

The **CROWNDDEL**

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ROYAL CANADIAN AIR FORCE



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VOL. 2, No. 3

JANUARY 1950

★ ★ ★ **CONTENTS** ★ ★ ★

EDITORIAL

	<i>page</i>
Attend "C" for Shatterproof.....	1

ARTICLES

No. 400 City of Toronto Squadron.....	3
Armament Staff—At Your Command.....	7
You're on the Glide Path—I Think.....	16
Stalag Luft III: Part 3.....	20
The U.S. Looks At Britain's Aircraft.....	36
The Motion of a Hand-Held Camera.....	41
Avro Orenda Jet Engine.....	43
Miniature Pulsejet.....	44

REGULAR FEATURES

The Royal Canadian Air Cadets.....	12
Have You Seen These Posters?.....	27
R.C.A.F. Association.....	28
What's the Score.....	34
The Dimmer View.....	47

MISCELLANY

Goblin 600-Hour Life.....	11
One Vital Control.....	15
Jet Tunnel.....	33
Tracers.....	40
Celestial Robot.....	46
Pilot Ejection.....	46
G!.....	48
Letters to the Editor.....	48

This Month's Cover

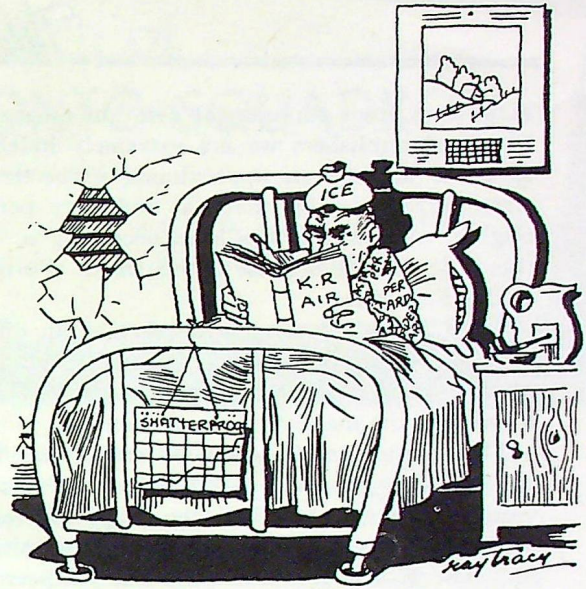


Cover photograph shows a Mustang aircraft being bombed-up at Watson Lake, Y.T.

A modified tail jack is being used to hoist the bomb.

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ATTEND "C" FOR Shatterproof



Word has recently been received from Sgt. Shatterproof's Commanding Officer that our redoubtable champion of the "boys in the field" fell prey to an unfortunate attack of oyster colic during the recent holiday season. The devastating effects of this disorder, coupled with an overdose of the brew which is apparently part of the ritual of the Christmas oyster, completely inactivated the old warrior. We must confess that we were somewhat taken aback to discover, after discreet enquiries, that it is common custom for members of the hinterland messes to indulge in this odd form of revelry. Whether it is in keeping with the traditions of the mistletoe season we are not prepared to say, since, to the best of our recollections, we have never participated in such festivities.

Latest reports indicate that Shatterproof is up and about and is soon expected to recover. Meanwhile, however, he must refrain from any serious literary endeavours, and has forwarded his apologies to his many supporters and his best wishes for the New Year.

The absence of Sgt. Shatterproof's usual words of wisdom may be a blessing in disguise for it provides us with an opportunity to substitute some thoughts of our own that have accumulated during the fifteen months that "The Roundel" has been in existence. Our remarks will perhaps be particularly appropriate since they will appear at a time when almost everyone pauses briefly to survey the ground that has just been covered and then sets forth, it is hoped, with fresh enthusiasm.

* * *

The policy of "The Roundel" as it was first conceived has changed little, if any, during the magazine's brief history. Essentially, the original plan contemplated a publication which would serve as an official journal for all ranks of the R.C.A.F. and which would provide a medium for

the presentation of miscellaneous educational and training topics. In other words, even before birth your magazine was destined primarily to be a serious undertaking. That this foreboding prospect has been somewhat mitigated may be attributed to the intervention of Sgt. Shatterproof, who so strongly protested the weighty fare that was to be served from month to month.

Many suggestions—and not a few denouncements—have been received since our first issue appeared in November, 1948. Needless to say, constructive remarks will always be welcome and are appreciated. Many suggestions have been adopted, while others, although perhaps quite sound, were based on a premise which was not in accord with the aims of "The Roundel," and consequently had to be discarded. Often, because of the limited size of our staff, it has been impossible to institute those new ideas which so readily spring to mind and which require extensive travel and research to develop.

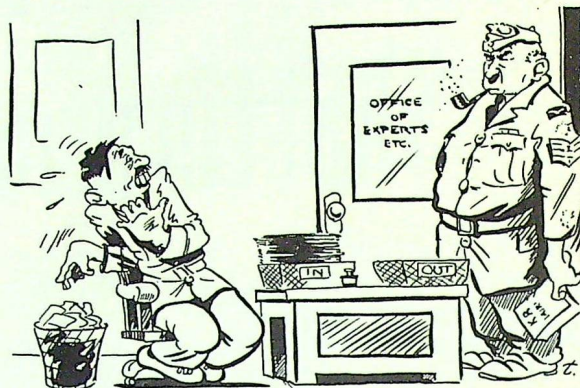
This latter fact has been the most unfortunate bridle to our progress. We are neither roving reporters nor trade specialists, and consequently must rely upon other sources for material. It was decided at the outset to glean much of our tech-

The Roundel

nical data from commercial aviation magazines, to whose publishers we are extremely indebted, so as to achieve an approximate proportion of sixty percent reprint material and forty percent original. At times it has been necessary to vary this ratio, largely because of the dearth of original R.C.A.F. articles.

"The Roundel" cannot function as an official Service journal if it must continually fall back upon sources which are foreign to the R.C.A.F. to provide the majority of its contents.

The solution to this dilemma rests, then, with those many of our readers who could make valuable contributions but who, as yet, have not done so. There is a wealth of subjects suitable for "The Roundel" which have not yet been explored, and which merely await the pen of the



specialist or the man with the idea. It will only be by such means that "The Roundel" will eventually materialize as a true image of our Service.—THE EDITOR



SUBSCRIPTIONS

We have been deluged during recent months by readers' enquiries regarding subscription rates for "The Roundel." Unfortunately, there are no means by which "The Roundel" can be purchased, and its distribution at the present time is limited to R.C.A.F. (Regular) units, Royal Canadian Air Cadet Squadrons, members of the Royal Canadian Air Force Association and Branches of the Canadian Legion.

Historical Sketch of No. 400 CITY OF TORONTO SQUADRON

(Prepared by the Air Historical Section)

(The article which follows is the first of a series of R.C.A.F. (Regular) and (Reserve) squadron histories which will appear in "The Roundel"—Editor)

THE CITY OF TORONTO SQUADRON, originally known as No. 10 Army Co-operation Squadron, was formed in October, 1932, and was the R.C.A.F.'s first auxiliary squadron. In 1937, when the auxiliary units were renumbered, No. 10 became No. 110 Squadron. Its first Commanding Officer was Squadron Leader (later Air Commodore) G. S. O'Brien, A.F.C., who was succeeded in 1935 by Squadron Leader (later Air Marshal) W. A. Curtis, D.S.C. On the outbreak of war in September, 1939, Squadron Leader (later Air Commodore) A. H. K. Russell was C.O., and Flight Lieutenant (later Air Commodore) G. N. Irwin was second in command.

On 25th February, 1940, No. 110 Squadron landed in England, the first R.C.A.F. squadron to go overseas on active service. Before embarkation it had been combined with No. 2 Army Co-operation Squadron of the Regular Force, under the command of Squadron Leader W. D. Van Vliet, who thus became the first Commanding Officer of the R.C.A.F.'s first overseas unit.

On arrival overseas, the squadron proceeded to Odiham and began intensive training on Lysanders. Earmarked as an army co-operation unit, it spent long months in training with very little action. Although the squadron was not operational at the time of Dunkirk, some of its ground crew personnel were used to service aircraft which were protecting the withdrawal of the B.E.F. from Dunkirk. To the eager pilots, tactical exercises with the Army were not an inspiring substitute for real operations, and in the summer of 1940, following Dunkirk, many of the pilots transferred to Fighter Command to participate in the Battle of Britain.

On 1st March, 1941, a new block of numbers was allotted to the R.C.A.F. overseas and the squadron was renumbered "400". Shortly after receiving its new number the now out-dated Lysanders were replaced by Curtiss Tomahawks. Again in June, 1942, the Tomahawks gave way to Mustangs, a single-seat, highly manoeuvrable American fighter aircraft. For almost 30 months the squadrons of Army Co-operation Command spent their time in watchful waiting. The time was not wasted and it is a tribute to such Commanding Officers as Wing Commanders W. D. Van Vliet, E. H. Evans, R. M. McKay and Harold W. Kerby that the situation, necessary as it was, was borne with so much fortitude and patience. Early in 1942 Wing Commander Kerby transferred to Bomber Command and subsequently became Commanding Officer of an R.C.A.F. Wellington Squadron until



The first contingent of No. 400 Squadron arriving in England in 1940.

he lost his life on a bombing mission over Hamburg in the summer of 1943. When Wing Commander Kerby left No. 400 Squadron, Wing Commander R. C. A. Waddell took over command.

While the reconversion to Mustangs was taking place, a matter of several months, the squadron was stationed at Middle Wallop and had an opportunity to do some reconnaissance sorties off the French Coast, during which the pilots attacked enemy gun positions, transport barges and aerodromes. The first operational sortie was carried out by Wing Commander Kerby and Pilot Officer J. O. H. Jackson, who reconnoitered a section of the French coast and attacked an enemy gun-post.

In August, 1942, came their first large job—Dieppe. Here the experience obtained in many army co-operation exercises became invaluable. For nine hours the Mustang pilots, working in pairs, patrolled the roads leading to the battle area, watching for troop movements. Half of the army reconnaissance work at Dieppe on 19th August was done by R.C.A.F. pilots.

After Dieppe they continued with day intruder sorties and accumulated an enviable score of locomotives and transport vehicles destroyed or damaged. On 7th November the first successful air combat was fought when Flying Officer F. E. Hanton shot the tail off a Me. 109 over the French coast.

In December, 1942, the squadron moved to Dunsfold where it continued its train-busting and transport strafing sorties.

In April, 1943, Flying Officer D. M. Grant of Ottawa, who later lost his life on a similar exploit, strafed a flying school near Paris, destroying a Dornier 217. "Bitsy" Grant was one of the most successful "train-busters" in the Toronto squadron and had well over 30 locomotives to his credit when he was killed in September 1943. In May the squadron as a whole put 26 locomotives out of action including 14 within a period of two days.

At midnight, 31st May, 1943 Army Co-operation Command ceased to exist and the Mustang squadron joined Fighter Command, only to become a part of 83 Group in the Second Tactical Air Force a short while later. Late in December,



The late Honourable Norman McLeod Rogers, then Minister of National Defence, inspecting the ranks of The City of Toronto Squadron in England early in 1940.

1943, it began to re-equip with Spitfires and became a photographic reconnaissance unit working at levels of 30,000 feet and more. One of its tasks at this time was to photograph the sites which the Nazis were constructing in the Pas de Calais for their V-1 Campaign against England.

An outstanding example of the type of work done by No. 400 Squadron at this time is shown in the story of the photographs taken preliminary to a bombing mission over Amiens in February, 1944. The aim of the raid was to blast a wall of the great prison there in an effort to facilitate the escape of important Allied prisoners. After several days' delay due to bad weather, four pilots of the City of Toronto Squadron set forth on 20 February to get low level photographs of the prison. They crossed the English Channel and on nearing Amiens flew at deck level, taking a variety of photographs from different angles of the prison wall and buildings. Flight Lieutenant A. S. Collins, D.F.C., of Renfrew, who led the sortie, was later congratulated for his fine navigation despite the handicap of bad weather. After the photographs were taken the four aircraft headed back to England, still flying close to the deck. By this time the flak posts had been aroused and they met heavy opposition on the return trip. Two of the aircraft had their cameras shot up but all the film was preserved and the pictures obtained were invaluable for planning the raid. Other pilots on this operation—the last



"Percussuri Vigiles". Left to right: Flt. Lt. P. G. Wigle, Leamington, Ont., Flt. Lt. H. E. Walters, Bloomfield, Ont., Flt. Lt. G. H. E. Maloney, D.F.C., Riverside, California, Flt. Lt. J. A. Morton, Godsbury, Alta., F/O J. J. Greenwood, London, Ont., and Flt. Lt. T. Tumman, Foxboro, Ont.



No. 400 Squadron overseas. Left to right: Flt. Lt. J. Fox, Toronto, Ont., Flt. Lt. J. McMillan, Peterborough, Ont., F/O P. Barton, Oshawa, Ont., F/O G. Hozy, Scarborough, Ont., Flt. Lt. L. Aldworth, Waterloo, Ont., Flt. Lt. D. Graham, Ottawa, Ont., and F/O J. Dew, Flint, Michigan.

sorties carried out by the squadron on Mustangs—were Flight Lieutenant "Gus" Garry, Flight Lieutenant A. A. McKiggan and Flight Lieutenant W. H. Godfrey.

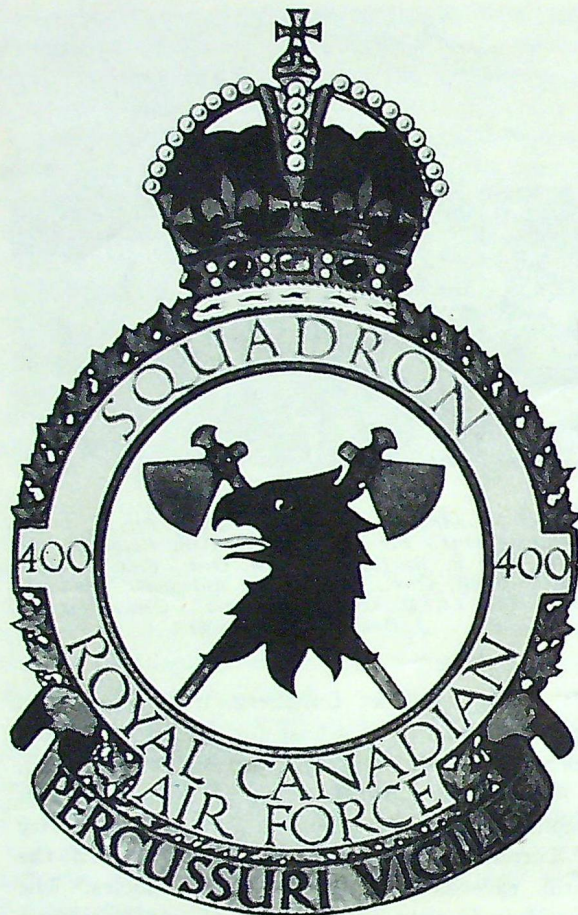
In the weeks immediately preceding D-Day the squadron photographed the invasion coast, producing evidence that was most useful in the planning of that great operation. After D-Day it moved across the Channel to Bayeux, France. On one occasion in July after seven days of foggy weather during which no sorties could be made, the first opportunity to take pictures was seized by Flight Lieutenant G. H. Maloney, D.F.C., an American, who flew to the enemy lines and took excellent pictures which showed new trenches and defences put up by the Nazis. The squadron contributed pictures of enemy airfields, rolling stock, railroads and bridges, noting spots suitable for operations.

The period before the Rhine Crossing in March, 1945, was devoted to the collection of information and the spotting of enemy movements and defences. After the crossing, No. 400 penetrated deeper and deeper into Germany. At the end of the war it was one of three squadrons of No. 39

(R) Wing based at Luneberg, the deepest spot used in Germany as a base for our aircraft. Here the squadron was disbanded on August 7th, 1945.

Although a complete score of the numbers of locomotives and transport destroyed by the City of Toronto Squadron has not been compiled, the total exceeds 150 engines and vehicles. The squadron is also credited with 11 enemy aircraft destroyed, three probably destroyed and nine damaged. Although this total may not look very impressive at first glance it must be remembered that 400's pilots were busy with reconnaissance work; it was their job to bring their information back to base, not to go looking for trouble with enemy fighters.

High scoring pilots of the squadron were Flight Lieutenant Frank Hanton, D.F.C., of Kenora, Ont., who is credited with 35 enemy locomotives and two enemy aircraft destroyed, Flight Lieutenant Alan Carlson, D.F.C., who was credited with two enemy aircraft and nine locomotives at the time of his award, and Flying Officer D. M. Grant, D.F.C., whose name has been mentioned above. Flight Lieutenant Paul S. Barton, D.F.C., of Oshawa was decorated for his



The Squadron Badge

outstanding work in photographic duties. His citation tells the story; "In March, 1945, Flight Lieutenant Barton was detailed to photograph an area in the Rees sector. During the operation much anti-aircraft fire was directed at his aircraft. In spite of this, he successfully completed his task and then, acting on his own initiative, went on to reconnoitre the whole of the Rhine River between Emmerich and Wesel. In this well executed sortie, he displayed skill, courage and coolness of a high order." Other pilots decorated for their work with the Toronto squadron were Squadron Leader M. G. Brown who won a Bar to his D.F.C., Wing Commander R. C. A. Waddell, Squadron Leader W. B. Woods, Flight Lieutenants



Airmen of No. 400 Squadron signing up for summer camp.

