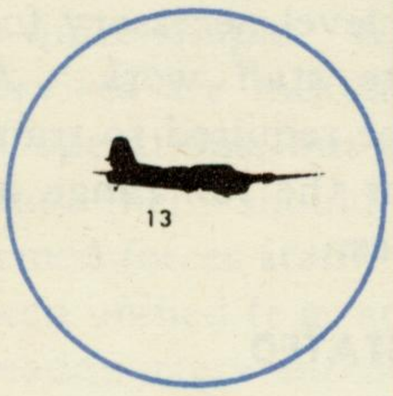
AIRCRAFT RECOGNITION QUIZ

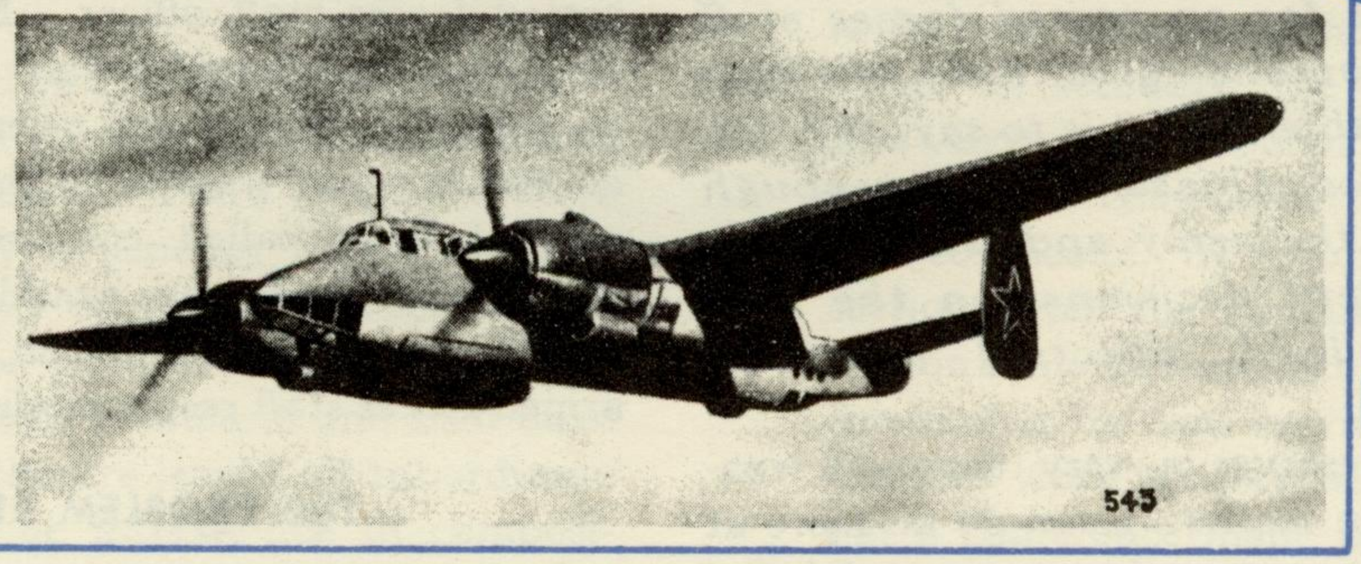
(*Courtesy of Inter-Services Journal of Aircraft Recognition*")