H. P. Peters, J. A. Morton, E. E. Tummon, and G. S. Brown, all of whom received the D.F.C.

The first auxiliary squadron of the Air Force to go overseas, No. 400 was the first Reserve squadron to re-organize in peacetime (in April 1946) and will continue to be known as the City of Toronto Squadron.

It is of interest to note that the squadron produced one Air Marshal—the present Chief of the Air Staff; three Air Commodores—G. S. O'Brien, G. N. Irwin and A. K. M. Russell, and at least five Group Captains—including "Bunt" Waddell, who holds the D.S.O. and D.F.C.

The squadron badge, approved by H. M. the King in September, 1942, depicts an eagle's head in front of crossed tomahawks, with the motto "Percussuri Vigiles"—On the Watch to Strike.



Armament Staff - At Your Command!

by AIR VICE-MARSHAL E. D. DAVIS, C.B., O.B.E.

(Reprinted by courtesy of "Air Clues")

"There were five of us, and when you have read this short but by no means comprehensive story, I think you will agree that we were kept fairly busy." In these words the author characterizes the activities of a command armament staff in war. In 1935-1936, Air Vice-Marshal Davis was chief Armament Experimental Officer. A. & A.E.E.; then, until 1940 was Assistant Director of Research and Development (Armament) in Air Ministry; and for eighteen months, during 1940-1941, was Command Armament Officer at Bomber Command Headquarters.

WAY BACK in the early '30s, a question frequently asked was: "What are the duties of a command armament officer in war?" It was quite an important question as the strength of the armament staff naturally depended on the answer, and this, in turn, affected the number of officers to be trained.

Here are a few of the typical replies and the counter-arguments:—

"To advise the staff on operational matters."

"Oh no; the groups are the operational formations. Command is only administrative, so he will have nothing to do with operations."

"To organize armament supplies."

"Oh, no; that is a matter for the Equipment Branch."

"To deal with modifications to equipment."

"Oh, no; that is for Maintenance Command."

"To organize armament training."

"Don't be silly—there will be no training in operational commands; all that will be done by F.T.C."

So, you see, there was just nothing for the C.Arm.O. to do—in fact, armament didn't count for much. But let us see what he and his mates had to do when the time came.

Phoney—but a godsend

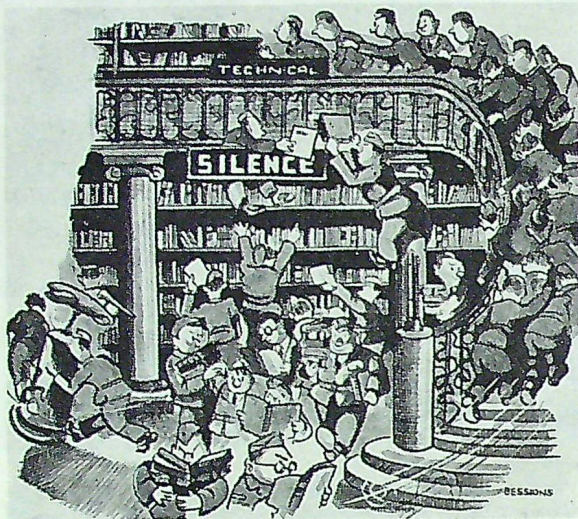
I was at H.Q., Bomber Command, from January, 1940, to July, 1941, and this period

covered the phoney war, the start of real ops., and the "groping stage" whilst we were learning from experience.

The first few months' phoney war were a godsend as they permitted detailed visits to groups and units and the establishment of close personal touch. The feeling that Command Headquarters was a mysterious ogre remote from operational units was, therefore, eliminated. This period was devoted also to improving minor matters of technical administration and effecting a reasonable standardization of procedure within the Command. Thus, when the real war started, we were in fairly shipshape and tidy order to meet coming events.

"Real" preparations

So now on to the real war. The Command Air Staff soon wanted to know what our weapons could and could not do and the best method of attacking various types of targets. There was mighty little information readily available, so it meant chasing around sources of technical knowledge such as the Ordnance Board, Ministry of Aircraft Production, and elsewhere, collecting data on penetration, blast, fragmentation, and delays, and then compiling a brochure on bomb performance for the Air Staff. Study was made of special targets, such as floating docks, dams of various types, and canals, and memoranda written on the methods of attack, types of bombs and



... chasing around sources of technical knowledge ...

fusing, and the likelihood of success. Concurrently with this, which was an ever-recurring task, was the study of ideas which came pouring in from every source, service and civilian, on the best way of winning the war.

Then trial . . .

Very soon our major technical headaches started—failures to release; and according to the type of aircraft the troubles were traced to such causes as icing-up, electrical, or errors in manufacture. In all cases immediate modification of some sort or another was urgently required, and there was no maintenance organization on a sufficiently large scale to compete with the task. I remember one such failure necessitated a two-hour job on every release slip. Just imagine it as an urgent job—two hours per slip, 36 slips per aircraft, 10 aircraft per squadron, and two squadrons per station, making 1,440 man-hours all told, if everything went well, exclusive of spare S.B.C.s having another three slips each.

... troubles . . .

We had our gun troubles also, and each one had to be investigated, but the vast majority could be attributed to the human factor and not to technical

defects. In fact, guns, sights, and turrets gave almost no worry, and failures sprang from minor errors such as forgetting to load, incorrect assembly, or even carrying as “gunners”, pilots, w/ops., and others who had never fired a gun in their lives. But human nature is human nature, and that’s all there is to it.

... and tribulations

Oh, yes, then we had our ever-present tribulation—the electrics of bomb releases. You must remember that our aircraft were designed for daylight ops., when there would be no difficulty in operating selector switches, master switches, and the like. But when night ops. were *de rigueur* the story was vastly different, and to simplify manipulation we were constantly making modifications or designing devices to avoid unintentional errors in operation under conditions of strain and darkness. I would mention that electrics of all kinds became so involved that we recommended, and the Air Ministry approved, the introduction of specialist electrical officers, who would be responsible for the maintenance of all electrical installations, and who would have a major interest in the initial layout of the circuits in the new designs of aircraft. The latter function was of great importance as, up till then, electrics had, like Topsy, just “grewed”, and had not been “designed” in the true sense of the word.

Wrapped up with this electrics story was the ever-changing Air Staff requirements for mixed loads of H.E. and incendiary. To meet these, we rewired or rearranged the wiring of Whitleys, Wellingtons, Hampdens, and Blenheims at least three times each. This was, of course, a major undertaking on every occasion as aircraft on the production line were affected as well as those in units or in storage.

Yet another major job was modifying the wiring of the S.C.I. to enable it to be operated on standard release switches instead of the original “bastard” arrangement that was sure to fail in emergency.

Leaflet orders

All this reminds me of Bomber Command Armament Staff Instructions. We found that issuing instructions in letter form was most un-

satisfactory as letters got mislaid or omitted in the hand-over from one station armament officer to another. So we introduced an indexed volume called B.C.A.S.I. in which staff or technical orders concerning armament were inserted. No amendments as such were issued; but if a change of instructions were needed, a complete new leaflet was prepared, the old order being extracted and destroyed. We kept a large supply of spare copies ready for issue to new units, and you can well imagine that the task of original publication plus the keeping of spare copies up-to-date was a major undertaking. *And* we kept all other commands at home and abroad, which were equipped with similar aircraft, supplied with the latest editions and amendments, or issued copies to them if they rearmed with such aircraft. You see, we were not parochial in those days.

Trouble in store

There was, of course, the permanent headache of where to store the vast supply of bombs, incendiaries, chemical and other weapons that overflowed from the totally inadequate bomb store and



... bombs ... overflowed from the totally inadequate bomb store ...

had to be distributed around the aerodrome at safe distances and yet be easily accessible. As the engineers were similarly afflicted in disposing their petrol, oil, glycol, and so on, and we had to take into account the prevailing wind, enemy attack, and fire risk, we had lots of fun.

Photographing the bomb-burst

It wasn't long before night photography of bomb-burst loomed to the fore; an application of photography totally disregarded before the war. It was a neat little problem of damned awkward ballistics: we still wanted to get our incendiaries, with their poor ballistics, to coincide with the H.E. bursts, but, at the same time, to get the photographic flash, with its even worse ballistics, to burst just off the edge of the camera field at a height proportional to the release height. The problem was further complicated by the limited number of selector switches and studs on the distributor. Weren't we thankful when the pre-selector or "Connell box" came into service and helped to solve this and all other "wiring sequence" problems!

Also, we got embroiled in the interpretation of night photographs and intelligence reports. Is that a bomb burst? Why should searchlights look like that? Why does ground tracer appear like that? Why, in some cases, should bomb-aimers report green flashes on bomb-burst, but blue in others? What is the envelope of fire of A.A. guns? And so on, *ad infinitum*.

Writing about photo-flashes reminds me of the original pattern flare-chutes. What shockers they were! Put the flares in by hand and push 'em out with your feet—quite exhausting in the dark at 18,000 feet without oxygen, and a procedure not conducive to reliable fuse-functioning. So we designed the multiple flare-chute with E.M. releases. From the "bright idea" to the trials of the 3-ply mock-up at Benson was five days—not bad going, I think you will admit.

No man can serve two masters

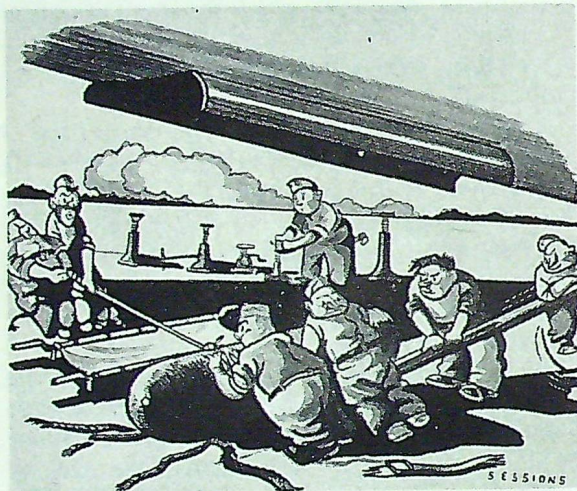
Air Staff—yes, they were a headache to us at times. They would change the "target for tonight" two or three times a day; which meant that the poor armourers at units armed, loaded, unloaded, and unarmed something like 500 bombs per diem. This was asking too much of willing horses, but it took many, many months of persuasion to convince the Air Staff of this.

I think you will notice how every task I have mentioned had an operational bearing, and this

led to a major victory for the armament staff. Originally we were partly A.O.A.'s staff and partly S.A.S.O.'s; but you doubtless recall the Good Book's advice about a man serving two masters. So, after several weeks of discussion, it was agreed that we were AIR STAFF: at long last we had got where we wanted and where we ought to have been all along. We were "users", not "suppliers".

Heavier bombs—weightier problems

Of course, there were incidental jobs like devising hoisting and handling gear for the heavier bombs as they came along (an aspect often for-



... devising hoisting and handling gear for the heavier bombs ...

gotten by the bomb designers). And, naturally, we were pretty active when new weapons such as W bombs, mines, razzle (you remember these doubtful incendiaries for setting fire to crops?), or new fuses, were introduced, complete with all their "ironmongery" to effect release. There were inevitable modifications, consequent upon hasty trials, and, of course, everything was highly urgent. Add to this, odd jobs like preventing tails from falling off S.A.P. bombs, testing experimental fuses for photo-flashes, and investigating failures of long-delay pistols, and you will see that even operational commands turned quasi-experimental at times.

There were such items, too, as devising tables or graphs for methods of bombing on a glide, as the sights of those days were not stabilized and could not compete with such tactics. Moreover, we were actively interested in the development of the Mk.XIV C.S.B.S. to replace the Mk. IX and A.B.S. Another side-line was finding suitable ground gunnery ranges where air gunners could fire at ranges up to 400 yards to keep them "gunnery conscious".

Guns to the right of them . . .

This question of gunnery recalls that hectic period when, the Blenheim's defensive armament having proved inadequate, requests poured in for guns in the engine nacelles, guns in the tail, guns underneath, and more guns on top. Most of the suggestions were quite useless because the guns were unaimable; but the ideas had to be sorted out and carefully weighed before major modifications were recommended to the Air Ministry.

Touching on training

Although training was not a direct function of the armament staff, we were consulted every day upon some aspect or other of it, and frequently training staff used us as their stalking-horse. Methods of harmonization, self-towed targets, "shepherd shooting" areas—all came to the C.Arm.O., as did new bombing ranges, infra-red bombing targets, and the like.

Also, we started operational research in a way, as inspection of combat reports disclosed considerable divergence between numbers of engagements on moon and non-moon nights and between the various types of aircraft in the Command. We did no more than nibble at this, for, shortly after we started, the O.R.S. proper was formed and the job passed to them.

The Five and their functions

Our total staff? Well there were five of us, and when you have read this short but by no means comprehensive story, I think you will agree that we were kept fairly busy, and yet found time to visit groups and units, attend meetings at the Air Ministry, R.A.E., or M.A.P., or call on other

formations. And we still had time to laugh—much to the chagrin of our more sedate neighbours in the sigs., int., or nav. offices—when Sam, Bill, or Twig cracked the most recent merry quip from town.

I will end my story here, hoping that its telling will stimulate other command armament officers to recount their worries or to take over where I have left off. But before closing down, let me try to sum up. Very briefly, it can be said that the armament staff had two correlated functions: the first, to advise the Air Staff on the potentialities and limitations of weapons and the best method of their use; the second, to ensure that the weapons and equipment did the job required by the Air Staff. To fulfil these functions meant that the duties were many and varied, covering the operational, technical and human fields.

As this story shows, among the major tasks were the collection and dissemination of data concerning the performance of weapons and advising the Air Staff on the application of weapon power; the modification of equipment to meet changing operational needs or to reduce the chance of human failure; the investigation and rectification of defects; the introduction, storage, maintenance, and preparation of new weapons and their use in the air; reviewing Air Staff requirements and weighing them against the national effort involved in production, and, lastly, helping to maintain training efficiency. Add to this list the day-to-day problems too numerous to mention and you will have some idea of the arm. staff's life.

What's that you say? What *were* the duties of the C.Arm.O.? Tell him, someone, *please!*



Goblin 600-hour Life

FOLLOWING THE SUCCESSFUL series of 500-hour trials to which Goblin 2 engine No. 1761 has been subjected during the past twelve months, this type of engine has been approved by the Ministry of Supply for an overhaul life of 600 hours—the longest life for any turbine so far. The overhaul life of 600 hours is subject to inspection of the combustion equipment and renewal of the flame tubes, where necessary, at 300 hours and routine maintenance inspections in accordance with the current official servicing schedule. The tests were carried out without the addition of lubricating oil to the fuel.

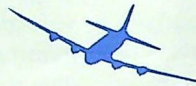
Almost exactly seven years have passed between the first run of the Goblin prototype and the shutting-down of production engine No. 1761 at the end of 1,000 hours of combat-simulated

running at Hatfield. In terms of aero-engine development, seven years is not a long time, and it is creditable that in such a short space of time a degree of reliability very nearly equalling the best of the more established forms of power unit, should be achieved.

When comparing the 600-hour life of a turbine with that of a piston engine, it must be remembered that the maintenance cost, in terms of man-hours, of the gas turbine is not only less at the complete overhaul, but is correspondingly lower than that of an equivalent piston engine throughout the service life. That has been the experience of the R.A.F., and of the de Havilland engineers during the Goblin's endurance runs. This saving must reflect itself in the cost of operation.

(“The Aeroplane”)

The ROYAL CANADIAN AIR CADETS



Mr. D. Alex Ross, the Air Cadet League president, recently completed a coast-to-coast tour in the interests of the Air Cadet movement. Mr. Ross attended the annual meeting of each provincial committee during which the activities of the past year were reviewed and new plans were laid for 1950.

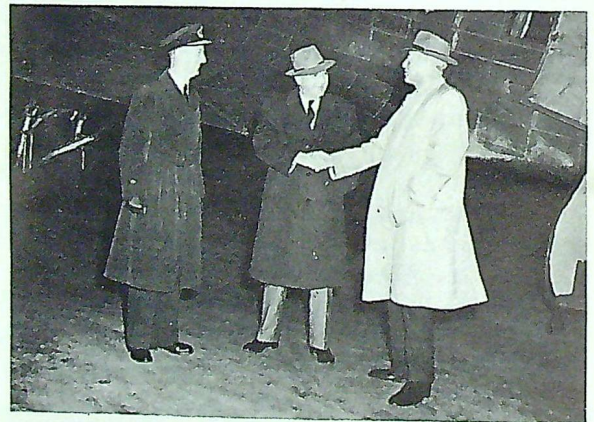
His extensive travels gave Mr. Ross the opportunity to judge the present status of the Air Cadet movement as a whole. At one of the final provincial meetings, he concluded: "All across Canada, interest in Air Cadets is on the upsurge. In every province there is a demand for new squadrons, and a number of established units have been forced to set up waiting lists in order to accommodate the great numbers of young men anxious to enroll. There is no doubt that the Air Cadet League has attained a high position in Canadian life."

Probably the most important announcement made by the president during his tour concerned Air Cadet medical examinations. Although many details remain to be worked out, the general plan may nevertheless be roughly outlined.

The Air Cadet League, in co-operation with the R.C.A.F., is instituting a programme under which every Air Cadet will be given a thorough medical examination at least once a year. The results of these examinations will be carefully recorded and retained on file by the League. In cases where the medical exam discloses a disability, parents will be notified and encouraged to arrange for the necessary treatment.

The plan is being drawn up under the direction of the League's medical consultant, Dr. J. W. Tice, of Hamilton, Ont. Dr. Tice headed the R.C.A.F. medical branch during the war and is an internationally known expert on aviation medicine. He will be requesting the assistance and co-operation of R.C.A.F. (Regular) and (Reserve) M.O.'s, honorary M.O.'s attached to Air Cadet squadrons and Department of Transport Medical Examiners across the country.

It is expected that some three years will pass before the scheme can be placed into full scale operation. Meanwhile, an experimental organization is being set up in the Hamilton area and will be functioning this year.



The Air Cadet League President visiting the Maritimes. Left to right: Air Commodore F. G. Wait, C.B.E., Maritime Group Commander, Mr. D. Alex Ross and Mr. H. W. Aslin, Chairman of the Nova Scotia Provincial Committee.

While on tour the League president was accompanied by General Manager George M. Ross, of Ottawa. The R.C.A.F. was represented by Wing Commander R. M. Cox, D.F.C., A.F.C., Air Cadet Liaison Officer at AFHQ, and Flight Lieutenant H. M. Miller, Air Cadet Training Officer. In each province the group was joined by top-ranking League officials and R.C.A.F. officers of the region.

Although it is impossible to give a full report of each provincial meeting, the highlights can be summarized as follows:

Newfoundland

The Air Cadet movement is now formally established in Canada's tenth province where an extremely active committee, under chairman Darroch S. Macgillivray, has been functioning since Confederation. At present there are four squadrons in Newfoundland with two more in the process of amalgamation. These squadrons are expected to attain a total strength of some 600 cadets by the end of the training year.

Nova Scotia

Under the able leadership of chairman H. W. Aslin, the Nova Scotia Provincial Committee reported an outstanding year of consolidation and progress. Almost without exception, squadrons in this province have satisfactory accommodation and are offering a full programme of syllabus training. Actual cadet strength is well up over last year and a few new squadrons are being formed.

Prince Edward Island

Although Canada's smallest province boasts a strength of only two squadrons, the advantages offered by Air Cadet training are well known on the Island. A revitalized Provincial Committee is being formed under chairman Arthur Brennan and even further progress is expected in 1950.

New Brunswick

During the past year the New Brunswick squadrons stressed consolidation to take full advantage of the opportunities offered under the Air Cadet programme. At the annual meeting,

R. A. Lambert, of Fredericton, N.B., was elected chairman to succeed C. K. Beveridge, Saint John, N.B., who has directed the movement in New Brunswick since its inception in 1941. Mr. Beveridge, who is a vice-president of the Air Cadet League, was appointed honorary chairman in recognition of his outstanding services to Air Cadets over the past eight years.

Quebec

Several new squadrons were formed in Quebec last year and interest in the Air Cadets is at a new peak throughout the province. This is largely a result of the leadership given by Lawrence S. Marsh, Montreal, who served as chairman for the past two years. Mr. Marsh has been succeeded as chairman by A. Ross Grafton, Montreal, who has long been associated with the well known No. 1 (West Montreal) Squadron.

Ontario

At the time of writing, the annual meeting of the Ontario Provincial Committee had not been held. A report on this meeting will be included in a future issue of "The Roundel."

Northwest Ontario

This Zone was formed two years ago to supervise squadrons in Port Arthur, Fort William, Geraldton and Nipigon. Dr. Crawford C. McCullough, under whose direction the Zone was formed, has handed over the reins of office to Andrew F. Madore, of Fort William. Considerable progress during the next year is expected under Mr. Madore, who is well known in aviation circles throughout Canada.

Manitoba

Under chairman E. Vopni, Winnipeg, the Manitoba Provincial Committee enjoyed a most successful year in 1949. A notable feature was the outstanding effort made to assist and strengthen smaller squadrons in the outlying areas of the province. The provincial chairman achieved some sort of a record when he succeeded in visiting all but one of the rural squadrons during the past year.



The Revelstoke Air Cadet Drum and Bugle Band. Back row left to right: Flt. Lt. S. L. Hubbard, AC1 J. Robertson, AC2 D. Marino, LAC D. Story, Cpl. Birkinshaw, Sgt. Paul Gerly, Cpl. G. Crich, AC2 J. Shaw. Center row: LAC F. Williamson, LAC B. File, AC2 J. Rutherford, Cpl. J. McMahon, AC1 W. McKenzie. Front row: AC1 S. Austrom, Cpl. T. Gergley, LAC H. Kelsey, AC1 F. Christopherson, AC1 R. Bolton, AC2 J. King and Drum Major R. Olsen.

Saskatchewan

No province in Canada recorded more progress during 1949 than did Saskatchewan. As we write, several new squadrons are in the process of formation and Air Cadet strength is growing by leaps and bounds. The new provincial chairman is Group Captain G. A. D. Melfort, succeeding Group Captain J. Cyril Malone who has given vigorous leadership to the movement in Saskatchewan for the past two years.

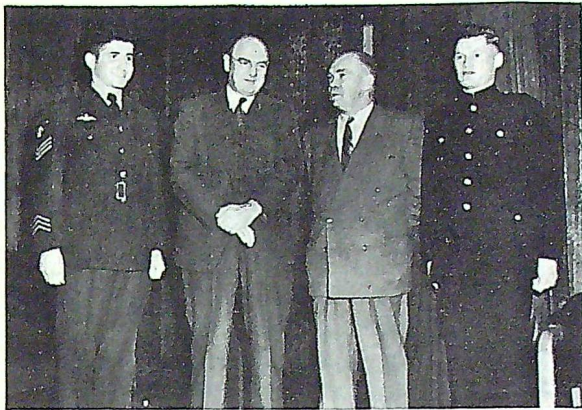
Alberta

Air Cadet strength is also increasing in Alberta where the Provincial Committee has been one of

the League's most active groups. Last year this committee staged the final round-up of British and American exchange cadets, which was acclaimed one of the most inspiring Air Cadet gatherings ever held. The Committee re-elected Eric M. Duggan, of Edmonton, as chairman for the coming year, and also appointed a small executive committee to assist him in his demanding duties.

British Columbia

British Columbia has always been recognized as one of the real strongholds of the Air Cadet League. Virtually every squadron in B.C. is on a



The Annual Dinner of the British Columbia Provincial Committee. Left to right: Flt. Sgt. Rex B. Cameron, No. 1 Wing, Vancouver, B.C., Mr. D. A. Ross, Mr. Urwin Finch and Cadet Ronald Holland of Royal Roads, formerly of No. 243 (Kelowna) Squadron.

sound footing and the movement is well financed in addition to being well organized. Much credit for the League's healthy position in B.C. must go to Urwin Finch, of Vancouver, who has been provincial chairman for the past several years. On Mr. Finch's retirement, the committee elected another Air Cadet enthusiast, Air Commodore



A. D. Bell-Irving, M.C., E.D., as chairman for the coming year.



A feature of every meeting was the sincere vote of appreciation tendered to the R.C.A.F. for the assistance and support rendered to the Air Cadet League, particularly since the end of the war. This sentiment was underlined by President D. Alex Ross when he said: "The R.C.A.F. has bent over backwards to assist the Air Cadet movement; in fact, it has often done more than its share. The League's main job is to strengthen our committees and to do even more than our share for a fine group of young Canadians."

The Revelstoke Drum and Bugle Band

Word has recently been received from Flight Lieutenant S. L. Hubbard, Commanding Officer of No. 324 (Revelstoke) Squadron, B.C., describing the successful progress of the squadron Drum and Bugle Band. During recent months the band has appeared at various functions in B.C., including the Kelowna Regatta and the Salmon Air Fair, and has received considerable public acclaim. Flight Lieutenant Hubbard states that the squadron hopes to maintain a permanent band and, if possible, to increase its size during 1950.

One Vital Control

FUNDAMENTALLY IT IS surely wrong that the flying controls of light (and other) aircraft are not arranged so that failure of any one can be compensated by operation of the other two. As things are, failure of lateral or directional control is of little moment, but elevator failure is usually catastrophic.

If the rudder of an aircraft jammed in the air the pilot would probably continue the journey. If the ailerons collapsed in a gust, it should be possible to struggle along to the nearest airfield.

But if the elevator control goes one has the tab which might see one through, but the situation would be hazardous.

Perhaps the thing to do is to make the tabs much larger and restrict the limit by mechanical stops, so that the pilot can always override the trimmer in flight. If the elevator fails the pilot should then be able to withdraw the mechanical stops quickly and use the tab to override the elevator.—R.G.W.

You're on the Glide Path - I Think

(This humorous background sketch of the development of GCA in England has been condensed from an article which recently appeared in "The Aeroplane".—Editor)

Now THAT GCA has become thoroughly established as one of the leading blind-approach systems and has been doing yeoman service all over the World—not least at a little place called Gatow—it is perhaps safe to reminisce about some of the early pioneering days, when the idea of talking pilots down the glide path was regarded with the gravest suspicion.

The first GCA unit was built in 1942-43 at the great Radiation Laboratory, Massachusetts Institute of Technology, its inventor being the atomic physicist Dr. (now Professor) Luis Alvarez, who had become tangled up in radar when America entered the War. He was later to be rapidly untangled and directed back into atomic physics when that subject appeared to have some remote connections with warfare.

Most people must by now have seen photographs of the present GCA equipment, even if they have not seen it in actuality; but the prototype was a very different affair. It occupied two vast trucks instead of a single trailer, and was much more impressive and very much more of a nuisance to move. It was also considerably more complicated (someone once counted 500 valves—sorry, tubes—before they got tired), and it needed more operators than the present sets.

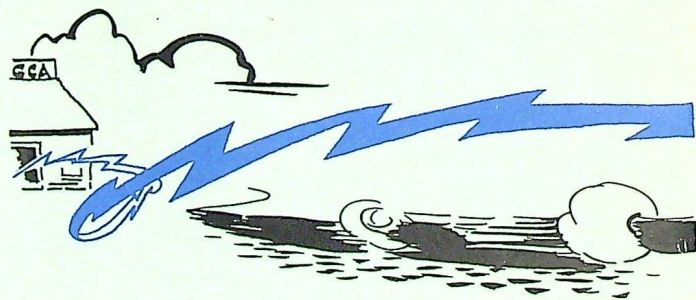
The Beginning

The Mark 1 was undergoing tests in the States, apparently without arousing any great excitement, when it was discovered almost accidentally by a visiting British V.I.B. (Very Important Boffin). He at once realized its importance and, by what means we know not, succeeded in "capturing" the whole equipment and loading it aboard a British battleship. He also "kidnapped" Dr.

Alvarez and his team, whisking them to the United Kingdom on a priority so high that they crowded Bob Hope and Frances Langford off the flying-boat at Shannon.

The equipment was reassembled at Elsham Wolds, then a bomber station, where the first trials were successfully accomplished. Unfortunately, it was not long before some genius decided that the weather at Elsham was altogether too good, and that since GCA was supposed to be a blind-approach system it ought to go to a station in a state of more or less permanent "clamp". So the unit was moved to Davistowe Moor.

We only saw this aerodrome in the rainy season, which possibly does not last the entire year, but when we arrived on the scene as Technical Officer U/T, we found the American scientists amplifying their already excellent vocabularies over expiring transformers, and complaining bitterly that their equipment wasn't built for underwater operation. At night, when the apparatus closed down and cooled off, the all-pervading mist would creep gleefully into every cranny, depositing moisture in high-voltage circuits so that brief but spectacular firework displays would ensue in the morning.



As part of the battle against this insidious enemy electric heaters were installed and switched on at night. One evening, as we were connecting these to the mains in the completely blacked-out hangar, a series of eldritch ululations disclosed the fact that we'd electrified one of the mechanics inside the equipment. We eventually located him by rapid sound-ranging and are still annoyed that we never got a Royal Humane Society medal for hauling him, still in a state of twitch, out of the works. Our tough Canadian Flight Sergeant, who got bitten more or less regularly by the 15,000-volt transmitter power supply, couldn't understand what all the fuss was about.

Luckily, the unit was removed to St. Eval, near Newquay, Cornwall, before the whole apparatus became waterlogged; and it was here that the Mark 1 saw most of its service with the R.A.F.

Testing an experimental blind-approach system on an operational station had its disadvantages. Since there were no proper hardstandings for the apparatus, the big GCA trucks and their satellite fleet of service trucks, NAAFI vans and visitors' cars had to be sited on one of the out-of-use runways, near the main intersection. All too often a change of wind would demand a hasty retreat by the entire unit—a move which we resisted tooth and nail, since it required readjusting the controls and uncoupling all our cables. There were so many of these—an inch or more thick—linking the vehicles that the site sometimes looked like a rendezvous for amorous squids; but eventually we got so streamlined that we were able to change positions in about twenty minutes.

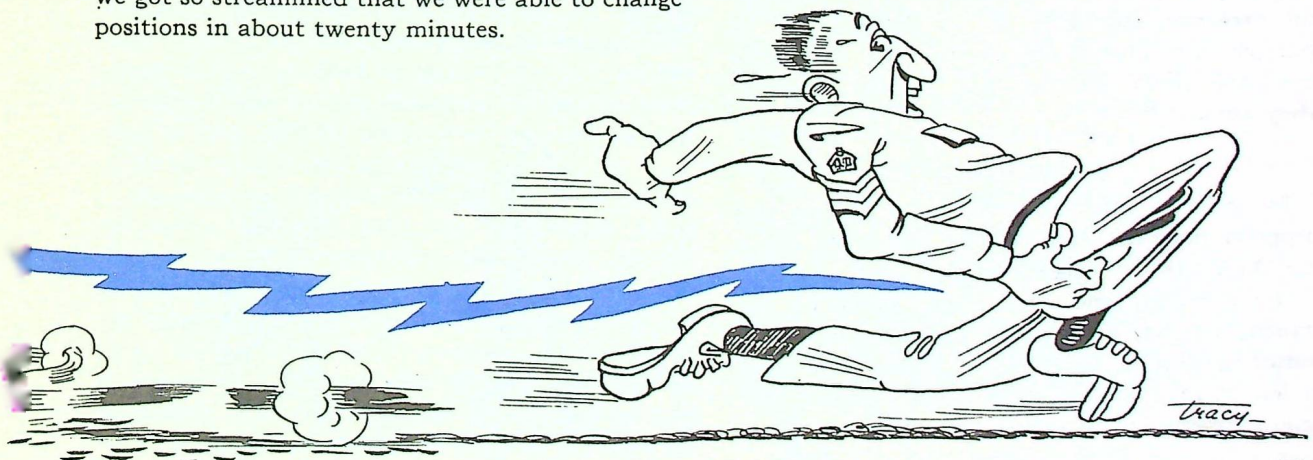
The original American team was still with us for the early part of the time at St. Eval, although Dr. Alvarez had now returned to the States. Incidentally, Alvarez was very far from the popular conception of a high-powered scientist. He had a pilot's licence and was one of the best, as well as perhaps the first, of GCA controllers.

According to legend, he would calmly continue talking a plane to earth even when cathode-ray tubes were popping in all directions, frenzied mechanics were crawling under his legs, and smoke was gently curling from his meter panel. Moreover, he was an expert at breaking down "sales resistance"—and there was plenty of it in those days, particularly among exponents of rival systems.

With the assistance of the Americans we had trained a team of R.A.F. mechanics, operators and controllers who were later to form the nucleus of the GCA empire. But when the Americans left us we were very much on our own and could no longer run to the experts when anything went wrong—as it very frequently did. It had never been intended that the laboratory-built Mark 1 should be used continuously, month after month, for training and for innumerable demonstrations, in a foreign country and run by people who hadn't watched it grow up from a blue-print.

Trials and Tribulations

We sometimes thought that everyone in the R.A.F. above the rank of Group Captain had



visited us at one time or another. They usually went away thoughtful, if not convinced. There were times when the crowd in the control truck was so thick that mere Air Commodores had to sit outside on the grass, waiting their turns. The operators grew quite accustomed to working with a packed mass of humanity breathing down the back of their necks.