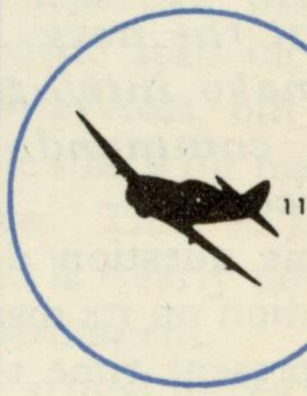


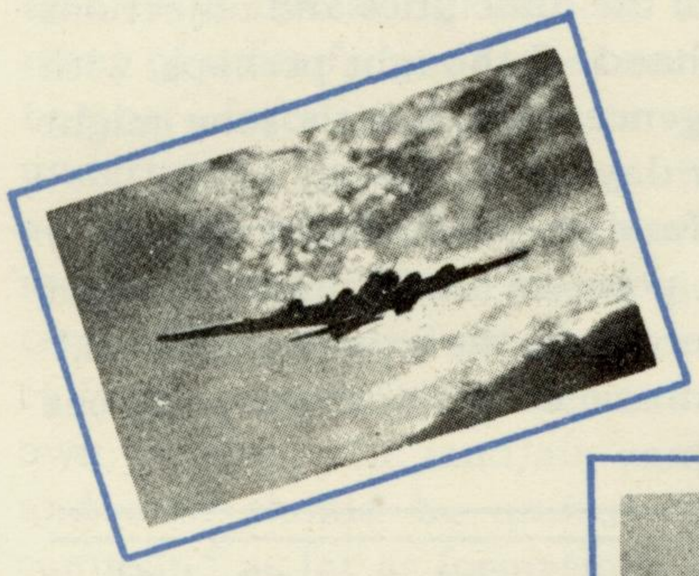


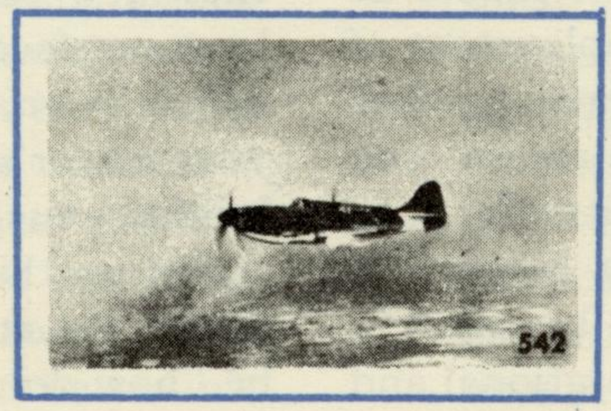


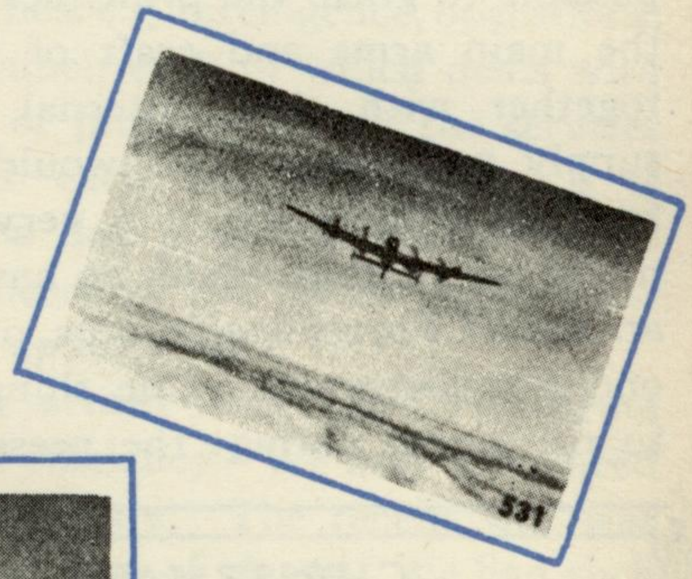


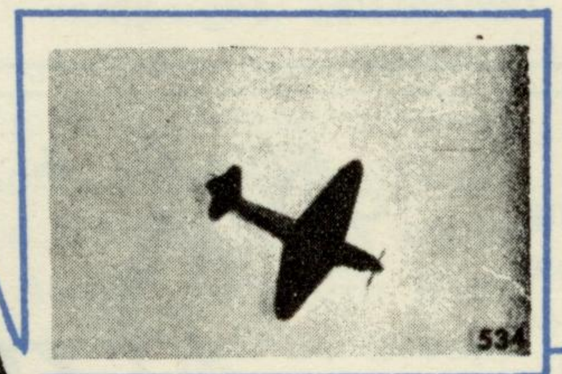


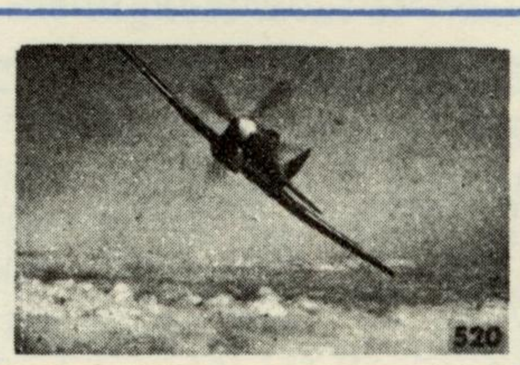


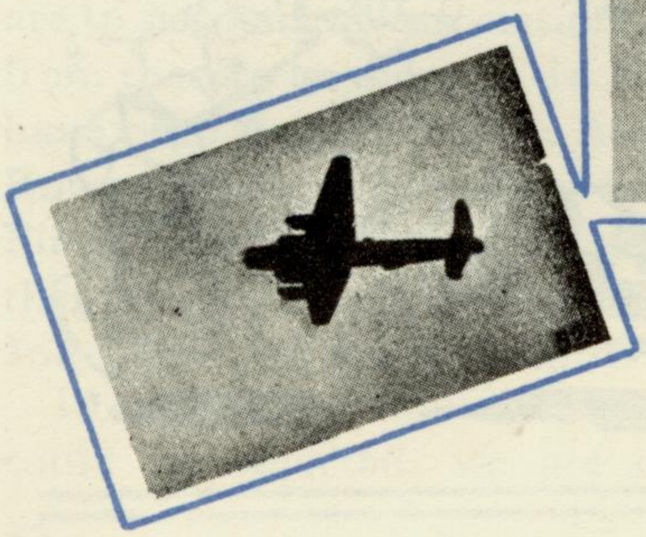


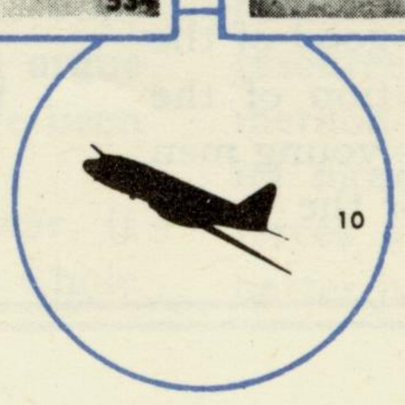


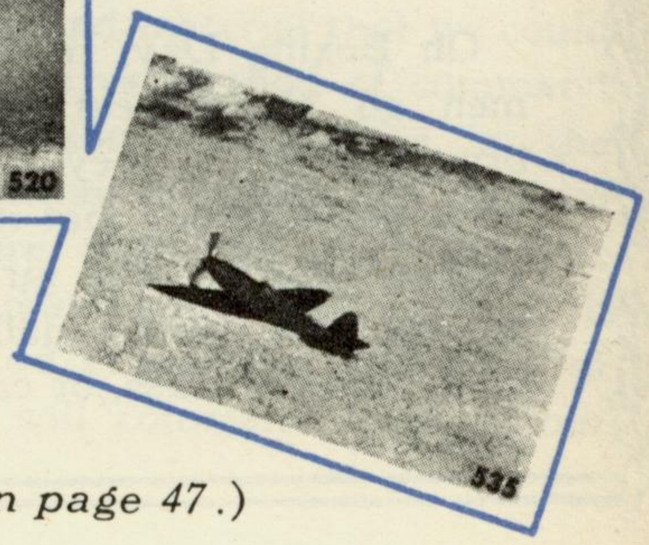












(*Answers on page 47.*)

The SOVIET AIR FORCE

By "POLYGON"

(Reprinted by courtesy of "The Aeroplane")

This is the second of four articles by "Polygon" on the Soviet Air Force.

OPERATIONAL EFFICIENCY AND TACTICS

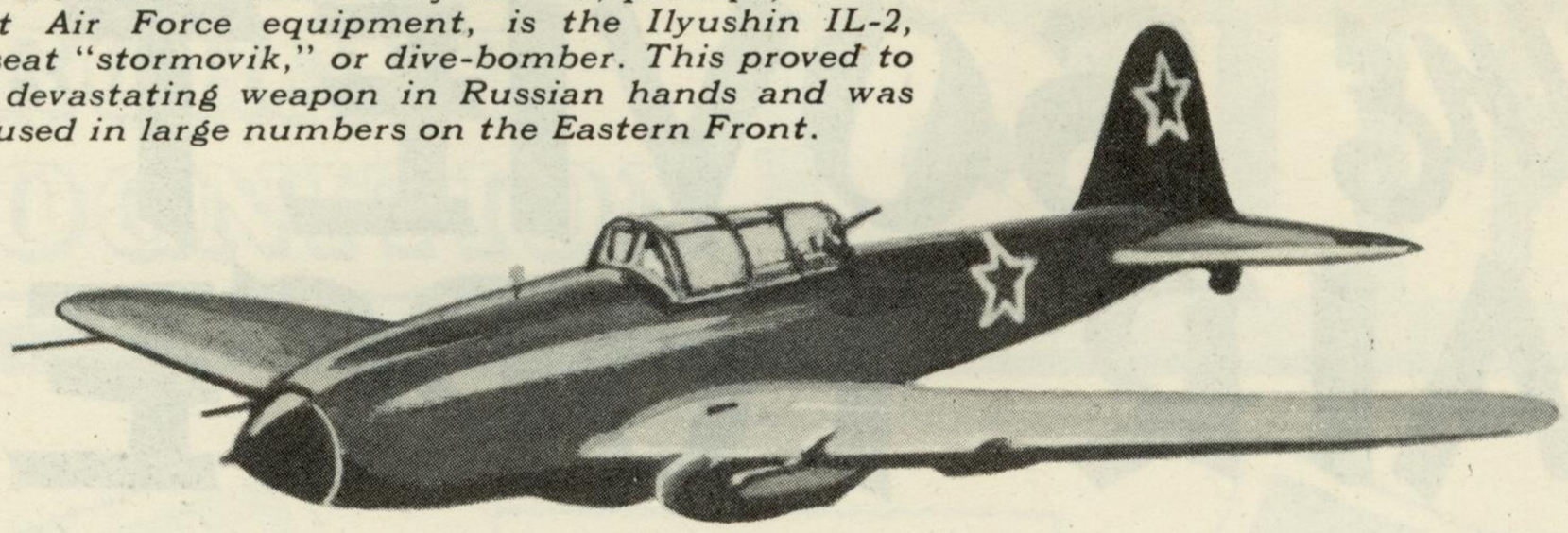
At the start of the War the Russians had an Air Force of considerable size but very low efficiency. Most aircraft were obsolete, production facilities were limited, and designs were rarely original. In spite of continual improvement during the War the Soviet Air Force was always inferior in equipment to that of the Germans, and quality of equipment is a most powerful factor in all air warfare. Compared with their opponents, the Soviets were ill-equipped, badly supplied, and inefficiently controlled, yet in the end they won the battles.

There are three main reasons to explain this apparent paradox. The first, of course, is that towards the end of the campaign, the Russians were numerically superior to the Germans. The second is that the airmen, fighting over their own country, showed fanatical bravery and a complete disregard of casualties. The third reason is that Russian aircraft, although inferior to the German types in performance, were of simple design and, consequently, easily maintained by the relatively ill-trained personnel. They were also, on the whole, suitable for the tactical methods employed. In some hands a Ford may give as good service as a Rolls-Royce.

At the start of the war with Germany, the Russians were not only unprepared but they made the mistake of deploying their Air Forces too far forward. In the retreat of 1941 they lost not only a large part of their operational strength but also much of their reserves, together with vast quantities of stores and supplies as well as certain factories. This forced the great decision to transfer the aircraft factories to the Urals and to Siberia. The next year saw the Soviet Air Forces struggling against a vastly superior force but building for 1943. From January, 1943, to the end of the War the S.A.F. constantly increased, while that of the Germans decreased; and, by mid-1944, the German strength was so low that the Russians had almost complete air superiority.

I have already pointed out that most of the S.A.F. was employed for the immediate and close tactical support of the Army operations. Although we may criticize the Russians for not developing a big strategical Air Force, we must always remember that their equipment and training was far from suitable for strategical bombing work. In my opinion, their staff was right in concentrating their air effort in support of the armies.

The main aims of their Air Armies in attack were to destroy the enemy's forward defence screen and smash his strong points. Their attention was then directed to armour or infantry disposed for support. These tasks came before attack on airfields or even the countering of enemy air activity, and took precedence over attacks on artillery, transport and main reserves. In defence the Air Armies concentrated mainly on armour, infantry, field artillery, and immediate reserve formations.



DIVE BOMBER. Most widely known, perhaps, of the Soviet Air Force equipment, is the Ilyushin IL-2, two-seat "stormovik," or dive-bomber. This proved to be a devastating weapon in Russian hands and was used in large numbers on the Eastern Front.

Tactical surprise demands not only meticulous staff work, but often leads to complication not suited to the Russian mentality. Probably for this reason it was rarely attempted. The normal policy was to reduce frontline strength before a big offensive and to build up a reserve; the first phase started some three months in advance, involving continual air reconnaissance. Then came increased activity by the Air Forces against the enemy back areas, up to 120 miles behind the line. The third phase concentrated on transport and communication, and, in the last phase, the ground-attack aircraft and the bombers slacked off their operations in favour of intensified fighter activity. Finally, came the offensive, with all aircraft helping tanks and infantry.

So much for the general tactical plan, but no rigid rules for the guidance of operations were laid down. Always the Russian Staff was ready to improvise or alter plans as a result of war experience and, consequently, there was great flexibility in operational procedure.

The fighter forces in particular were adept at improvisation and the correct exploitation of war experience. Their operations showed not only tactical flexibility but also ruthless and unorthodox employment of aircraft in abnormal roles. Their main tasks during an offensive consisted of patrolling the battle area and airfields, co-operation with infantry and tanks, and a certain amount of reconnaissance work, both visual and photographic. Patrol heights varied from 2,000 ft. to 20,000 ft. unless enemy bombers were expected, or there was bad weather. For escort work fighters were split into two groups—one, the assault group, flying some three-quarters of a mile ahead of the bombers and about 200 ft. above. The other group acted as close escort just behind and above the bombers.