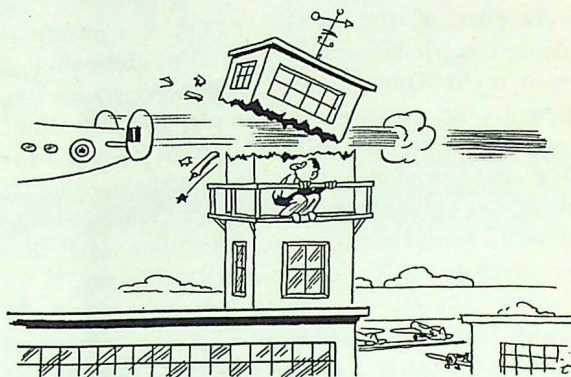
At St. Eval we made every imaginable mistake, and quite a few others, mastering the technique and developing the RT patter that has now become universally familiar. Nothing could be taken for granted, and we had to learn by trial and error.

No one, for example, seemed sure of the best glide-path: anything between two and five degrees was suggested for different types of aircraft. Changing the glide-path involved mechanical rearrangements in a Heath-Robinsonian apparatus full of gears, clutches, solenoids and selsyn motors. As the GCA was not sited at touch-down, but well up the runway, the radar operator "saw" a distorted picture of the aircraft's approach: the glide-path, in fact, appeared on the screen as an hyperbola instead of a straight line.

This distortion was corrected by most peculiar cams based on a curvilinear spiral co-ordinate system: these revolved once during every approach, except when they fell off their shafts. Changing a glide-path meant changing a cam, but one day the wrong cam was accidentally left in the machine so that we brought a heavy bomber down a fighter glide-path. Nevertheless the pilot reported an excellent approach, so we decided not to pamper our clients any more, and thereafter everyone came down at $3\frac{1}{2}$ degrees, whether they knew it or not.

Strange Echoes

In order to check that the radar system was properly lined-up, each runway had at its end a metal reflector or "marker" which acted as a kind of radar mirror and gave a fine signal on the screens. One day a marker fell down and we didn't notice its absence as we found a nice echo more or less in the expected place. Unfortunately, this echo happened to be caused by a Liberator on a



hard-standing a hundred feet from the marker, so that in lining up on it we had slewed our glide-path round through several degrees. We discovered that something was wrong when the pilots complained that the approach we gave them passed through the top of a hangar.

At this point it might be as well to reassure any nervous readers by again pointing out that these incidents took place during the training of the first crew and with the first experimental equipment. They were our schoolboy howlers, we learnt a great deal from them, and they never did anybody any harm.

The last incident was by no means the only time we lost a marker; one day we found that workmen were borrowing them to serve as builder's hods, which they strongly resembled. So eventually we used to send a mechanic out to the runway marker to wave it up and down while we watched to see which radar signal disappeared from the screen.



We were occasionally troubled by sea-gulls—though not in the usual way. They gave transient echoes which flickered across the screen from time to time: there was no possibility of confusing them with aircraft responses—they were far too feeble—but they puzzled us until we found the explanation.

FIDO Plus GCA

For a long time attempts were made to arrange a combined GCA-FIDO landing, but they were foiled by persistently good weather. At last we got what we wanted—a drizzling fog with practically zero visibility. It was so bad, in fact, that the aircraft could never even have taken off without FIDO.

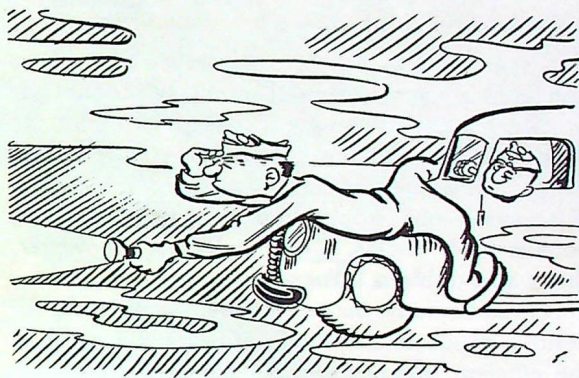
At midnight, all was ready. The scene might have come from Dante's *Inferno*—there were great sheets of fire roaring on either side, clouds of steam rising into the mist, and a heat like that from an open furnace beating into our faces, for we were only 100 ft. from the nearest burners. The aircraft was standing by, waiting to take off with the Station Commander aboard, and in the GCA trucks the cathode-ray traces were scanning normally, building up the radar pictures on the screens. At that precise moment, the turning gear that rotated the P.P.I. aerial decided it had had enough, and crunched to a halt shedding half its teeth in the process.

The search or Traffic Control system, with its 360 degrees of vision, was thus completely blind: but the aerials of the landing system were still scanning, giving us a picture some 30 degrees wide centred on the runway and pointing downwind. It was decided to risk it, by keeping the aircraft in the narrow 30-degree sector and using the landing system, which was now all we had, both for control and approach.

As soon as the aircraft took off it of course promptly vanished into our 330-degree blind sector, but we immediately turned it through 180 degrees and it soon reappeared. It was allowed to fly downwind for a few miles—we dared not let it go too far, as the landing system had a range of less than 10 miles—and then whipped round for an approach. The pilot was unable to land on this run: he found himself at the edge of the runway,

but visibility was so bad that he could only see a single line of FIDO burners and didn't know on which side of the runway he was! So the manoeuvre had to be repeated, and luckily the second approach was successful, despite the attempts of the FIDO-induced gale to push the aircraft off course.

Those were the worst conditions under which the Mark 1 was ever used. As we took the trucks back to their hangar, visibility was still so bad that the drivers had to be guided by instruction from the running-board; and we could have done with our own radar to get us round the perimeter track.



That exploit was also one of the last highlights of the Mark 1's career. It had already run for six months longer than it had ever been intended to operate, and we are very proud of the fact that in the days before it was finally dismantled it was working as well as it had ever done, thanks to extensive overhauls and partial rebuildings. But the operational Mark II's were now on the way, and the GCA team was moving to a new airfield all (or nearly all) of its very own.

The Mark I made the trip, but was never reassembled, and finally perished in a cannibal orgy. A long time later we came across the gutted and derelict vehicles in a M.T. park and had a quiet weep inside them, remembering some of the happiest as well as some of the most exasperating hours of our life. *Requiescant In Pace.*—A.C.C.



Stalag Luft III: Part 3

by FLT. LT. JOHN E. MAHONEY

(In this instalment of Flt. Lt. Mahoney's account of life in Stalag Luft III, the author describes how the "kriegies" occupied themselves from day to day. In addition, he explains various camp organizations and provides an insight into the ingenious means by which he and his associates overcame the boredom of prison life.—Editor)

CHAPTER FOUR

Camp Activities

Daily Routine

AT STALAG LUFT III the average kriegie spent much of his time in lazy relaxation. In the summer months the Sagan climate was very warm and we lived in little more than a brief pair of shorts from May until September. Almost every day during this period one would find kriegies sunbathing outside their rooms. Even at its best, however, this was a dubious luxury.

It was an easy matter to keep busy if one so desired, much of the diversion being the result of the efficient organization of the camp. In order to ensure smooth running of the numerous communal programmes, the Senior British Officer ruled that each phase of prison life of the camp as a whole was to be supervised by individual officers, and that other officers were to be in charge of the various activities pertaining to their own blocks. A brief note of these officers' duties will give a good indication of the variety of the daily schedule:—

Block Commander.—The senior officer in the block, generally a Wing Commander, who attended weekly meetings of the Senior British Officer, informed the block of any new orders or notices of the Senior British Officer, and was responsible for the allocation of block duties.

Adjutant.—Assistant of the Block Commander.

Barrack Warden.—Responsible for the inventory of chairs, tables, mattresses, jugs, etc., and their distribution.

Education.—Responsible for class schedules and the distribution of note books. Lectures on almost any subject were available.

Parcels.—Distribution of personal parcels.

Canteen.—Distribution of canteen articles.

Mail.—Collection and distribution of letters.

Cigarettes.—Distribution of cigarette ration (50 per week).

Accounts.—Checking officers' credit allowances. Each officer received about 20% of his basic pay with which he purchased articles supplied by the Germans (theatre costumes, canteen articles, barrack equipment replacements, etc.). The balance was returned to the officer's bank account.

Rations.—Distribution of German ration issue.

Red Cross Parcels.—Distribution.

Orderlies.—Supervision of Orderlies' duties.

Entertainment.—Distribution of theatre tickets.

Books.—Distribution of parcels.

Clothing.—Distribution of Red Cross clothing parcels.

Garden.—Allocation of plots and seeds; information and guidance.

Coal.—Distribution to officers' rooms.

Newspapers.—Distribution of approximately 2 per day.

Blackout.—Responsible for adequate blackout.

Foodacco.—Distribution of information concerning prices, regulations, etc.

Canadian Representative.—Responsible for Canadians' interests.

Scangriff.—News reporter.

"X".—Code name for camp escape organization. The camp escape leader was known as



Kriegies of Stalag Luft III listening to the "Liberation Speech" by the Senior British Officer.

"Big X". Together with an escape committee, which consisted of a representative from each block known as "Block X", he supervised all tunnel activities and approved any plans for escaping.

The Theatre

The camp theatre occupied the time of a great many kriegies. Most of the various departments of the theatre organization required full-time workers. There were carpenters to make the stage sets and props, painters, decorators, electrical technicians, costume designers, costume manufacturers, make-up artists, set designers and stage hands, not to mention the directors, producers and actors.

The actors, of course, spent most of their time rehearsing. Many of them were very accomplished,

and the audience soon acquired their favourites who appeared again and again. This experience was invaluable to the performers in developing their natural aptitude, and before long at least two or three were, in the prisoners' whole-hearted opinion, of professional standard.

A few of the kriegies also showed hidden talent in the art of play writing. One comedy entitled "Twinkle, Twinkle Mr. Starr" was definitely a first class production. A musical comedy entitled "Messalina", written and produced in the camp and based on the days of early Rome, was so good that the authors definitely intended to have it produced in London.

Approximately one show was produced every two weeks. It would run for six nights to give everyone in the camp a chance to see it. The theatre committee, elected by the theatre staff,

chose the plays, and varied them to suit all audiences. There were dramas, comedies, musicals, and even Shakespeare. The following is a list of plays produced in North Compound from September 1943 until January 1945.

George and Margaret	Arsenic and Old Lace
Design for Living	Pygmalion
Rookery Nook	Philadelphia Story
Let's Go (Revue)	Music Hall (Revue)
MacBeth	I Killed the Count
Twinkle, Twinkle, Mr. Starr	Blithe Spirit
Tony Draws a Horse	The Man Who Came to Dinner
Escape	I Have Been Here Before
Between Ourselves (Revue)	Orchestral and Male Choir Concert
Palina Panic (Revue)	The Flashing Stream
Messalina	At Home (Revue)
Saint Joan	The Importance of Being Earnest
Thark	The Drunkard
No Time for Comedy	French for Love

The German officers of the camp were no less interested spectators than ourselves. They never missed a show.

Most of the musicals were quick-fire revues written by men on the camp. To illustrate the type of humour which appealed to a kriegie audience, I have reproduced the following tidbit entitled "News Broadcast" which was given by the Master of Ceremonies in the Revue "Let's Go" (produced prior to the invasion of France):

"Here is the News. Take it or leave it. In summary form it seems to contain the usual account of strategic withdrawals, misguided judgments, patches of oil, floating debris, banging noises and the usual fantastic American aircraft claims. (Roars of laughter from the American kriegies).

Sweden.— It is announced from Sweden that the Nobel Peace Prize for the year has been awarded to the British Army.

Italy.— The Allies advanced a foot today. On being grazed by a piece of shrapnel, the foot was rapidly withdrawn. An American General says of this great advance, "Hot Ziggedy". This feeling was echoed by a General from South Africa in this statement, "By jove, give us a mile and we'll take an inch".

Russia.—

Marshal Stalin in his twenty-eighth order of the day announced the liberation of fifty-five thousand seven hundred and forty-five more localities. Robertovitch Donatski, special correspondent, reports that at Krupski, on the Moscow-Leningrad line, the important corridor connecting No. 2 platform to the wash-room was recaptured; whilst at Paipsielograd three mechanized divisions went through three bridgeheads, fifteen blockheads and a redhead.

The West.—

American aircraft today shot down nine hundred and seventy-three enemy aircraft. Ripley states in his column, "If all the aircraft reputed to have been shot down by American forces were placed end to end, they'd go from Germany to England and back again—without losses."

Washington.—

Diplomatic circles view with grave concern the proposed loan of three invasion barges to Great Britain in exchange for a ninety-nine year lease on Canada.



P.O.W.'s awaiting evacuation after their liberation in 1945.

Senator Gooley put the general feeling into words. "We're being gypped", he said.

London.— Australians' feeling about the situation back home was summed up by one of them who said, "We must thank the Yanks for sorting out our girls. We'll know now who are the good ones."

London.— The question of repatriation of old Prisoners of War was brought up again in the House yesterday when Mr. Gaggins, member for Blarney, asked, "Wot the 'ell does it mean?" It will be remembered that the question was brought up last year by Mr. MacSimple, who asked how it was spelled.

That is all the News, Good night."

Occasionally our dance orchestra produced a show of its own, and the camp's Symphony Orchestra gave periodic concerts under the direction of a Canadian kriegie. These were always well attended.

Once a week there was a lecture on some topic of interest sponsored by the "International



This photograph appeared in Part 1 of "Stalag Luft III," and the caption was omitted in error. Standing left to right are: F/O Louis van Aardt, F/O John Hood, Sqdn. Ldr. J. E. Mahoney, the author. Kneeling: F/O Donald Blott, Flt. Lt. William Thurston.

Union", an organization with representatives from almost every allied country in the world.

Debates were held periodically in the theatre. These were on various subjects, both serious and light. The following definitions were taken from one of the lighter debates—"Resolved that it is Preferable to be a Gentleman rather than a Cad." (Definitions taken from the Saganese English Dictionary):

A Gentleman: (1) Any kriegie who, by his unselfishness, tolerance and good manners is an asset to both his room and his block.

(2) One who is never caught smoking on appelle, unless it be in the ranks of a block other than his own.

(3) One who, when he is room stooge, does it willingly, silently, and without leaving the dishpan full of grease.

(4) Any kriegie who is prepared to assist another kriegie in his attempt to escape either by holding the ladder, the baby, or both.

A Cad:

(1) A new kriegie who admits to an old kriegie that he knew his girl friend back home.

(2) An old kriegie who remarks to a new kriegie that when he came down the other was probably still at school.

(3) One who accepts clothing from admiring, yet ill-equipped American kriegies without so much as offering his autograph in return.

(4) One who teaches himself, whilst a kriegie, to smoke, play a musical instrument or take sugar in his tea.

(5) One who is caught pinching coal from the kitchen.

(6) Anyone who is "in the rackets".

Foodacco

Foodacco was the name we gave to our camp food and tobacco exchange. It was, in fact, a grocery store, canteen and auction room combined. Here one could buy any item of Red Cross food, or food and clothing from personal parcels. The medium of exchange was our own surplus supplies, because money, of course, had no value. A customer merely put his goods into Foodacco to be sold, thereby establishing a credit.

Goods were valued on a point basis, according to the popularity of the various items. As some items became scarce and others more plentiful, the prices were changed accordingly. It required astute business ability on the part of the manager to see that Foodacco did not operate at a loss.

Two per cent commission was charged by Foodacco to cover loss from damage. Profits were distributed in various ways; for example, free tea was distributed by Foodacco on sports day, prizes were given out at the theatre in Christmas week, the counter clerks and bookkeepers were given a small compensation, certain items were held back for "X" purposes (to be used in bribing the Goons), dividends were declared and given to best customers.

The following prices represent average market conditions during periods of plenty:

Food	
Corned beef	65 pts.
Powdered milk	100 pts.
Condensed milk	70 pts.
Chocolate (4 oz.)	40 pts.
Sugar (4 oz.)	10 pts.
Soluble Coffee	40 pts.
Raisins (1 lb.)	80 pts.
Butter (1 lb.)	90 pts.
Prunes (1 lb.)	20 pts.

Miscellaneous

Socks	80 pts.
Shirts	300 pts.
Shoes (new)	1000 pts.
Handkerchiefs	20 pts.
Pencils	15 pts.
Playing cards	80 pts.

Tobacco

100 cigarettes 10 pts.

A very popular service of Foodacco was its weekly auction. Goods which hadn't been sold for some time, as well as goods especially offered for auction, were sold to the highest bidder.

Sports

There were numerous sporting facilities on the camp. Every kind of popular game except tennis was available to the kriegies.

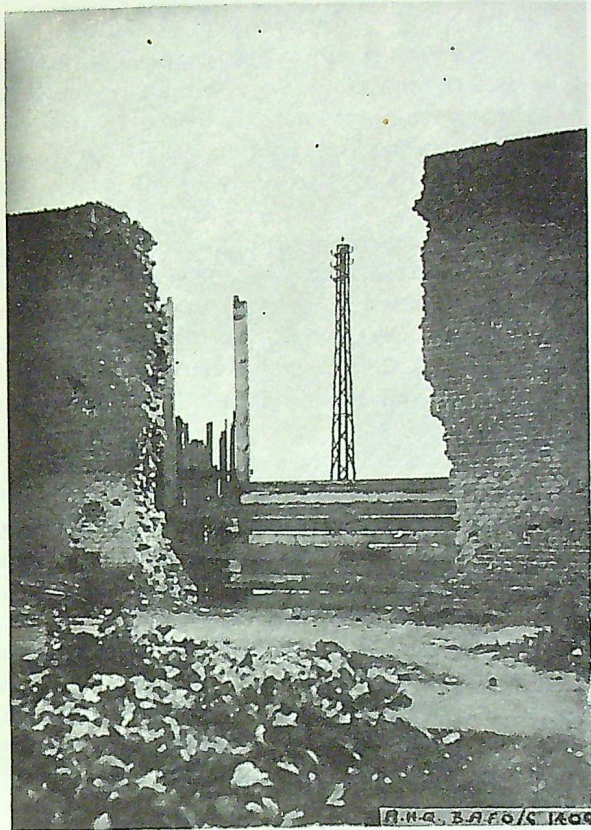
In the summer the most popular game was softball. Primarily a North American game, it nevertheless attracted many Englishmen. There were four leagues—Senior, Intermediate A, Intermediate B, and Junior. Players were graded according to their ability and could move from one league to another, according to the judgment of their coach, a Senior or "Inter A" player. Some of the English boys, particularly the good cricketers, caught on quickly, and were soon among the top-notchers.

Each Sunday an exhibition softball game took place. These were very exciting, the teams being made up from among the best players in the camp. They were always designed to have a popular appeal, and the players were often chosen to represent a particular faction, such as "Eastern Canada versus Western Canada", "Pilots against Air Gunners" or "Senior Officers against Junior Officers". This last combination was invariably amusing.

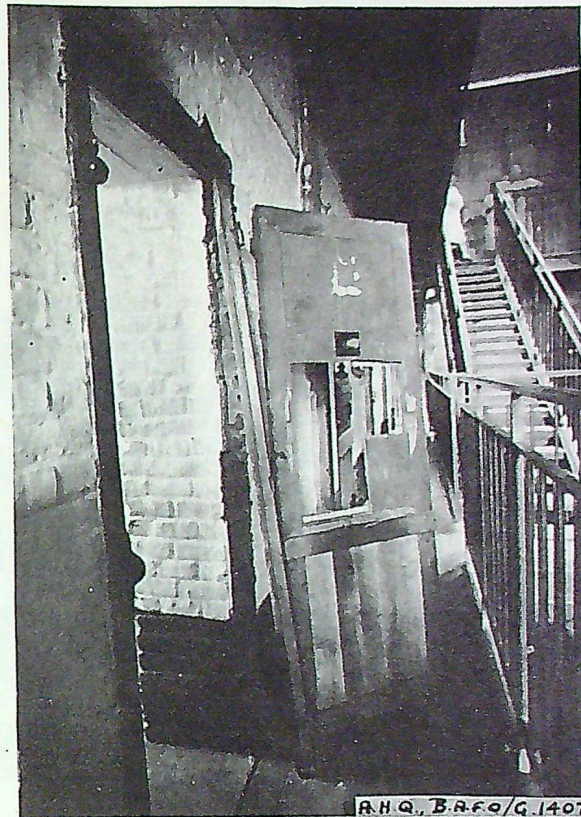
During the latter days of captivity the Americans were billeted in our camp because of insufficient accommodation in other compounds, and some real "blood matches" ensued—"A Matter of National Importance, Sir".

Softball's greatest rival was cricket. Essentially an English game, it seemed a bit slow to most of the Canadians. Perhaps we just didn't understand it.

In the summer, the swimming pool—really the "fire" pool, a brick water container about thirty feet square—became a great attraction. Unfortunately, it could only be used for two or three days after a water change, which took place



The accompanying photographs of Amiens Prison were taken by official French police photographers—with the approval of the German military authorities—after the R.A.F. low-level bombing attack in February, 1944. The exterior view shows the breach made in the wall through which some of the prisoners escaped. The other photograph gives some idea of the interior damage.



about every two weeks.

Many prisoners were attracted to the high bar, of which there were about four in the camp. Volleyball proved another source of activity. The best at this game were the Poles. It seems that volleyball is somewhat of a national game with them, and at first they were quite cocky about their prowess. However, they gained a healthy respect for the Canadians, who before long were winning as many as they were losing.

We had a few footballs, but unfortunately no football clothing, so could not undertake the game because of the danger of injury. The English

games of soccer and rugger, however, were played by many.

In the cold winter of 1944-45 our skating rinks were very successful. There were two good rinks in use, one for skating and one for hockey. Just before we departed from Sagan, the Germans relaxed their prohibition against visiting teams, a rule they had put into effect after the tragic escape in March, 1944. As a result, a team from the East Compound came over for a game that provided entertainment for everyone, including the Germans and the "Commandant".

Thought Trends

What did kriegies think and talk about?

The primary topic of conversation was the progress of the war and when it was likely to end. Next in importance was the eternal subject—women—more important to us, perhaps because of our lack of them. Current affairs and post-

war problems also formed a large part of our conversation.

A good indication of the "Trend in Thought" may be obtained from our local "Gallup Poll" results, which we called "T.N.T." Questions of common interest were submitted to the organizers, who selected a certain number and made a survey of the camp each week. Some of the results were as follows:

1. What is your month and year for the end of the European War? (asked October 21, 1944).
Results—December 1944—371 votes
November 1944—247 votes
March 1945—170 votes
2. Do you consider female infidelity a worse crime than male infidelity?
Results—No—61.2%
Yes—38.8%
3. Do you agree with the repatriated padre who said, "There is not a man who does not feel spiritually uplifted by his incarceration?"
Results—No—1137 votes
Yes—383 votes
4. Are you in favour of compulsory military service in your country after the war? If so, how long should it be?
Results—

	For	Av. Time	Against
Great Britain	473	1½ yrs.	49
U.S.A.	294	1¼ yrs.	45
Canada	149	1½ yrs.	31
Australia	68	1¼ yrs.	14
New Zealand	54	1½ yrs.	10
South Africa	31	1½ yrs.	4
Poland	23	2	7

5. Do you, or would you prefer a double bed or two single beds for married life?
Results—

	Singles	Double
Single Men	359	430 (53.2%)
Married under 5 years	69	252 (79%)
Married over 5 years	33	70 (68%)

The News

We were very proud of our camp radio. Radios were strictly prohibited by German regulations, but there were ways and means of achieving our end. The news was an important item to a prisoner, and obtaining it was considered a job which just had to be done.

There were several electrical wizards among the wireless operators, and between them a receiver was built. Piece by piece it was put together. Wires, tubes, earphones, and the like were smuggled into the camp by Germans who had been bribed, and the condenser was made from melted tin foil.

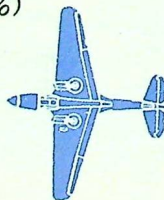
Our radio section had to be very carefully guarded. Whenever it was in operation guards were posted at each end of the hut to give a warning should any Germans approach. The receiver was built in sections which could be easily and quickly dismantled and hidden in case of danger.

A record of the B.B.C. London Broadcast was made daily. In addition, a regular watch was kept during certain hours and any special item of news was circulated as a "Flash". The regular news was first typed and then taken around to each hut and read aloud in the corridor. This was one of the big moments each day. Aroused by the familiar cry of "Come and Get It", one and all took their places by their door, some with maps in hand, all with a vivid picture of the various fronts indelibly printed on their minds, to hear how far we had advanced—or retreated.

It was very remarkable how the tenor of the news affected the mood of the kriegies. If things were going well, we were in the best of spirits. "War'll be over in three months—maybe two". If movements came to a standstill, we soon grew impatient, cross, and jumpy.

And so it went. The news, the kriegies' barometer of optimism and pessimism, always remained one of the most popular features of our camp life.

(To be continued)



Have You Seen these Posters?



OVERSHOOTING?

Not the gannet. If he comes in too fast or misjudges his glide, he can pull up and still get in. A pilot is not so well-equipped and must make up his mind early to go round again when there is the faintest chance of over-shooting.

Steep Turn

No skid or slip—dead accurate. But look at the direction of his head. He remembers to look round to see if all is clear.

UNDERSHOOTING

For ten million years the eagle family has been flying. Yet the eagle cannot take flying liberties. Young eagles fall if they do. On the short side during the run-in, this eagle puts on power and completes his landing with a few beats of his wings. He made up his mind early.

12,000 CONTROLS

Twelve thousand controls in the form of muscles are operated by the Ibis in working its feathers alone. That's a few more than you've got to worry about. The Ibis has to rely on instinct not reason—but he never pulls the wrong lever. The Ibis is a good pilot.

RAMSHACKLE CONSTRUCTION?

So it seems. (But he never forgets to lower his undercarriage when he comes to land.) The Stork goes on flying until he is 70, because he is master of his equipment, and doesn't take chances.

- RCAF Poster No. 79: Ramshackle Construction?
- RCAF Poster No. 80: Undershooting
- RCAF Poster No. 81: 12,000 Controls
- RCAF Poster No. 82: Steep Turn
- RCAF Poster No. 83: Overshooting?

ORDER WHAT YOU WANT FROM YOUR SUPPLY SECTION

ROYAL CANADIAN AIR FORCE

Association



A New Year's Message from the Dominion President

ONE YEAR AGO we were in the midst of organizing and preparing for our membership campaign, which was launched early in February of that year. Your response was magnificent, and as a result, we have a membership of almost 7,000 and 40 chartered Wings.

To all of you who have taken up the torch and who have toiled to make our Association a success, I extend my best wishes for a prosperous and happy New Year.

(L. S. Breadner)
Air Chief Marshal
Dominion President (Provisional)

WING NEWS

No. 100 (Bluenose) Wing, Halifax, N.S.

Climaxing a year of social and benevolent activities, members of No. 100 (Bluenose) Wing celebrated their first birthday at "Gorsebrook" on Tuesday evening, 18th October, 1949.

It was regretted that Air Commodore F. G. Wait, C.B.E., who was largely responsible for the creation of this Wing was unable to be present.

The Chairman of the Wing's first meeting, Miss Patricia Smith and the Executive elected at that meeting were all present. They included:

President	Miss Ruth Vogler
Vice-President	Miss Hilda Thompson
Secretary	Miss Mildred Rogers
Treasurer	Miss Eleanor Cameron

Guests included the members of the Airmen's Club and their wives, and three patients from Camp Hill hospital; namely Miss Olive Sheppard, ex-W.D. of Harbour Grace, Nfld., Mrs. Muriel "Dickie" McMenemy, ex-W.D. of Stewiacke, and Mrs. Edith Dennis, Ex-C.W.A.C.

No. 404 (Kitchener-Waterloo) Wing, Kitchener, Ont.

On 2 March, 1949, a group of Kitchener-Waterloo veterans attended the Charter dinner of No. 400 Wing in Guelph. They returned with a keen desire to form their own Wing. On 2 May, in the Canadian Legion Hall, their organization meeting was held. This meeting was addressed by Air Vice Marshal G. E. Brookes, C.B., O.B.E., who had recently assumed the position of Provisional President for the Ontario Group. At this meeting, 32 applications for membership were accepted and, with the additional transfer of members at large, plus an energetic publicity director and membership committee, the strength of the Wing now stands at 128.

On 16 September, 1949, their Charter Night, the Chief of the Air Staff presented the Charter. Air Marshal Curtis, in his address to the Wing, outlined the R.C.A.F. jet aircraft programme and explained the plans for giving the Reserve more active participation by the formation of non-combatant reserve units.

No. 405 (Porcupine) Wing, Timmins, Ont.

No. 405 Wing officially received its Charter Thursday, 13 October, 1949, during impressive festivities held in the McIntyre banquet room. Nearly 200 members attended the dinner, pre-



Presentation of Charter to No. 404 (Kitchener-Waterloo) Wing, Left to right: Air Vice Marshal G. E. Brookes, Mr. Charles Stover, Air Marshal W. A. Curtis and Group Captain A. J. Snetsinger.

sentations, speeches and dancing.

Acting Mayor Philip Foy presented the key of the town of Timmins to the new Wing. It was received by President Ernie Cain who expressed the sincere thanks of the club to Mayor Foy and council.

Rt. Rev. R. J. Renison, Bishop of Moosonee, who was the first padre of the R.C.A.F. during World War II, made the presentation of the Charter to Mr. Cain.

No. 700 (City of Edmonton) Wing Carnival

The week of 12-17 September was carnival time in Edmonton. Members of No. 700 (City of

Edmonton) Wing were the highly successful proprietors of an old-fashioned Midway which, despite a sudden onslaught of adverse weather, earned a net contribution to a new Wing headquarters of \$600.

The junction of 97th Street and Jasper Avenue echoed the stentorian tones of insistent barkers who invited the Edmonton citizenry to try their luck at everything from Bingo to Crown and Anchor. Unlike most commercial carnivals, the prizes were well worth the risk of dimes and quarters. In the Glass Pitch, the well-aimed toss of a dime earned for the contestant one of a prodigious selection of fancy glassware. To whet the instinct of the hesitant gambler, a tempting array of dolls, thermos flasks, and aluminum pots and pans were offered to the winners in the Bingo



Rt. Rev. R. J. Renison, Bishop of Moosonee, and Ernie Cain, President of No. 405 (Porcupine) Wing, Timmins, Ont.

tents. Each evening, as an added encouragement, a radio was raffled to the public.

The man behind the scenes who organized the carnival was the Wing President, "Tiny" Ferris. He was ably coached by Mr. and Mrs. Harold Wright who, although not Association members, generously contributed their knowledge of what makes a carnival tick. Others who participated in the week's work included: Dave Roberts, Alice Dexter, Jim Cox, Phil Scott, Len Kay, Larry Hunt, Roy Martins, Henry Stamp, A. J. Hall, Dick Cherry, Ishbel Ferris, Roy Leard, and Chester Wallace.

Altogether, the carnival was a highly successful venture, despite considerable trial and error. No. 700 Wing has every reason to anticipate a bright future.

No. 801 (City of Victoria) Wing

The following extracts of a letter from the President of No. 801 (City of Victoria) Wing,

Dr. W. D. Marshall, indicate that the Victoria Wing has not been inactive:

"The first fall meeting of No. 801 Wing was held on 22 August. The meeting was addressed by Wing Commander J. D. Somerville, D.S.O., D.F.C., who gave a very interesting talk on 'Jet Aircraft and Jet Propulsion'. After Wing Commander Somerville's speech, plans were laid for 'Battle-of-Britain Sunday'.

"On 18 September, '49, the Battle-of-Britain parade was held. It comprised units of the R.C.A.F. (Regular), No. 801 Wing of the R.C.A.F. Association, R.A.F. Club, Royal Canadian Air Cadets, and the Canadian Legion. Led by the R.C.N. Band from H.M.C.S. 'Naden,' about 250 marched to the cenotaph where a drum-head service was held. This was followed by a March Past which was taken by Air Commodore S.L.G. Pope from the steps of the B.C. Legislature buildings.

"On September 17th, a group of officers from the Wing and other ex-Air Force Officers in and around Victoria held a mess dinner at the Pacific Club. Group Captain J. B. Millward, D.F.C., was the guest speaker. The executive plan on making this function and the Battle-of-Britain Sunday parade an annual event.

"The City of Victoria Wing extends greetings to all Wings and invites any member of the



Charter members of No. 405 (Porcupine) Wing, Timmins, Ont. Left to right: Mr. Tommy Goodman, Mrs. Ernie Cain, Mrs. Tommy Goodman, Mr. Ernie Cain, Mrs. Ken Gildner and Mr. Ken Gildner.



Association who may be in Victoria to visit one of the meetings which are held the fourth Monday of every month in the Army, Navy & Air Force Veterans Building, 1001 Wharf Street."

New Wings

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

No. 303 (City of Sherbrooke) Wing

On Thursday, 13th of October, an organization meeting and dinner under the chairmanship of Mr. E. T. Webster, A.F.C., was held in the eastern township city of Sherbrooke. There were approximately 100 in attendance with Air Vice Marshal

Executive of No. 300 (City of Sherbrooke) Wing. Front row, left to right: Mr. Bert Keeler, Mr. Eric Webster, Mrs. Buddy Riel, Mr. Andre Duchesnay. Back row: Mr. Hector Simoneau, Mr. Gregg O'Boyle, Mr. Roland Bergeron, Mr. Arthur Wright and Mr. Sydney Hart.

G. V. Walsh, C.B., C.B.E., as guest speaker. At the dinner it was decided to apply for a charter, and the following were elected to the executive:

President:	Eric Webster, A.F.C.
1st Vice-President:	Andre Duchesnay
2nd Vice-President:	Sydney Hart
Secretary:	Hector Simoneau
Additional Members:	Roland Bergeron
	Bert Keeler
	Gregg O'Boyle
	Mrs. Buddy Riel

No. 409 (St. Catharines) Wing

The decision of the Air Force Club of St.

Catharines to join the national association is indeed gratifying and appreciated by Dominion Headquarters. It has been in existence for over three years and has been active in civic affairs pertaining to returned Service personnel.