Night-fighter tactics were crude and mainly depended on searchlights guiding the fighter into the defended area. After that they had to look after themselves, for there was little effective control from the ground. The artistic and complicated system of controlled interception used in this country was being developed in the S.A.F., but had little use during the War.

Ground-attack aircraft usually operated in formations of four in a blunt arrow head. Early tactics were to approach at very low level but, later on, the efficient German light flak forced up approach heights to between 2,500 ft. and 8,000 ft. Bombs were dropped in a shallow dive at below 500 ft., and aircraft broke away from the target individually.

Medium bombers usually worked in flights of three with three flights, making up a V formation at staggered altitude, and flying loosely before and after attacks, but in close formation over the target. Bombs were dropped from a shallow glide on the signal of the flight leader. Operations were frequently carried out at divisional strength with four, five, or even more, groups taking part.

As previously explained, the Long Range Force was in no way a strategical force like our own. Admittedly it carried out some minor and ineffective attacks against German towns in 1941 and 1942, and, in 1944, a series of raids were made on Finland with the idea of accelerating peace terms. All such raids were most unimpressive both in plan and in execution.

For most of the time the L.R.F. operated within 120 miles of the front and its function was largely

tactical. In spite of superior training the navigation of the L.R.F. was weak and its instruments inefficient. However, at the end of the War improvements were being made and experimental work done with radar navigation. Tactics by day were similar to those of the bomber forces; by night the "stream" of bombers was mainly determined by the take-off times. Heights for night attack generally ranged from 10,000 to 16,500 ft. and target marking was seldom used. Inefficient though it was, the operations of the L.R.F. gave the Russians very valuable experience which will stand them in good stead should they decide to develop a strategic force on our own lines.

* * *

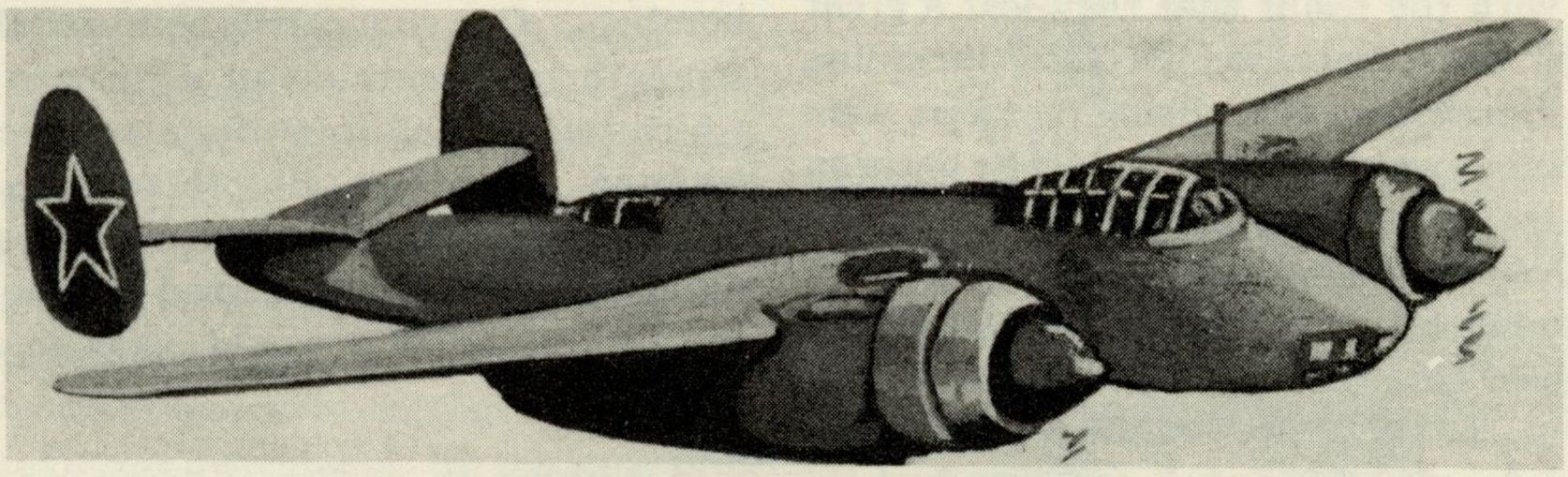
The Soviet Naval Air Fleet had a better standard of education and training than the Army side because of less wastage. Their main handicap was the types of aircraft used, which, often being the same as those used by the Army, were unsuitable for naval work; tactical employment was on similar lines to that of the Army Air Forces. Their main tasks were to attack ports and shipping, convoy attack and escort duties, the defence of naval bases and reconnaissance for the Fleets. They were used in support of land operations during engagements in the coastal area and in support of amphibious operations.

Airborne operations were very limited in scope during the War despite the fact that the S.A.F. started taking interest in this during 1930. However, the airborne forces were an independent part of the Russian Armies, being responsible directly to the Supreme H.Q.; their strength at the end of the War was about 21,000. Paratroops were used on a small scale in 1941 during defensive operations at Smolensk and in the Crimea, but these were a failure. In 1943 a large-scale operation was carried out on the Dnieper, but the airborne forces were not accurately dropped and were too lightly armed. The operation was a complete failure, and the forces were not used again until 1945 in Manchuria and Korea where there was no opposition.

Tactics for airborne home forces were to assemble the aircraft about 100 miles behind the line and send on one aircraft to reconnoitre the landing grounds. Aircraft were then directed by W.T. and Light Signals and went forward in two groups, the first carrying the parachute men equipped with rifles and light machine-guns, and the second group bringing the mortars and light guns in glider or transport aircraft. However, despite many years of pioneer work in the tactics and training of airborne forces, their operations were a sad disappointment, although they were used considerably for helping guerrilla warfare. But valuable experience has been gained and no doubt this arm could be expanded rapidly in time of necessity.

Factories and Research Establishments

In spite of the War we are still apt to think of Russia as a vast continent of steppes, forest and farm lands, producing mainly grain and timber. It is difficult to appreciate the enormous increase in industrial resources which has been achieved



TUPOLEV TWIN. Although now several years old, the Tupolev Tu-2 is still the primary medium bomber and ground-attack monoplane of the Soviet Air Force, and seems likely to remain in service for some considerable time. It has a maximum bomb load of 5,070 lb. and a maximum range of 1,550 miles.

since the Revolution. The first step towards large-scale industrialization was undoubtedly the institution of collective farming which gave rise to an immediate and enormous demand for tractors. At first these were imported, but the Soviets soon began to establish factories to produce their own.

The Russians have a natural aptitude for things mechanical, and a natural genius for copying the essential features of a good design and adapting it to suit their own conditions. I have no figures available for their tractor production in 1939, but probably it was as big or bigger than that of any country in the World. Factories which can make tractors can also make lorries, tanks and aircraft, and German reports indicate the high quality and efficiency of the Russian heavy tanks and also of their big lorries.

The manufacture of aircraft is naturally one of the most refined and specialized types of industry, far more complicated than the making of tractors or cars. Yet in this country we turned over almost the whole of the motor industry to the manufacture of aircraft and engines during the War. In Russia the great tractor factories formed the nucleus of the present vast aircraft industry.

By 1939 the aircraft industry was well established, although few modern types were in production. The German invasion of Poland caused a rapid expansion, just as the shock of Munich accelerated our own industry. Then came the German invasion. As I have explained previously, the Russians made the mistake of deploying too far forward, with the result that they lost a great proportion of their front-line aircraft, including much of the stored reserves. Some factories were overrun and most were threatened, so the decision was made to transfer the factories to the Urals and to Siberia. Anyone acquainted with the aircraft industry will realize what a stupendous and almost impossible task this meant. The decision was made early in the War, and while the factories were being moved, the fighting front had to manage, as best it could, with obsolete aircraft and the few remaining reserves.

However, a terrific drive must have been put behind the move, for at the beginning of 1942 the factories were going concerns and production was on the increase. During the following year it was built up at an ever-increasing rate, and, by the beginning of 1943 the S.A.F. was expanding rapidly while the German Air Force was dwindling.

This great move of aircraft factories must be regarded as one of the greatest industrial achievements of the past 50 years. Not only were the factories moved bodily vast distances, but at the same time production was planned for new types, which, long before the end of the War, were pouring out like a river. Our own experience has taught us that it takes five years to get a new type of military aeroplane into production. The Russian engineers managed to do it in much less time, although handicapped by the move of the factories. By the end of 1944 all factories were producing the most modern types.

It is not easy to make any accurate estimate of the total productive capacity of the Soviet aircraft industry. Mr. D. F. White in his book "The Growth of the Red Army" estimated that aircraft production in 1936 was about 5,000 per year and that by 1939 it had risen to the figure of 20,000 per year. By the end of the War the S.A.F. completely overwhelmed the Luftwaffe by weight of numbers and it would not be unreasonable to assess their front-line strength of operational types at about 20,000 aircraft, of which almost half would be fighters and the rest about equally divided between ground-attack aircraft and bombers. One can usually estimate that front-line strength represents about a quarter of the total, which includes all immediate and stored reserves, training, civil and all other types of aircraft. Working on this rough-and-ready basis the total number of aircraft possessed by the Russians at the end of the War would come to about 80,000 or more.

Accepting these figures as an intelligent guess, and working from our own experience, one might estimate a fighter production capacity of over

2,000 per month and a bomber production of well over 500 per month. Trainers would probably absorb 1,000 per month. Aero-engine production, of course, must be in proportion.

These estimates may be only rather bad guesses but there can be no doubt that, at the end of the War, Russia had a vast production capacity which is probably retained, or even increased, today. Even more remarkable is the attention paid to research. Here in England we have two establishments, the R.A.E. and the N.P.L., and only the R.A.E. may be considered as devoted solely to aeronautical research. The strength of both has been sadly reduced since the War, regardless of the obvious truism that, if one cannot afford production, at least one should increase research facilities against an emergency. Design staffs of aircraft companies are being reduced, and we have just seen one of the most brilliant design teams in the whole industry disbanded.

The Russians, by the end of the War, possessed at least ten Government research establishments, quite apart from numerous research laboratories attached to the great aircraft factories. There was the Central Aero-Hydro-Dynamic Institute and the Central Aircraft Engine Institute, the Soviet Union Aircraft Building Material Institute and the Scientific Research Institute of the Army Air Force. Then there was a Scientific Research Institute for Aircraft Arming and a similar institute for aircraft materials. Even the civil air fleet had its own scientific research institute, and one is tempted to wonder whether it does civil aviation more, or less, good than does our own Ministry of Civil Aviation. The Soviets have also many experimental design bureaux, and research laboratories are attached to Higher Training Establishments.

It seems obvious that the Russians realized, even before the War, that they were backward in the design of both aircraft and engines, and made a most determined effort to expand their research facilities. There can be little doubt that, by the end of the War, the Soviets possessed more State-controlled aeronautical research facilities than any country in the World. It is probable that these have been expanded since the finish of the War—they certainly have been strengthened by the influx of German scientists and engineers.

(To be continued)

CHRISTMAS CUSTOM No. 5

The Aztec festival of the goddess Ilamatecutli ("Our Mother") was celebrated on Christmas Day. The lucky girl chosen to represent "Our Mother" did a prolonged solo dance to an orchestra composed of very old men; then towards sunset, she was led up the long ascent to the pyramidal temple's summit. When she reached the platform at the top, she was murdered in the usual way, her heart rather messily extracted, and her head cut off. All operations were carried out, with the aid of a blunt stone instrument, by the local priest. (Fun for the spectators.)





From a Talk to Eastern Canada A.R.R.L. Convention, 8 Oct. 1948

By S/L S. J. BALKE

AT THE OUTBREAK OF WORLD WAR II, it was realized by the RCAF that its lines of communication would be vital to the success of the whole Air Force effort. Highly skilled personnel were urgently needed to plan, install, operate and maintain these communications. There were not nearly enough such personnel serving in the permanent RCAF in 1939 and there wasn't time to train unskilled men to the high standard essential to the efficient operation of a rapidly expanding communication network.

It was then that radio amateurs across Canada were called upon to help fill this need for practical technicians and operators. Hams required little or no training except in the special applications of communications to airborne operations. In a very short time hams became fully trained radio ground and air operators and maintenance technicians for ground and airborne radio equipment. Many went overseas with the first Canadian squadrons. Others were employed as instructors at the wireless schools and helped to train thousands of Wireless Air Gunners, Wireless Mechanics and Wireless Operators as part of the British Commonwealth Air Training Plan.

At the close of the war, most amateurs returned to their various civilian jobs and took up their radio hobby where they left off. Many new members were added to the amateur fraternity as a direct result of their previous radio training in the RCAF. A few stayed with the permanent force. When the ham bands were reopened, the air was filled with the signals of more hams than ever before.

A number of hams who had served with the RCAF got together and formed an organization known as the Air Force Amateur Radio System (abbreviated to AFARS). Under the capable leadership of Ex-Air Commodore Keith Russell, this organization began with the main aim of bringing together, through their amateur radio hobby, those ex-RCAF personnel who were interested in contacting the many friends they had made while they were in the RCAF, and any other hams who were interested in the activities of the RCAF. There was then, as now, no obligation whatsoever placed upon any AFARS member to join the RCAF, nor was it ever a recruiting campaign. Many hams who belonged to local clubs, such as the CAROA and the ARRL, became staunch supporters of the AFARS. There was then, as now, no attempt at competing with any existing organizations. Furthermore, by restricting their activities to certain frequencies, the AFARS helped to clear the ham bands.

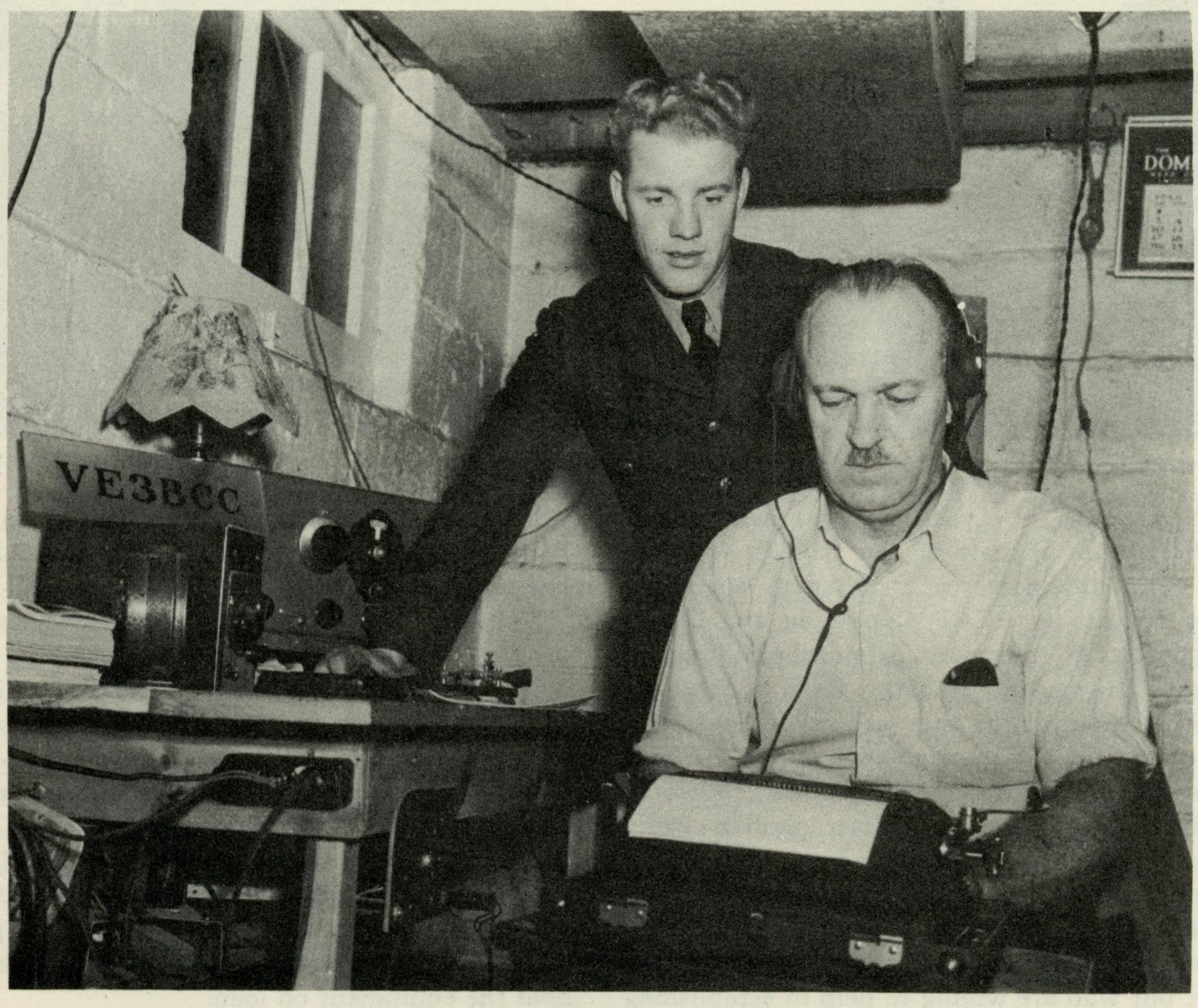
Shortly after the formation of the AFARS, the RCAF was appointed by the Canadian Government to co-ordinate all search and rescue operations in Canada, in order to meet the need for an international Search and Rescue Organization under the terms of the ICAO. Centres were set up at Halifax, Trenton, Winnipeg, Edmonton, and

Vancouver. The vital importance of communications in search and rescue operations was fully appreciated. Teletype and radio teletype channels were put into operation across Canada and to Rescue Co-ordination centres in the United States.