The present officers of the Club are:

President: Mr. E. M. McBride
 Secretary: Mr. K. G. Thorne
 Treasurer: Mr. J. R. Christie

No. 410 (Ottawa and District) Wing

On Friday, October 7th, an organization meeting under the chairmanship of Jack Sutherland for the purpose of forming a Wing of the Association in Ottawa and Hull was held in Beaver Barracks. Approximately 300 attended and were addressed by our Dominion President. As a result of this meeting, a vote was taken to apply for a Charter.

Elected to the executive were:

President: Mr. J. D. McNee, M.B.E.
 Vice-President: Mr. H. A. Lipscombe
 Secretary: Miss M. A. Spinney, M.B.E.
 Treasurer: Mr. V. E. Courtemanche
 Additional Members: Miss E. M. Moles
 Mr. R. Moffat
 Mr. R. St. Amour, M.B.E.
 Miss D. D. Webster

No. 411 (City of Chatham) Wing

On Thursday, 6th October, an organization meeting was held in Chatham under the chairmanship of Mr. J. Volkes. The turnout was sufficiently good to warrant the organization committee to go ahead with their plans, and they expect that by January an official application for Charter will be submitted. In the meantime, the following were elected to the provisional executive:

President: Mr. John Volkes
 Secretary: Miss Donna Margaret Pickering
 Additional Members: Mr. Frank Jordan
 Mr. William Frank Norton
 Mr. Norman Joseph Cross
 Mr. Max Erwin Dunlop

No. 412 (Air Force Club of Windsor) Wing, Windsor, Ont.

Air Vice Marshal G. E. Brookes, C.B., O.B.E., was the guest speaker on the Chapter Night of No. 412 (Air Force Club of Windsor) Wing held November 4th, 1949. This Wing is sponsored by Branch 364 of the Canadian Legion. Elected to the executive were:

President: Mr. John Burnet
 1st Vice-President: Mr. Thomas Muldoon
 2nd Vice-President: Mr. Edgar Stark

Secretary: Mr. Alvin Montrose
 Treasurer: Mr. Leonard Baldock
 Sergeant-at-Arms: Mr. William Stark
 Executive Members: Mr. Ralph Nicol
 Mr. Robert McDonald
 Mr. Harry Brumpton
 Mr. Willfred Casey
 Director of Organization: Mr. John J. Kelly

No. 413 (Trenton) Wing

On Wednesday, 2nd November, an organization meeting was held in Trenton at which Air Vice Marshal Brookes was the principal speaker. As in all other cases, it was successful and a Wing of the Association was formed. Elected to the executive were:

President: Mr. Richard C. Kent
 1st Vice-President: Mr. Walter Staveley
 2nd Vice-President: Mr. Howard G. Aziz
 Secretary: Mr. John C. West
 Treasurer: Mr. James D. Campbell
 Additional Members: Mr. Richard E. Builder
 Mr. Glen A. Rawson
 Mr. William T. Lawson

No. 414 (Haileybury) Wing

On November 16, 1949, an organization dinner and meeting was held to form a Wing at Haileybury. This meeting was composed of ex-Air Force personnel from Haileybury, Cobalt and New Liskeard. They were addressed by Squadron Leader J. H. Giguere, O.B.E., of Dominion Headquarters. Also in attendance and speaking for the Association was Ken Gildner, who is our Northern Ontario Representative. A vote was taken and it was decided to form a Wing. At the time of writing, we have not received their application for certificate, and are therefore unable to give you the names of their Executive. However, you will be hearing more from this Wing, and in the meantime we extend our thanks to Gordon Hellens and J. B. Sullivan, who did the primary organization work.

No. 415 (Prince Edward) Wing, Picton, Ont.

We are particularly grateful to Mr. J. E. Folds for the formation of a Wing in Picton. As we have previously pointed out, even in small communities, the formation of Wings are a definite possibility and with a little digging soon become a reality. This is what happened at Picton. They held their organization meeting on November 18th, and the following Executive were elected:

President: Mr. D. F. MacDonald
 1st Vice-President: Mr. R. D. Byres
 Secretary: Mr. H. Beaumont

Treasurer: Mr. T. Folds
Additional Members: Mr. H. A. Hince
Mr. E. J. Bateson
Mr. H. Raby

Get Your Gongs!

Many enquiries have been received regarding

the procurement of medals by veterans.

To get your medals you must apply for them. Application forms are available in all post offices, and merely require filling out and mailing. D.V.A. will do the rest.

Jet Tunnel

(Reprinted by courtesy of "Flight")

THE WIND TUNNEL was one of the first pieces of aeronautical laboratory apparatus and since its inception has developed along classic lines. That is to say, the initial concept of using a motor driven fan to produce the requisite airflow has remained unchanged until recent years. With the enormous increase in flight speeds which has come about during the past decade, however, the powers required to produce tunnel windspeeds approaching and surpassing that of sound have risen to such tremendous values that the constructional and operating costs of wind tunnels of the traditional type have become prohibitive.

For these reasons, tunnels of intermittent-flow types have been and are being constructed in which air stored at high pressures is released through a working section for a short period (during which the flow velocities can be extremely high) after which the storage chambers must once more be pumped up for the next run. Alternatively, a vacuum chamber can be filled with air *via* a working section to produce similar high-speed flows. Even the smaller tunnels of these types are by no means inexpensive.

Some little time ago, however, a new approach to the high-speed tunnel problem was evolved at the English Electric Co., Ltd., makers of the Canberra. The idea was delightfully simple, in that all that was required to generate the requisite airflow was an ordinary turbojet unit mounted inside a relatively short length of tunnel. A Rolls-Royce Nene with a static thrust of 5,000 lb. was chosen as the power unit and some idea of the

compactness of the installation is given by the fact that the tunnel has been erected in an erst-while piston-engine test-cell measuring 60 by 34 by 18 ft.

In form the tunnel is perfectly straightforward. The Nene is housed in a nacelle which in turn is housed inside a bulged portion of the tunnel downstream of the working section. The principle of operation is that flow through the working section is induced by the ejector action of the jet efflux, so that in this sense, the Nene can be regarded simply as an extremely powerful ejector pump.

Air enters the tunnel from a settling chamber *via* a gauze filter, thence flowing through an intake flare to the 3 ft. 8 in. by 1 ft. working section. It is then diffused down to the "pumping section" where one-third of the flow is passed through the jet unit, the remaining two-thirds flowing outside the Nene nacelle in the annular space between the nacelle and the bulged wall.

A flow velocity of Mach 0.9 is reached with the tunnel empty, and with a model wing of 15 in. chord, this speed falls only to M 0.83, the corresponding Reynolds number being 5×10^6 . On most normal days of the year, operation of a straight-through tunnel of this type would induce condensation troubles if means were not taken to lower humidity at the intake. This trouble is avoided by collecting a proportion of the hot exhaust gases and conducting it forward to mix with the entering air.



WHAT'S THE SCORE

The following questionnaire is based on R.C.A.F. activities during 1949. Anyone who fails to score 16 or more correct answers is definitely not in the running. Answers appear on page 48.

1. Air Vice Marshal H. L. Campbell, former Air Officer Commanding, North West Air Command, was re-appointed as:
 - (a) Canadian Air Attache, Washington, D.C.
 - (b) Canadian representative to the North Atlantic Defence Organization
 - (c) Canadian Adviser to Western Union Defence
 - (d) Canadian High Commissioner to the U.S.A.
2. The 17th December, 1949, was a significant date to the R.C.A.F. since it was the tenth anniversary of:
 - (a) The Second World War
 - (b) Air Training in Canada
 - (c) The Battle of Britain
 - (d) The B.C.A.T.P.
3. Announced during the summer of 1949 was the formation of the new R.C.A.F.:
 - (a) Air Defence Group
 - (b) Home for Aged Airmen
 - (c) Fighter Command
 - (d) Photographic Reconnaissance Group
4. Canada's first jet transport aircraft which was test flown at Malton during 1949 is the:
 - (a) A. V. Roe Jetliner
 - (b) DeHavilland Comet
 - (c) Bristol Brabazon
 - (d) Curtiss Condor
5. For his outstanding contribution to Canadian aviation as a Search and Rescue Pilot, Flying Officer R. B. West was awarded:
 - (a) The M.H.D.I.O.F.
 - (b) The Harmsworth Trophy
 - (c) The McKee Trans-Canada Trophy
 - (d) A Green Endorsement
6. The Beau Trophy was won by a Squad of Royal Canadian Air Cadets for:
 - (a) The superiority of its Trumpet and Drum Band
 - (b) Annual efficiency
 - (c) A drill display during international competition
 - (d) An excellent turnout of recruits
7. "Operation Metropolis" was:
 - (a) A R.C.A.F. (Reserve) attack on Canadian Army defences of Quebec
 - (b) A joint RCAF (Reserve)—Air National Guard mock defence of New York City
 - (c) A joint R.C.A.F. (Reserve)—Air National Guard operation to test the air defences of Toronto
 - (d) A rapid switch manoeuvre of Air Transport Command squadrons
8. The Canadian Government took active steps to procure for the R.C.A.F. the:
 - (a) Sopwith Camel
 - (b) Gloucester Meteor
 - (c) Lockheed Shooting Star
 - (d) North American Sabre
9. The Trenton Memorial Gates were presented to the R.C.A.F. on 30th September, 1949, to commemorate:
 - (a) No. 6 (R.C.A.F.) Bomber Group
 - (b) The B.C.A.T.P.
 - (c) Canadian participation in the Battle of Britain
 - (d) The wartime service of Canadians in the R.A.F.
10. The 1st of April, 1949, marked the 25th Anniversary of the:
 - (a) R.C.A.F.
 - (b) Air Board
 - (c) Wright brothers' first flight
 - (d) Royal Flying Corps

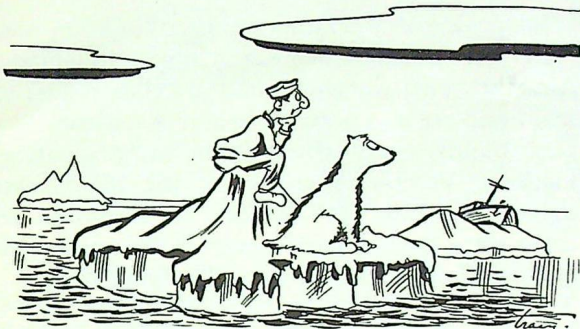


11. No. 408 Squadron, which was formed early in 1949, made a large contribution to:

- (a) Photo Survey operations
- (b) Search and Rescue operations
- (c) Balloon Defence operations
- (d) Trans-Atlantic Training operations

12. The R.C.A.F. marine craft which was stranded in Canadian Arctic waters was the:

- (a) Antigonish
- (b) Haida
- (c) Malahat
- (d) Malabar



13. The larger of two islands discovered by R.C.A.F. aircraft in Foxe Basin was given the name:

- (a) Barnett Island
- (b) Tomkinson Island
- (c) Overlap Island
- (d) Prince Charles Island

14. An original member of the R.C.A.F. who retired from the Service in 1949 was:

- (a) Sgt. Shatterproof
- (b) Air Commodore D. E. MacKell
- (c) Air Vice Marshal C. R. Slemmon
- (d) Air Vice Marshal E. E. Middleton



15. During their 1949 operations, R.C.A.F. Photo Survey Aircraft snapped pictures of Canadian territory totalling:

- (a) 634,000 square miles
- (b) 870,000,000 square miles
- (c) 859,000 square miles
- (d) 756,000 square miles

16. The formation of No. 405 Squadron was announced during 1949. This squadron will fly:

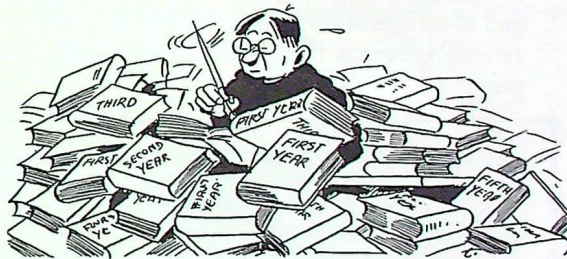
- (a) Cansos
- (b) Vampires
- (c) Lancasters
- (d) Sabres

17. The new title given Maintenance Command in 1949 was:

- (a) Air Materiel Command
- (b) Air Logistics Command
- (c) Air Supply Command
- (d) Air Services Command

18. The third and final volume of the official account of the R.C.A.F.'s operational activities in the 2nd World War appeared in 1949 and is called the R.C.A.F. Overseas:

- (a) The Third Year
- (b) The Fourth Year
- (c) The Fifth Year
- (d) The Sixth Year



19. Much work was carried out by R.C.A.F. construction engineering staffs to re-activate the wartime station at:

- (a) Davidson, Saskatchewan
- (b) Ancienne Lorette, P.Q.
- (c) Brandon, Manitoba
- (d) Bagotville, P.Q.

20. The first Reserve ground training unit was found in 1949 and is called:

- (a) No. 1 Fighter Control Unit
- (b) No. 1 Technical Training Unit
- (c) No. 1 Radar and Communication Unit
- (d) No. 1 Ground Training Unit

The U.S. Looks at Britain's Aircraft

(Mr. Robert Hotz, the News Editor of "Aviation Week," recently wrote a rather interesting descriptive article on British aircraft after his visit to the 10th annual Society of British Aircraft Constructors' exhibition. A few of his concise observations, together with the photographs that accompanied them, are reprinted herewith.—Editor)

THE OPENING of the 10th annual Society of British Aircraft Constructors' exhibition was key-noted by appeals from British government leaders to push aircraft export sales to a new peak; renewed confidence of British aircraft builders in their commercial products; and a strong British press reaction assuring readers that "British aircraft again lead the world."

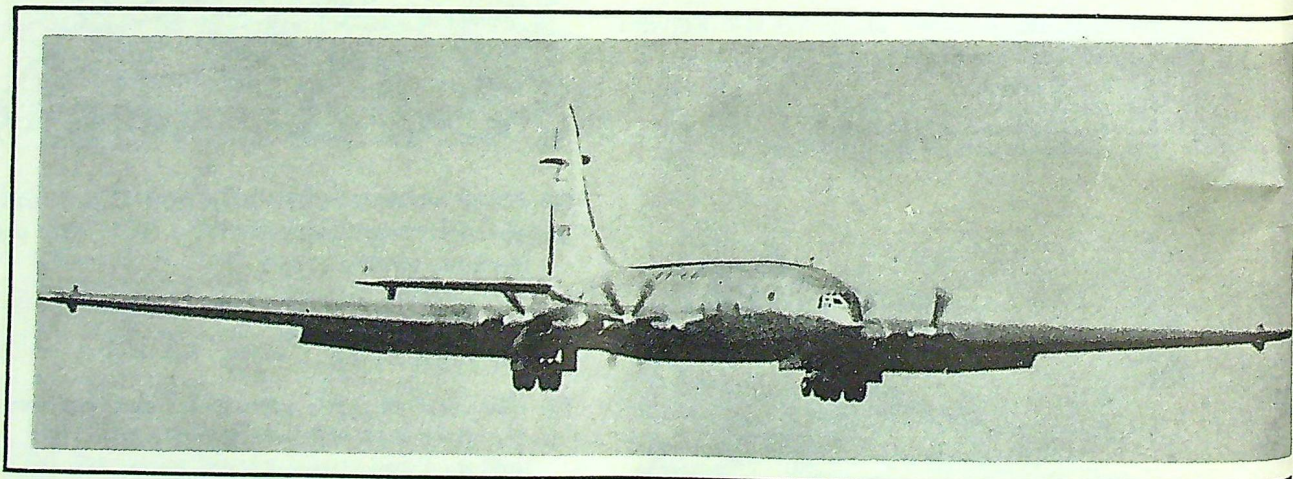
These sentiments were echoed by Sir Roy Dobson, president of A. V. Roe Ltd. and SBAC president who said at Farnborough:

"This show is ample evidence that our dependence on U.S. aircraft is a phase that is now passing. There are planes on view here that cannot be beaten anywhere else in the world and there are other planes coming forward but secrecy prevents them from being shown this year."