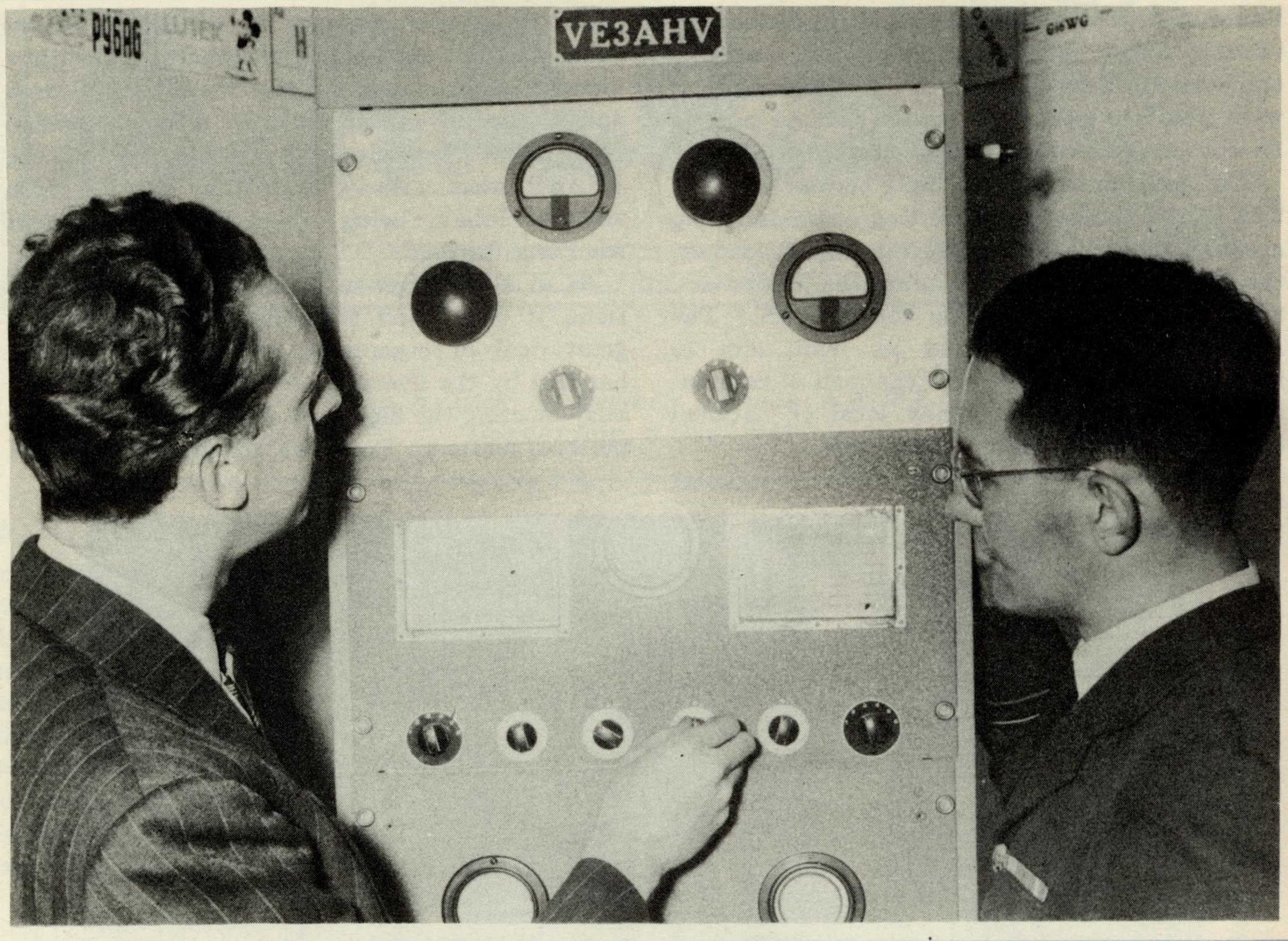
The need for additional links became evident. The RCAF contacted all existing communicating agencies, including the Department of Transport, the CNT and CPT, local telephone companies, and many others, including the AFARS. The AFARS then reconstructed its main aim to include the provision of radio channels of communication in the event of any local or national emergencies. This is now its main aim.

For the past six months the AFARS has been going through a complete reorganization with a view to eventually providing the RCAF Search and Rescue Organization with a much needed emergency communication system. To link the AFARS more closely with the RCAF, radio amateur clubs are being formed at every permanent Air Force Station.

As in all emergency communication organizations, it was found that the AFARS needed a great deal of organizing, which could not be handled by the average civilian ham who is kept busy meeting the high cost of living and by other personal matters. Therefore, the organization was



Mr. W. Smart (right), of VE3BCC, copies a message on his typewriter while LAC D. E. Fraser, of R.C.A.F. Station Toronto, looks on.



Left to right: Mr. H. M. Reid, F/L E. S. Brown. Tuning transmitter at VE3AHV.

placed in control of a radio amateur who is also the Director of Signals of the RCAF, with six other radio amateurs, each of whom are Chief Signals Officers at RCAF Command and Group Headquarters at Vancouver, Edmonton, Winnipeg, Trenton, Ottawa, and Halifax. Each of these six Area Co-ordinators, as they are called, has complete control of the management of the AFARS organization within his respective area. He works directly through two or more civilian radio amateurs who are called Squadron Controllers. The members are drawn from those civilian and Air Force radio amateurs who are interested in amateur radio not only as an extremely interesting hobby, but who are willing to help in establishing radio communications in the event of any local or national emergency. Fortunately we have not yet had a national emergency, but there have been a few local emergencies in which the AFARS has taken an active part.

Recently, the RCAF has released a frequency near the 80 meter ham band (4290 Kc/s) which will be used by designated members of the AFARS as a trans-Canada cw net frequency, using special calls. This will be the main channel in the event of any emergencies, although certain other ham frequencies will also be made available. The RCAF has also provided a limited supply of spare (not surplus) airborne transmitters and receivers which will be used as emergency sets at key points throughout Canada by AFARS members who will hold the equipment on loan.

Being affiliated with the RCAF, the AFARS enjoys a number of privileges. In the near future

it is hoped that the AFARS will become more closely connected with the Air Force Search and Rescue Organization.

This fall, the AFARS will be on the air, and we hope very soon to have sufficient representation throughout Canada to provide an organized network which will normally conduct training exercises so that it will be ready at all times for any emergency requiring speedy and reliable radio communications.

We believe that the AFARS affords one means whereby the Canadian amateur can effectively serve his community and his country, and thereby further justify the continued existence of that part of the radio frequency spectrum which his most cherished hobby now occupies.

A FEW MORE WORDS ABOUT HAMS

After referring to the RCAF's sponsorship of the new amateur radio network described above by Squadron Leader Balke, the Toronto "Globe and Mail," of Oct. 13th, proceeds with the following description of the genus Ham:—

The radio amateur—"ham" to himself and his associates—is perhaps not as fully appreciated as he should be. Because the amateur is as a rule a rather solemn and introspective fellow, speaking in a jargon almost incomprehensible to the outsider, he is usually looked upon by his neighbors with mild amusement or suspicion, or both. His house is an apparent maze of wires, dials and plugs and he stays up very late at night. A born experimenter (most of them, we would say, took alarm clocks to pieces as children), the "ham" spends nearly all his waking hours dismantling his broadcasting equipment and putting it together again—at least that's the way it seems to his wife and his friends. In between these exercises he is talking to people in such queer places as Chile and Pakistan.

For all this, the radio amateur is no feckless hobbyist or mechanical crackpot. The license he holds indicates he is highly skilled, socially responsible and prepared to serve the needs of the community when called upon. In thousands of cases radio amateurs have rendered invaluable public service. In floods, tornadoes, earthquakes, shipwrecks, explosions and other disastrous happenings, they have played gallant and selfless roles. When other means of communication are destroyed, the amateur is nearly always the only means of contact with the outside world. His technical contribution has been immense. His unceasing experimentation has led to all manner of radio improvements. Many an amateur, for that matter, is ahead of the gigantic radio industry itself in technical developments.

The growth of amateur radio in Canada, as in other democratic lands, has been nothing less than spectacular. Canada now has nearly five thousand licensed "hams" and the United States sixty thousand. There are five hundred in Toronto alone. The fraternity has no apparent social bounds. Bank managers, housewives, high school students, radio engineers, doctors, lawyers and policemen are included in its ranks. One need not be affluent to take part. Equipment ranges all the way from modest little low-powered sets to huge and elaborate setups that may fill two rooms and include television. The radio amateur is properly an "amateur" and works his hobby solely for the love of it. Which, these days, is something.

Operation Paperclip

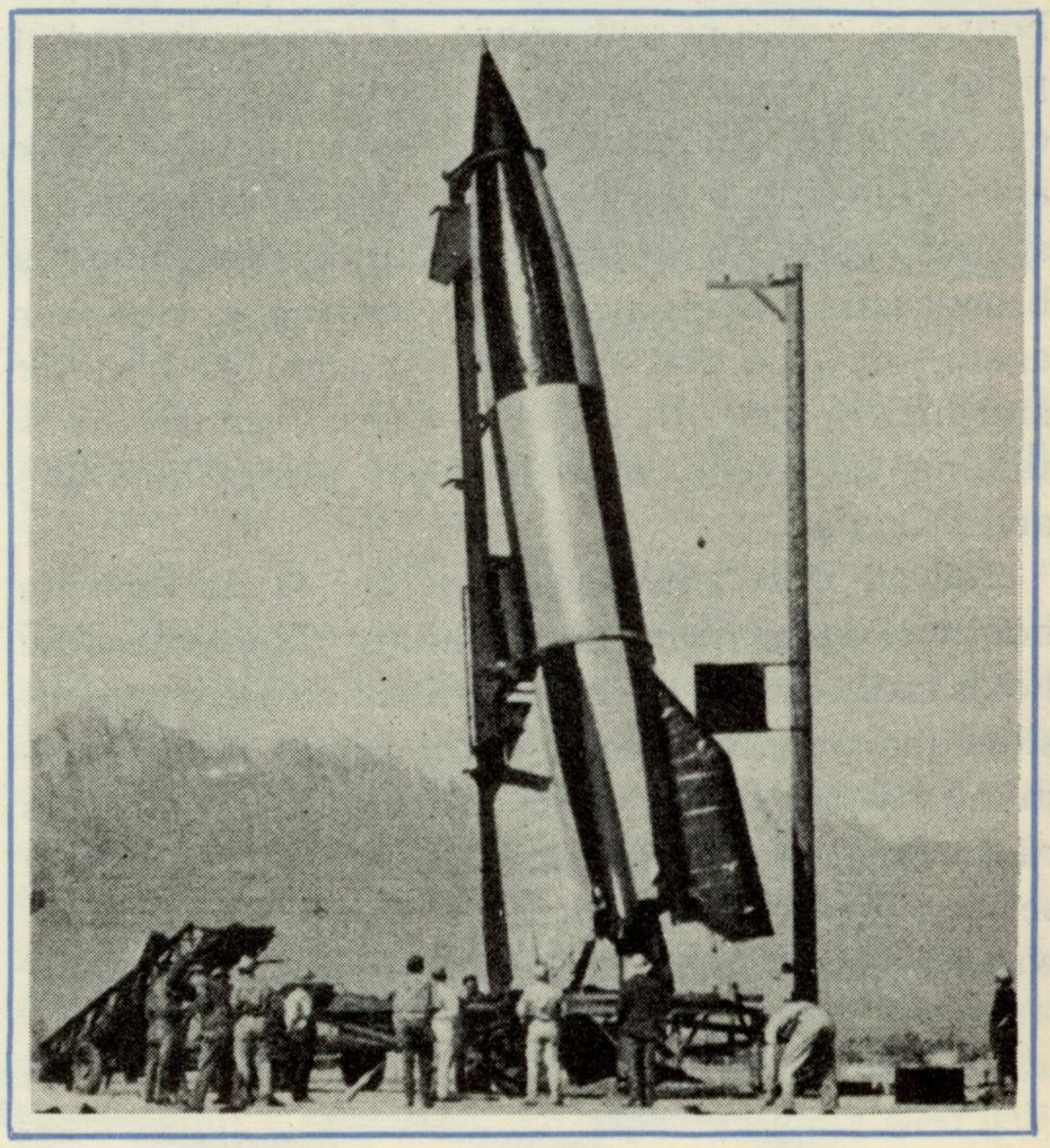
(*Reprinted by courtesy of "Interavia"*)

SINCE THE OUTBREAK OF THE LAST WAR, the world has become accustomed to the queerest of names for the plans and undertakings of the Western Allies. Logically, a code name is only useful if it is quite meaningless and does not convey the slightest indication of what is actually going on.

One of these operations, which has been proceeding quietly under the name of "Paperclip" since the end of the War, and as a matter of fact only reached the ears of the general public during recent months, began when the Americans first marched into Germany and German-occupied countries. The aim of "Operation Paperclip" was to track down and use for America's own purposes, every scientist who had accomplished something of importance in any particular technical domain.

A known fact towards the end of the War was that aeronautical research was the *pièce de rêsistance* of German science. It is therefore not surprising that this operation was particularly interested in picking up German aeronautical engineers.

And thus started one of the first postwar Allied plans. Even externally, it no longer bore the hallmark of smooth co-operation. Almost from the outset, it was a feverish race conducted according to varying concepts of fair play. Americans, British and Russians did their utmost to lure the best booty over to their own camps, and it was not long before France also began to recognise the value of such experts to her crippled industry. The object here is not to describe the various methods used in attempts to get hold of especially promising German scientists—smuggling them by night out of one occupational zone to another, or promising them money awards for their services. The methods used by the victorious countries were not uninteresting; but from their choice of scientists from different branches of aeronautical research, certain clues may be found concerning the domains which—at least at the end of the War—evinced the greatest interest.



Tests with V-2 guided missiles at White Sands, Texas, are being conducted with the help of Dr. Werner von Braun.

"Operation Paperclip," to begin with the U.S. movement, was not faced with any very great difficulties. Firstly, it was more or less organised before it started, as U.S. Intelligence had previously checked up on German research activities. Secondly, envoys from the realm of dollars did not have to run after their quarries: most of the Germans came forward of their own accord and offered their services. In this way it was possible for a first group of seven scientists to be transported secretly to the U.S.A. in September, 1945. With them went about 1,200 tons of scientific material which Air Force Intelligence had managed to gather. "Operation Paperclip" certainly set up a record, for never before were so many American scientists stuck into uniform and sent abroad. But the trouble and expense has been worth while. The list of German experts in the U.S.A. is long, and many more followed after that first sending in September of 1945. Perhaps the greatest difficulty facing the Americans was to find a loophole in the State Department's bureaucratic barrier against immigration of ex-enemies to the U.S.A. In the absence of a peace treaty, the Germans were finally made employees of the U.S. forces in Europe, on the basis of simple employment contracts, and transferred for temporary duty in the U.S.A.

A main group of German scientists is now at the big U.S. Air Force test centre at Wright Field, Ohio. They include aircraft designers, turbine and rocket specialists, aerodynamicists, parachute constructors and even special doctors, who are all continuing their research from where they left off in Germany.

Articles published during the past two years on U.S. experiments with V-2 rockets prove the keen interest displayed by the U.S. Air Force in the guided-missile field. It is no secret that these experiments have been proceeding under the guidance of German scientists. One of the formerly closest guarded groups from Peenemünde is now working under Dr. Werner von Braun at the White Sands test centre in Texas.

The conditions under which German scientists work for their ex-enemies are not exactly regal, but they are above the average living conditions in Europe. After expiry of the first six-month contract, it is usual to sign a five-year contract, which averages 5,000 dollars a year and thus offers a standard of living which can certainly not be found in Germany. And since they will be granted an opportunity to become U.S. citizens after a certain period, it is safe to guess that a good number of the German scientists will remain true to their "new" home.

* * *

By far the smallest number of German scientists was probably taken over by Great Britain. Here, too, preference was given to rocket specialists, including a series of engineers who formerly worked for the Walter concern in Kiel. It was only a few months ago that the newspapers reported an accident in this field, causing the death of the best-known German scientist in England, Dr. Schmid, formerly chief designer for the Walter-Werke.

* * *

France, who was above all interested in collecting jet-engine specialists, has obtained the co-operation of the former head of the B.M.W. turbine division, Dr. Oestrich. Another large group of specialists was sent to the south of France, to work on a big turbine project. As this project has since been abandoned, however, it is possible that the group will be dissolved and its members sent back to Germany.

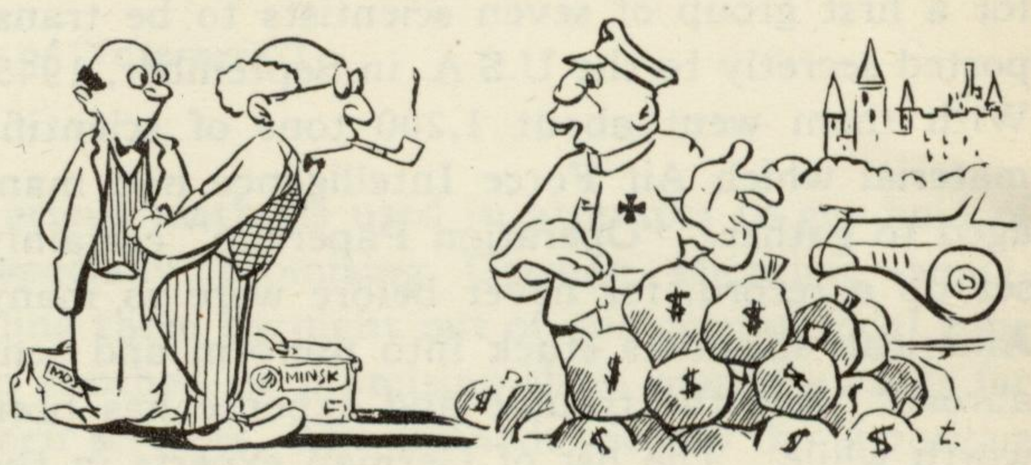
* * *

The Soviet Union had other methods of recruiting German specialists who seemed to be of use. No sooner had Berlin been occupied than a special commission began evaluating all the scientific material it could lay its hands on. Some material included lists of names which had escaped the planned destruction procedure. This gave the Russians a lead to the identities and whereabouts of many engineers. For instance, the head of the rocket development division of B.M.W. at Zühlsdorf, Berlin, Dr. K. Schnell, was hauled out of bed in the middle of the night, and dragged off with this firm's chief designer, W. Singelmann, to their