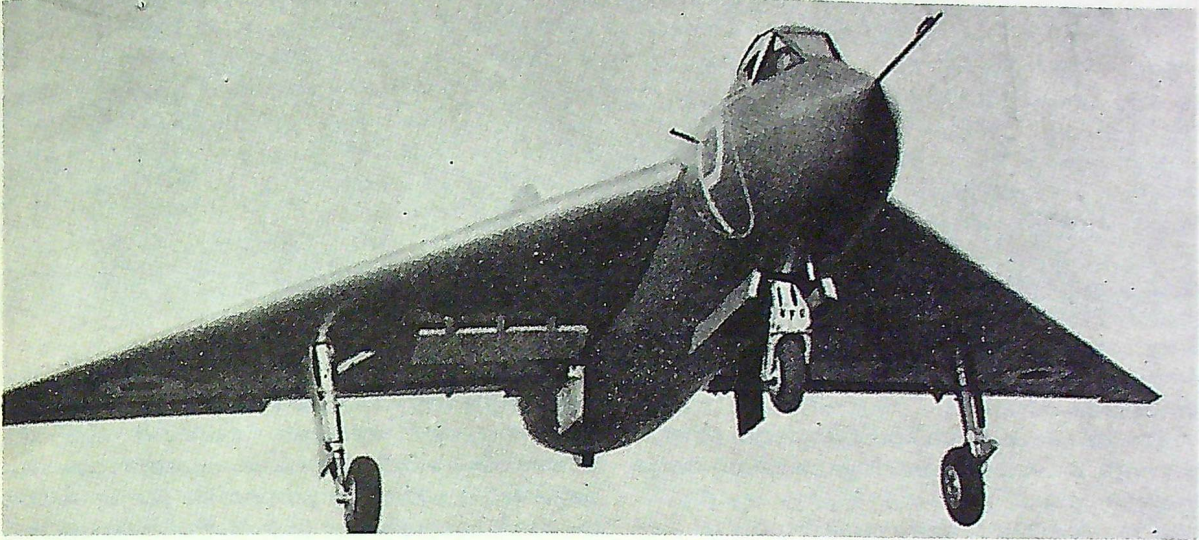
Some British manufacturers took a more sober view, but generally feel they have now emerged from their post-war slump in civil aviation development and are in a position to give American transport builders stiff competition in international markets. Veteran observers of the SBAC show agreed that the 1949 display far surpassed any other since the war particularly in the number and quality of civil transports in the flying stage.

De Havilland Comet

Brightest star in the British transport galaxy, is of course, the de Havilland 36-passenger Comet powered by four DH Ghost (5000 lb. thrust) turbojets. Considerably smaller than the Douglas DC-6 and the Handley Page Hermes series, the Comet is one of those planes that cannot be fully appreciated until it is seen flying.



The Brabazon I



The Avro 707

Although it was flying nearly empty at Farnborough (except for fuel and test instruments) its flight performance in the hands of DH chief test pilot John Cunningham gave observers a good approximation of its flight characteristics.

De Havilland is still extremely secretive on details of the Comet's construction and performance, but the first 35 hours of test flying have seen the jet airliner surpass its designed cruising speed of 500 mph, and its anticipated cruising altitude of 40,000 ft. Comet has reached Mach 0.8. Observers were impressed with its short takeoff run (considerably less than that of an F-80) and the moderate approach and landing speeds.

It is obvious from the long, thin wing combining 30 deg. of sweepback with high taper that the Comet has a wing loading probably not as high as some American transports now in service. Approach and landing are aided by a tremendous flap area extending inboard from the ailerons to the fuselage. The flaps include a special arrangement whereby the under side of the jet engine nacelles are split laterally and the bottom half lowers to become part of the flap area.

The Comet is not a particularly radical-looking plane. De Havilland officials indicated that they modified original design plans to retain more conventional features calculated to reassure

prospective passengers. Of special interest is the manner in which the 53-in. diameter Ghost turbojets have been buried in a thin wing. There is little nacelle protuberance. In a head-on flight view it is hard to spot the Comet's engines.

Miles Marathon

Next to the Comet, foreign interest centered on the biggest exhibition of turboprop powered aircraft ever displayed. The Miles Marathon is a 20-passenger, 254-mph. feederliner powered by two 1400-hp. Armstrong-Siddeley Mamba turboprops.

The Marathon offers an interesting contrast between a piston and turboprop-powered version of the same airframe. Substituting two Mamba turboprops for four Gipsy Queen piston engines increased total horsepower by 600, reduced gross weight by 2200 lb. and increased cruising speed by 43 mph.

Vickers Viscount

A 32-passenger, 276-mph. liner powered by four Rolls-Royce 1300-hp. Dart Turboprops.

Armstrong-Whitworth Apollo

A 31-passenger 305-mph. liner powered by four 1400-hp. Mamba turboprops.

With a gross of 43,000 lb. the Apollo offers payloads of 7500 lb. and cruises at 305 mph. over a range of 1000 miles. This compares with an 1800-mi. range of the Viscount.

The Apollo impressed foreign observers as perhaps a more advanced airframe design than the Viscount but development delays of the Mamba engine retarded its entry into flight testing for nearly a year. The Apollo has a heavy vertical and dorsal fin which should produce good directional stability. British pilots who have flown the Apollo confirm this characteristic, particularly when flying with two engines feathered on the same side.

Like the Viscount the Apollo impresses passengers with its vibrationless flight and low noise level.

Handley Page Hermes V

A 60-passenger, 346-mph. liner powered by four 2800-hp. Bristol Theseus turboprops.

The 85,000-lb. Hermes V is the largest turboprop airliner now flying. It made its first flight only a

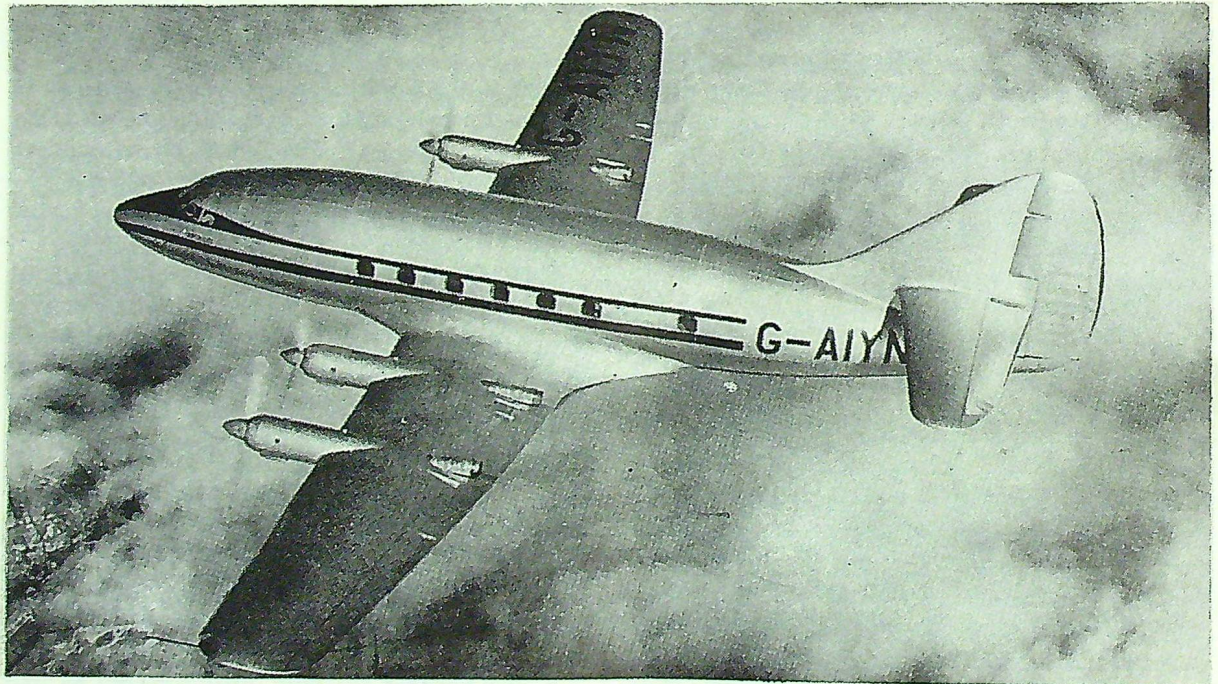
few weeks ago and its first public appearance at Farnborough. Comparison of the Hermes V with its piston-powered counterpart the Hermes IV should provide interesting data on the relative operational merits of the two types of powerplants for airline use.

Britain's largest transport, the Bristol Brabazon I—in later versions also slated to use turboprops—flew over the show once at 180 mph. and 300 ft. altitude, piloted by A. J. Pegg.

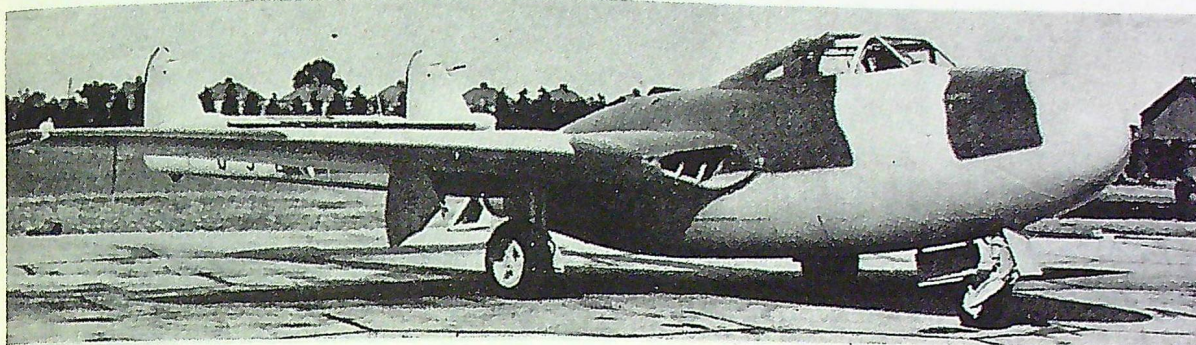
Canberra

Biggest military surprise of the show was the English Electric Co. sky-blue Canberra jet bomber. U.S. observers were not impressed with the Canberra's straight wing and somewhat conventional configuration on the ground. But in the air, the combination of test pilot R. P. Beaumont and the 15,000-lb. thrust from the two axial Avons made the Canberra behave in spectacular fashion.

Its speed range from 500 to less than 100 mph. was ably demonstrated by Beaumont who followed his high-speed passes on the deck with an approach



The Apollo



The DH-113

using full flaps and gear down and bomb-bay doors open that slowed the Canberra to less than 100 mph. At this speed he rocked the big bomber violently with ailerons to show the full control available as it approached stalling speed.

Beaumont whipped the bomber (designed to carry a 10,000-lb. bomb load) around on the deck like a fighter, flying it through a series of slow rolls, high-speed turns and remarkable rates of climb. The Canberra was originally designed for radar bombing at around 50,000 ft. but Beaumont's demonstration convinced many Britishers the new bomber may prove to be another Mosquito in its versatility at everything from low-level attack through night fighting and high altitude bombing.

The Canberra has a span of 64 ft., length of 65 ft., 6 in. Tail stands 15 ft., 7 in. above the ground. Wing has an aspect ratio of 4.3. Fuselage is slung so close to the ground that there is barely clearance for the tandem nosewheel. Mechanics have easy access to the Avon engine nacelles without the use of ladders or work stands. In addition to the pilot the Canberra carries a radar operator.

Delta

Most radical British design on display was the Avro Model 707, a Delta wing research plane. The Avro Delta is roughly comparable in general appearance to the Northrop X-4 and Convair XF-92A. Its Delta wing is located midway up on the fuselage and has a thick root tapering to a thin tip. The Avro Delta has a long dorsal fin but small rudder and vertical fin. Air intakes for the

3500-lb. thrust Derwent 3 turbojet are located on top of the fuselage behind the cockpit. The intake is bisected by the dorsal fin.

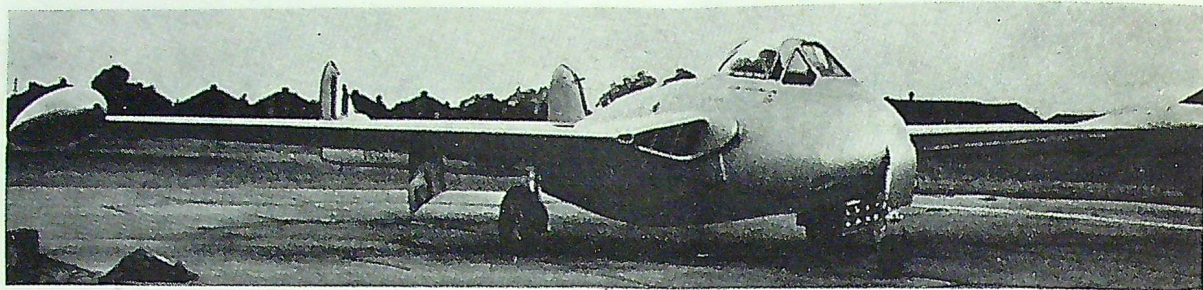
Outboard sections of the wing trailing edge are used for elevon controls with the inboard sections lowering on three supports as flaps. Wing span is 33 ft. and fuselage is 30 ft., 6 in. long. The Avro Delta had had only two hours flying time when it appeared at Farnborough. It is being used as a research plane for an Avro four-jet Delta wing bomber project. The Avro jet bomber is scheduled to be considerably bigger than the Canberra.

Venom (DH-112)

The latest version of the Vampire featuring a 66 percent increase in power and aerodynamic modifications for flight at high Mach numbers. The power plant is a DH Ghost turbojet (5000-lb. thrust). A thin high-speed airfoil has been substituted for the normal Vampire wing. Jettisonable wing-tip tanks have been added for the first time in the Vampire series to increase range. The Venom is in the 650 mph.-plus class and maintains its operational efficiency into the 45,000-50,000 ft. altitude range.

De Havilland Night Fighter (DH-113)

This is the first British jet night fighter and is based on a standard Vampire design. Modifications include a longer cockpit to accommodate a radar operator; an elongated upturned nose to house airborne radar gear; nose wheel strut moved back slightly to give the radar nose more ground clearance; and additional fuel capacity. The night



The DH-112 Venom

fighter, which was ordered into production this spring, is powered by the 3500-lb. thrust DH Goblin engine.

Westland Wyvern

This is the first fighter powered solely by a turboprop. It mounts an Armstrong-Siddeley 4100-hp. Python turboprop in the nose, turning counter-rotating four-bladed propellers and producing jet thrust through tail pipes just above the wing on both sides of the cockpit. The Python is the most powerful turboprop now flying in an operational aircraft and has just passed its 150-hour type certification for both civil and military use. The camel-back Wyvern is being built for carrier service with the Royal Navy and is scheduled to begin carrier trials in October. Present plans call for equipping one carrier air group with the Wyvern.

Gloster Meteor Mark VIII

This is the latest version of the Meteor series and features a redesigned tail aimed at better stability

and high Mach numbers; an elongated nose adding a fuselage fuel tank; and three jettisonable fuel tanks, two on the wing tips and the third fitted under the fuselage similar to the tank on the McDonnell Phantom.

Fighter Trends

The British fighter trend continues basically toward developing the Vampire and Meteor designs through aerodynamic refinements and increased power to produce high speeds and high altitude performance required of modern jet fighters. As yet undiscussed publicly, but definitely in the wind, is a British switch to the rocket-powered interceptor type fighter.

A Vampire and a Meteor were demonstrated equipped with afterburners (which the British call a re-heat) and another Meteor performed fitted with two Avons. The 15,000-lb. thrust behind the tiny fighter was evident in the performance of acrobatics, climb and high speed passes on the deck.

TRACERS

John W. Carr, 1096 Wigle Avenue, Windsor, Ont., wishes to learn the whereabouts of John Hogan who was a Medical Officer at R.C.A.F. Station Leeming, Yorkshire, England, and who is now believed to be practising somewhere in New Brunswick.

Will ex-Flt. Sgt. M. A. Grant (R-134432), Winnipeg, Man., and ex-LAC L. N. Howard, formerly of No. 14 S.F.T.S., Aylmer, Ont., please get in touch with LAC R. B. Trask, M.P.O. 306, R.C.A.F. Station Rockcliffe, Ont.

Murray R. Dawson, 4014 Lillibridge Street, Detroit,

Michigan, U.S.A., wishes to learn the whereabouts of Count W. Lashinski (?), and Henry Mauser (or Manser) of Johannesburg, South Africa.

Mr. and Mrs. Steve Hindle, formerly of No. 16 S.F.T.S., Hagersville, Ont., are requested to contact Mrs. Betty Freestone (nee Betty Lawrence), 612-24th Ave. N., Seattle 2, Washington, U.S.A.

LAC Warren Powell (14193), R.C.A.F. Station Sea Island, B.C., would like to get in touch with ex-Sgt. R. C. Cowdrey (7654), formerly of No. 9 R.D., St. Jean, P.Q.

The Motion of a Hand-Held Camera

by EDWARD P. CLANCY

Dept. of Physics, Mount Holyoke College, South Hadley, Mass.

(Reprinted by courtesy of "PSA Journal")

HOW MANY TIMES have you groaned in dismay when, after your best efforts at adjustment, the image on the focussing board of the enlarger is still fuzzy? Maybe it isn't too bad, but it doesn't have the clean-cut appearance that some types of pictures demand. You put loving care into that negative; what could have gone wrong? The image was sharp on the ground glass of the camera—or, if you used a range-finder, you are sure of its calibration, since you recently checked it. The subject, we'll suppose, was a new statue in the city park, and not given—presumably—to sudden twitches. It's true you forgot to take a tripod along that day, but you limited the exposure to $1/100$ or $1/200$ of a second, so you really didn't have to worry.

Well, this sort of thing has happened to the writer too often to be amusing, and he decided to do something about it. The weak link in the reasoning above seemed to be in the assumption about negligible camera motion during such a short exposure. Just what we mean by "negligible" in a case like this? Oh yes, in the books we've all seen statements like "Little trouble should be encountered at speeds of $1/100$ second or higher. A tripod is scarcely necessary for such exposures". But how well does this hold true when you want to be sure of a reasonably sharp negative?