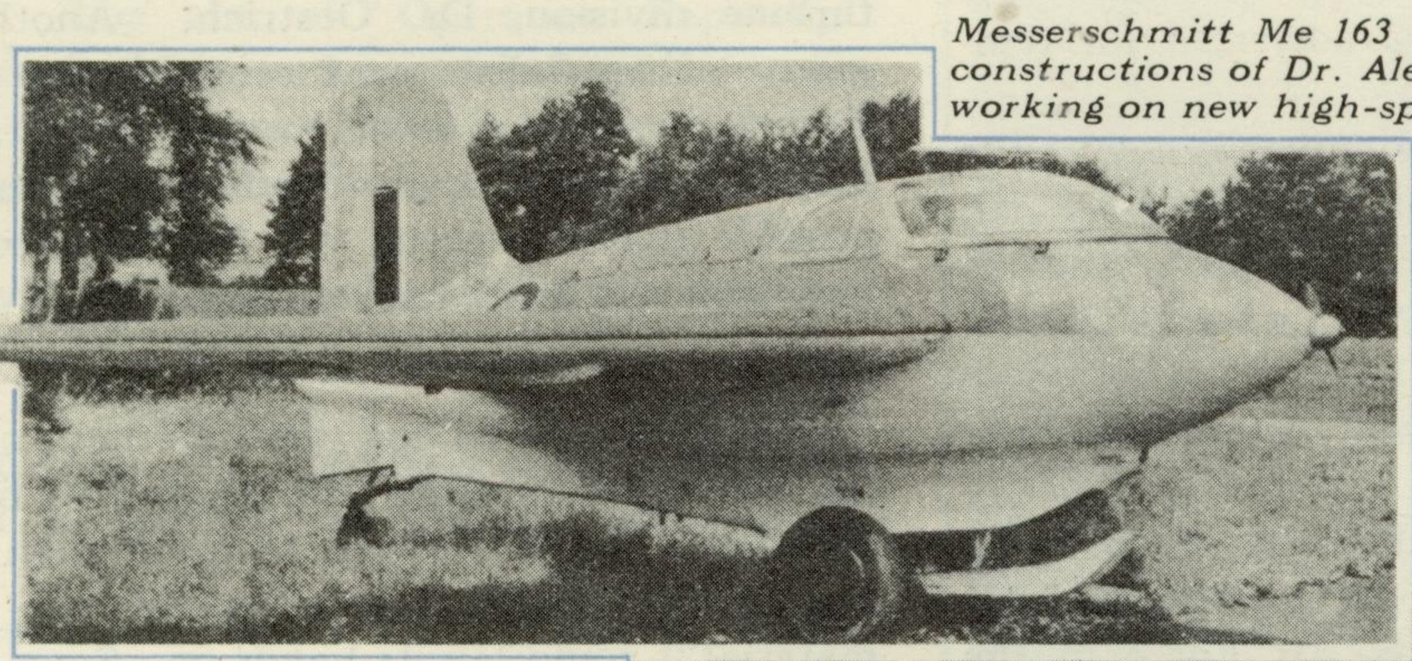
former factory. Together with a few mechanics they had to assemble, from what parts remained, rocket equipment for test bench runs. Under pressure, a number of workers revealed where finished equipment was buried under the ground or at the bottom of lakes and rivers. In this way the Russians were able to fish up one device after another, from the bottom of lakes around Berlin. The Soviet Commission was especially interested in the 109-718 rocket complement for the turbine of the Messerschmitt Me 262 B twin-jet aircraft. This apparatus, first used in March, 1945, at Lechfeld airfield, Augsburg, represents a combination of a Junkers turbine with a Walter rocket unit, and was built into the Me 163 fighter. It furnished the Me 262 with such a reserve of power (the rocket complement delivers over 4,000 lbs. thrust) that this aircraft succeeded in climbing to 50,000 feet in three minutes.

A little later the Russians established a big test centre at the former Siebel aircraft factory in Halle an der Saale, and had almost the entire Junkers development staff transferred there from Dessau and Köthen. Well cut off from the outside world, these men continued to develop airframes for supersonic aircraft, including the airframe of the Junkers Ju 287 jet project (with forward-swept wings).

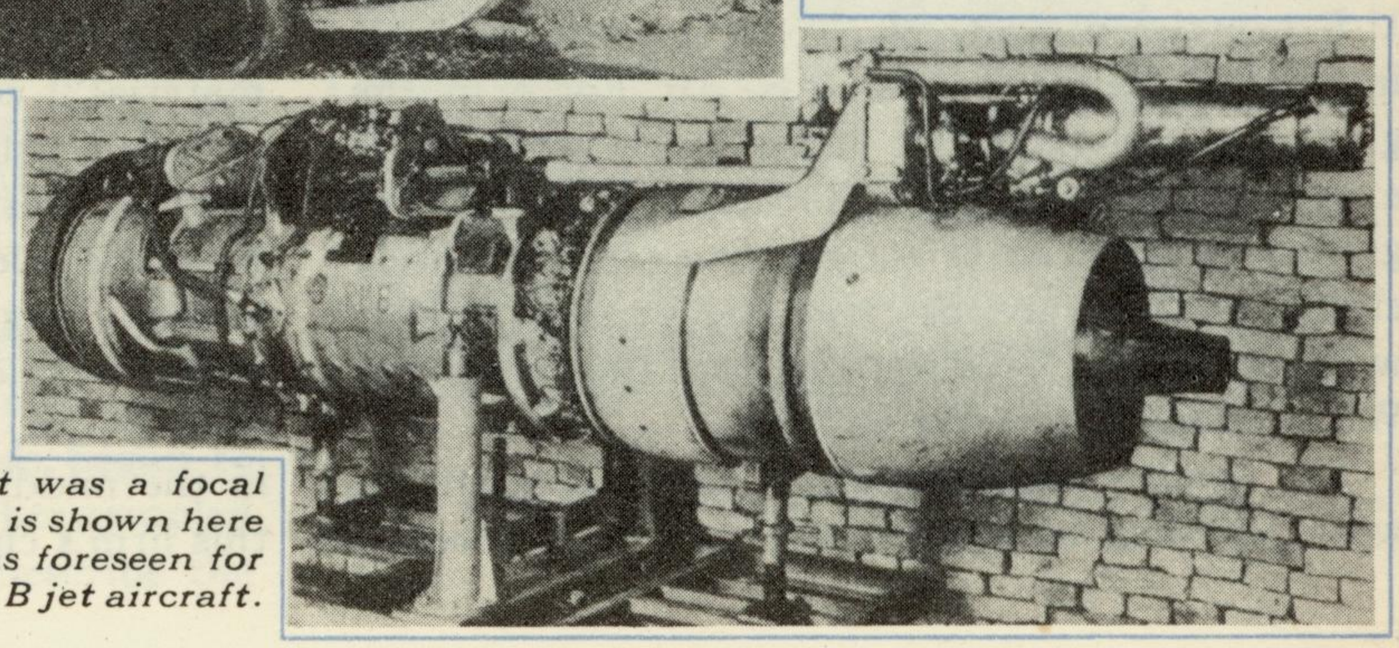
Members of the "Siebel" group, who were soon joined by former engineers from B.M.W. concerns in Spandau, Stassfurt and Munich, etc., were not only assured that they would stay in Germany and never be transferred to Russia, but were also offered princely salaries and priority living condi-



tions. According to their contributions, they were paid anything from 1,000 to 10,000 marks a month. These conditions lured many specialists from all occupational zones, though a few were chary and preferred to sign up with the U.S.A. Among these were W. Singelmann, and the two rocket experts, Gatmann and Ehrhardt.



Messerschmitt Me 163 rocket fighter, one of the last constructions of Dr. Alexander Lippisch, who is today working on new high-speed aircraft for the U.S. Navy.



The B.M.W. 109-718 rocket complement was a focal point of Russian interest after the War. It is shown here built on to a B.M.W. 003-R jet engine, as foreseen for installation in the Messerschmitt Me 262 B jet aircraft.

The "Siebel" group no longer exists today. At the end of last October it was transferred, along with many other German scientists, at a few hours' notice to various parts of Russia. Since then, little or no news has seeped out westwards; some of these scientists seem to have disappeared completely. The majority of the engineers who, under Russian orders, conducted the clean-up of the V-2 test centre at Peenemünde, were also dragged off to Russia. Nothing has been heard of them since.

It is quite impossible to give even an approximate figure for the number of German scientists employed by the Allied nations today. And it is only seldom that one hears details of their activities. However, it is fairly sure that their identities will occasionally be revealed in the aircraft, engines and guided missiles of the next few years.

H.—P.E.

Answers to Aircraft Quiz on Page 34.

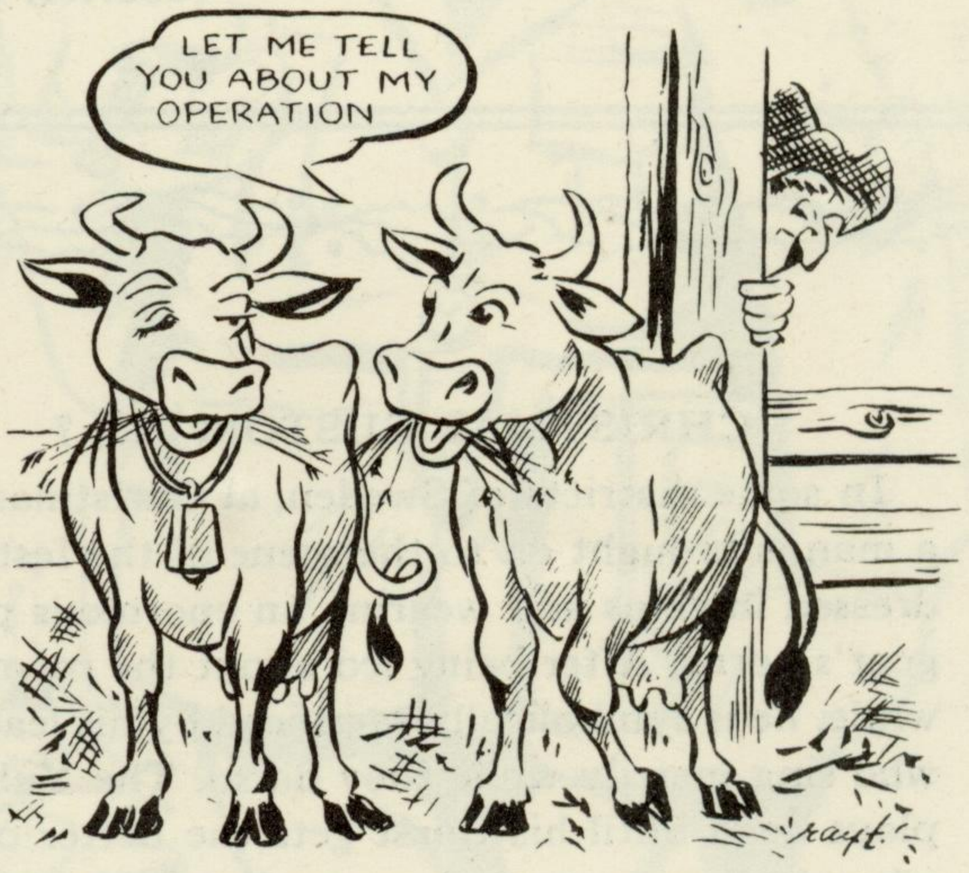
10 1L-12
11 LA-5
13 PE-8
520 Tempest VI
524 Lincoln
530 Brigand Mk. I
531 Lancastrian
532 PE-8
534 Yak-78
535 Seafire
536 Sunderland
538 Mustang P51-H
542 Firefly IV
543 TU-2

Answers to Quiz on page 20.

1:	D	2:	A	3:	C	4:	D
5:	C	6:	B	7:	B	8:	D
9:	D	10:	A	11:	C	12:	D
13:	C	14:	B	15:	C	16:	B
17:	C	18:	C	19:	C	20:	B

CHRISTMAS CUSTOM No. 6

In the Vosges Mountains, cattle acquired the gift of speech on Christmas Eve. Their conversation was highly instructional, as the future seemed to have no secrets for them. An old story tells how a farmer hid in a corner of his barn to listen to his



livestock's conversation. But it did him little good. One ox said to another, "What are we doing to-morrow, brother?" And the other replied: "Oh, nothing much. At about 14.35 hours we'll take the boss to the graveyard. Then we'll just relax." Naturally, the farmer died that night. (Bad for eavesdroppers.)

SIZE OF ATOM-POWERED AIRCRAFT

ONE of the first statements from the Fairchild Nuclear Energy for the Propulsion of Aircraft (N.E.P.A.) project has been made by Dr. Andrew Kalitinsky, the Chief Engineer. "American Aviation Daily," reporting the meeting of the Metropolitan Section of the Society of Automotive Engineers in New York recently, stated that the initial types of atomic-powered bombers would probably have a gross weight of about 300,000 lb.

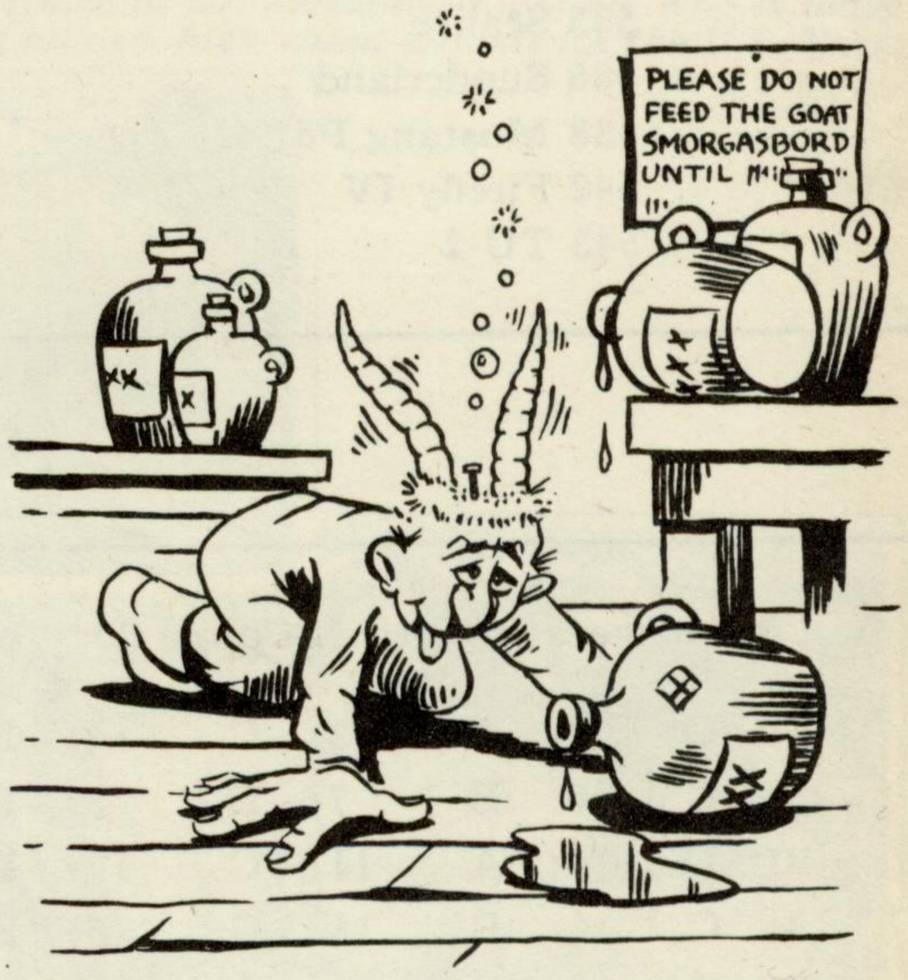
Dr. Kalitinsky added that aircraft so propelled would be able to fly non-stop to any point on the earth and return to the take-off point. One of the major problems at present is shielding the air crew from radiation; present shields are very heavy and cumbersome, but new materials and ingenious design are overcoming this problem. It is most significant that the problems associated with the development of atomic-powered aircraft are reduced to perfection of the engineering technique, and Dr. Kalitinsky made it quite clear that the programme of basic research had already established the practicability of using the new propellent.

Atomic development and research in Great Britain suffered a crippling blow when, for some reason which has never been explained, construction work was not put in hand the moment the threat of invasion was removed. We believe that work on the piles should have started when it became obvious that there would be no German invasion or at latest on VE-day. The lamentable backwardness of this country in the practical application of atomic energy for military or industrial purposes is once more underlined by the progress which is obviously being made by the Fairchild N.E.P.A., while British scientists like Dr. Watson and Sir Wallace Akers repeat that the idea of aircraft propulsion is impossible for an indefinite period ahead.

(*Courtesy of "The Aeroplane"*)

CHRISTMAS CUSTOM No. 7

In some districts of Sweden, at Christmas time, a man is brought on to the scene of the festivities dressed in skins and wearing an enormous pair of goat's horns. After being led about the room for a while, he is symbolically sacrificed by his leaders—who sing merrily while they do so. The Yule-goat plays dead until his thirst gets the better of him, when he jumps up and capers lustily from jug to jug. (Nice for the Yule-goat.)





SEND YOUR STORIES, ARTICLES, CARTOONS, AND WHAT HAVE YOU, TO :

"THE ROUNDEL"
ROOM 2540 · D.N.D. BLD'G. "A"
OTTAWA, ONT. CANADA.

The ROUNDEL