You may be interested in the results of some experiments which partially, at least, answer the question. These experiments were of two types: measurement of camera motion itself, and measurement of image motion on the negative, in both cases for a camera held at eye-level.

The actual motion of the camera is naturally pretty complex, but it can be thought of as made up of a combination of three simple rotational motions, as shown in Figure 1. This disregards

three other possible motions—movement of the whole camera sideways, up and down, and forwards and back. Actually, however, the last three motions may be disregarded because of their slowness. Reasons? The left side of the camera is held by the left hand, which in turn is "anchored" against the face, and any movement of this type corresponds to the relatively slow swaying of the body. The forward-and-back motion doesn't matter anyway, since it is parallel to the lens axis; even at large apertures the depth of field would be enough to prevent any difficulty.

It would seem, then, that the rotational motions are the ones which may cause trouble. These are caused mostly by trembling of the hands—chiefly the right hand. The implication in the drawing that the camera rotates about its centre is a little misleading, since the pivot point is going to be closer to the steadier left hand.

To test these motions, the following optical arrangement was used: A condenser lens formed an image of an auto headlight filament on a pinhole 0.5 mm in diameter. On the other side of the pinhole a projection lens was placed, at a distance from the pinhole about equal to the focal length of the lens. In this way a narrow pencil of light was formed. A dummy camera with a mirror

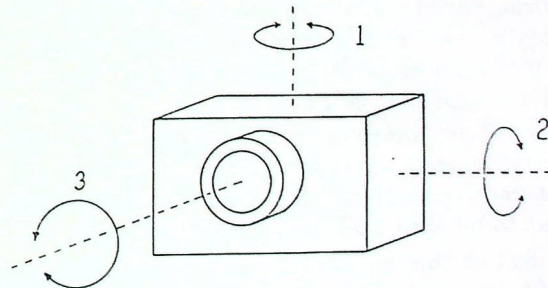
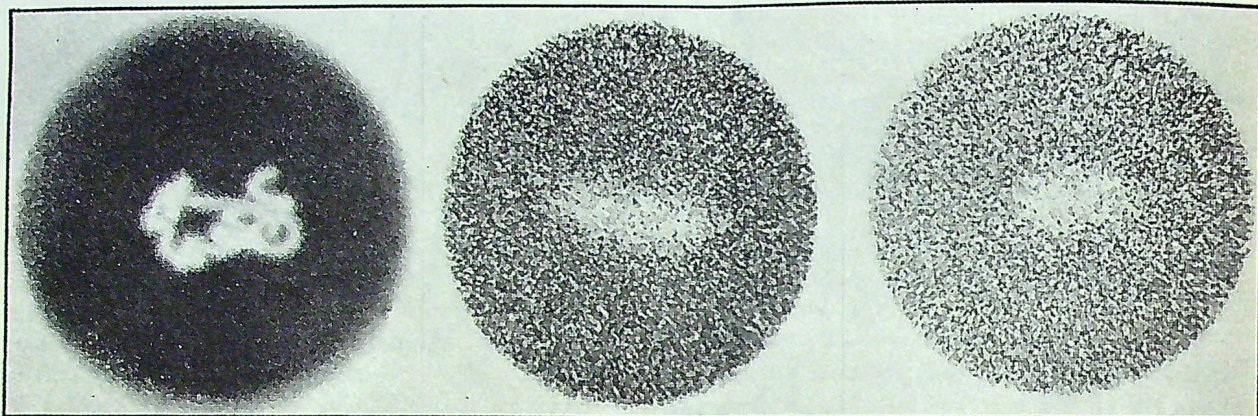


Fig. 1. Rotational motions of a hand-held camera



Figures 2(a) left, 2(b) centre, 2(c) right.
Photomicrographs of typical camera motions.

mounted on its front was held at eye level in the beam so that the reflected ray fell on a ruled screen 400 cm away. An observer at the screen could then easily estimate the average horizontal and vertical travel of the spot, representing motions 1 and 2, respectively (See Figure 1). It turned out that the horizontal motion was always the larger, a typical value being 4 cm, compared with about 2 cm for the vertical motion. These results correspond to angular motions of the camera of approximately 0.6° and 0.3° , respectively. To measure motion 3, the mirror was put on the end of the camera, and the person holding the camera stood sideways to the beam. The motion here was of the same amount as motion 2. (Incidentally, holding the breath seemed to have no beneficial effect whatever.)

As a check on these observations, a real camera was used to make one-second exposures of a distant pinhole. The image of the pinhole, falling on the film in a spot calculated to be only 0.03 mm in diameter, traced out the camera motion during the exposure. The lens was of 135 mm focal length; with such a lens, a rotational motion of 0.6° should cause an image motion of about 1.4 mm. Figure 2(a) is a typical record. A travelling microscope measures its total width as 1.6 mm, showing good agreement. Other negatives give similar checks. Note that the vertical displacement due to motions 2 and 3 is less, as predicted.

But all this leaves the most important question still up in the air: How much of this motion occurs during the short exposures one would

ordinarily use? Photomicrographs 2(b) and 2(c) help to give the answer. They are typical examples of many exposures, with the pinhole as subject, taken at $1/50$ sec. and $1/100$ sec. respectively. The travelling microscope tells us that the corresponding image motion during $1/50$ sec. is about 0.06 mm, and during $1/100$ sec. is (as would be expected) about 0.03 mm. Even the latter motion is great enough to cause serious blurring. It is much greater than any indistinctness arising from grain size or lack of resolving power at small apertures. In fact, it follows that even at $1/200$ sec. or less, motion can be enough to cause trouble where reasonable sharpness of definition is desired. It looks as though the "100 percent-tripoders" may have a good argument, after all!

It might be a good idea to mention, in conclusion, a possibly misleading statement sometimes seen. This is usually to the effect that a given amount of motion is more serious in cameras of short focal length since on enlargement the blurring becomes more obvious. But simple geometric reasoning will show that two prints of the same size, one from a miniature camera and one from a large camera, will have the same amount of blurring provided the rotational motions of the two cameras were the same. The real answer lies, perhaps, in the fact that often the rotational motion of the small camera will be greater, due simply to the fact that its lighter weight means less inertia to oppose the trembling of the hands.

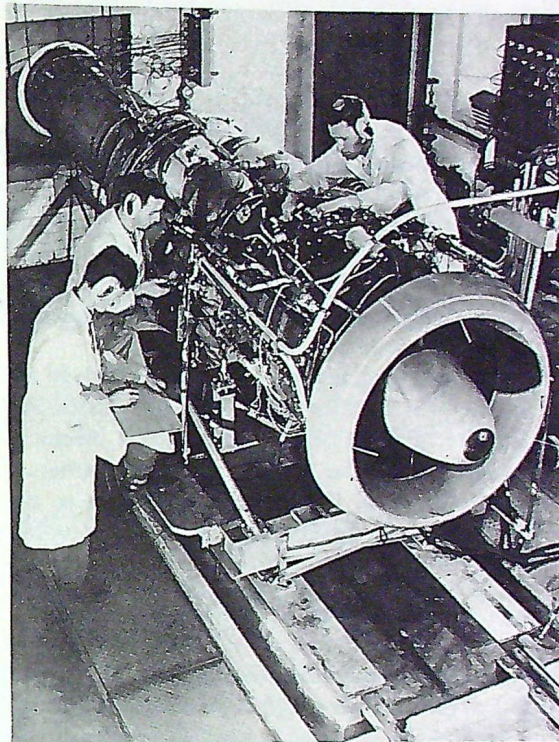
Avro Orenda Jet Engine

The "Orenda" No. 1, which is the first of a number of these jet engines now undergoing test at Malton, has recently been subjected to an endurance run of unprecedented length. At the present time the 3rd build of this engine has run more than 750 hours without a major rebuild or overhaul. This endurance test has been achieved within 8½ months of the date on which this engine ran for the first time.

The endurance run which has been completed to date has included:

1. 150-hour U.S. Endurance Test Schedule.
2. 25-hour British Ministry Special Category Test Schedule.
3. 150-hour R.C.A.F. Type Test Schedule.
4. 50-hour Preliminary Flight Rating Test Schedule (Canadian).
5. 150-hour British Ministry Service Type Test for Turbo-prop and Turbo-jet engines.
6. 50-hour Preliminary Flight Rating Test Schedule (U.S.)
7. Approximately 175 hours of miscellaneous running, including performance running to simulate engine flight conditions, acceleration trials, and endurance running to measure consumptions.

All of the above tests were carried out at the design rating of the engine, that is, the engine was not derated in any way to achieve this remarkable endurance. Only routine inspection and maintenance was carried out, and the only replacements



The Avro "Orenda"

of any significance comprised the replacement of the flame tubes at the end of 300 and 600 hours respectively, and the replacement of 6 nozzle guide vanes which had become accidentally damaged.

These tests were carried out under normal routine test and development conditions but were not under official observance.

Photo by A. V. Roe Canada Ltd.



Miniature Pulsejet

A 16-oz Model with Over 4.25 lb Static Thrust

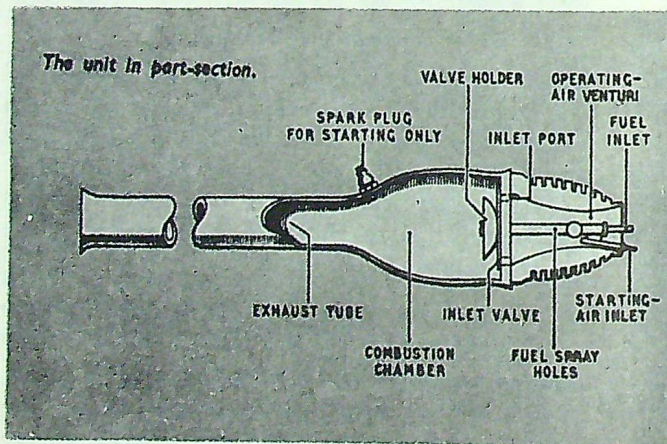
(Reprinted by courtesy of "Flight")

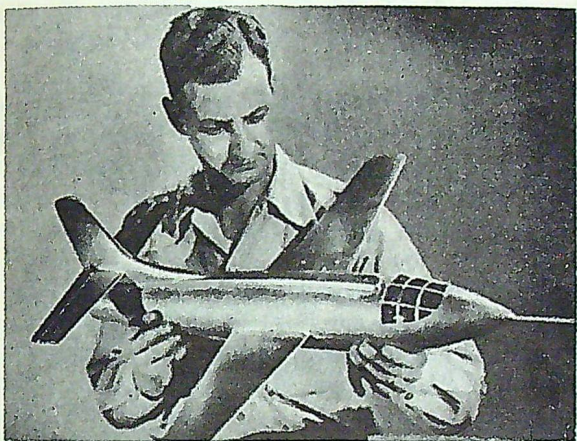
NOT ONLY DOES AMERICA hold the world's speed record for full-sized aircraft; she also holds it for models, at a speed of 179.03 m.p.h. The prime mover which has made such a velocity possible is a pulsejet unit called the Dyna-Jet Red Head—at present not generally available for purchase over here. At least one somewhat similar unit has been under development in this country, but for various reasons—including that of the noise it makes—the type has not so far received much encouragement, and the S.M.A.E. accords it no record category.

The pulsejet principle—which was used in the German V-1 flying bombs—is an essentially simple intermediate between the relative mechanical complexity of the turbojet and the mathematical complexity of the ramjet. Reference to the cut-away view of the Dyna-Jet will clarify understanding of the operational cycle. Air enters the mouth of the venturi inlet in the finned aluminium

nose-cap, and the depression in the throat causes fuel to spray through the feed pipe on the venturi axis. The combustible mixture thus formed flows through a ring of ten valve ports, past the lobes of a spring-steel valve covering the ports, to enter the combustion chamber. On ignition by the starting plug, the resulting pressure-wave first causes a negative pressure, so drawing another metered charge of fuel and air through into the

Dyna-jet installations for control-line of model aircraft and cars.

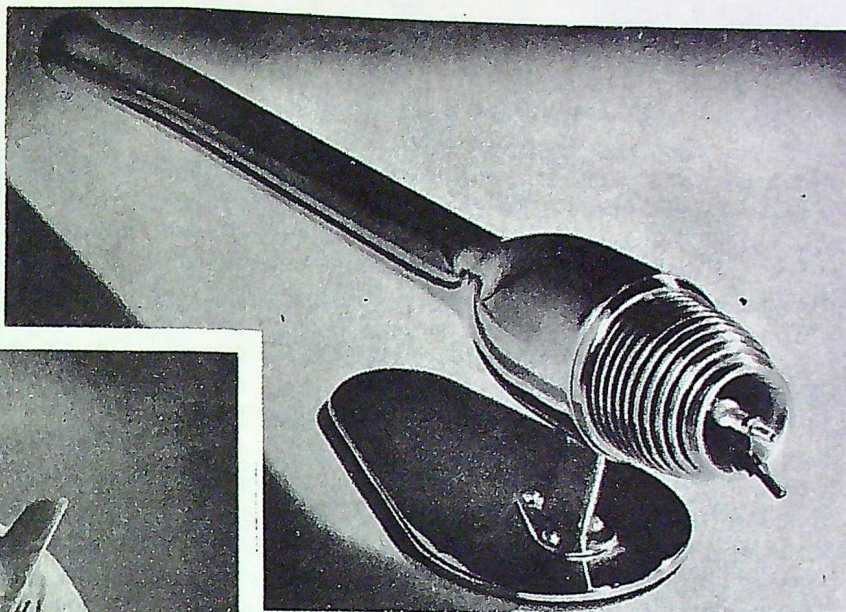




A scale model of the Bell X-1 supersonic research aircraft.

combustion chamber, and then changes to a positive one, closing the valve and firing the new charge by the residual heat remaining from the previous combustion. The process is repeated automatically so long as fuel and air are supplied, the frequency in the case of the Dyna-Jet being 260-280 cycles/sec.

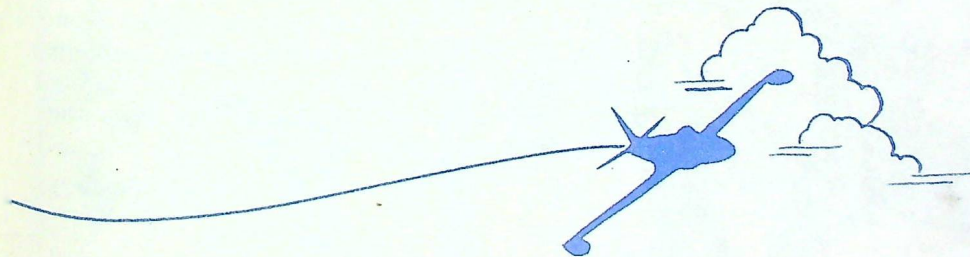
With a maximum diameter of 2.5 in, an overall length of 21.5 in and a weight of 16 oz, this unit is



The Dyna-Jet unit is so compact that, dimensionally, it offers few installation problems. Starting air is provided by a tyre-pump or air bottle. Petrol is the fuel.

claimed to deliver something over 4.25 lb. static thrust. Consumption is 2.5 lb/hr/lb thrust, the fuel being ordinary unleaded petrol.

When a Dyna-Jet is installed in a model, adequate insulation must be provided against heat transfer, for the combustion chamber and tailpipe become red-hot about five seconds after starting. As we can testify from experience, these tiny units make a most penetrating noise—so much so in fact, that it is literally painful at a range of about 10 yards and can, moreover, be heard across an airfield, in the cockpit of a Tiger Moth, above the noise of an idling Gipsy engine.



Celestial Robot

WE GATHER that push-button warfare is still some way below the horizon, particularly the accurate control of long range missiles. While the more purely aerodynamic problems of speed, range and military load are being solved—and, in fact, the aerodynamic know-how for developing a 5,000-mile, 5,000-lb. warhead is currently available—the snag of guiding them squarely on the target remains. The trouble seems to be that most of the accepted methods of guidance (radar, radio, heat, light, etc.) can be too easily jammed or offset by enemy counteraction. And misguided missiles are expensive mistakes.

Some Air Force experts believe that even short-range missiles are so intricate and expensive to build, and their tracking mechanisms so delicate in operation that they can be easily fouled up by comparatively simple counter-gadgetry in the bomber. If this is so, then obviously the problems are multiplied enormously in long-range ground-to-ground missiles. One answer—according to one school of thought—lies within the missile itself. It must not rely on beams of any kind, but must contain an independent guidance element within its own anatomy.

The proponents of this school are pinning their hopes on automatic celestial navigation—that is, the missile will be given a course (preset into instruments) and be sent on its mission computing its own navigation as it flies. Like a human navigator it will take star sights as it wings towards the target, plot “fixes,” and feed them continuously to its automatic pilot for accurate directional flight. (Auto-celestial-guided missiles were reported in *THE AEROPLANE* of October 8, 1948.)

The technical difficulties are imposing, as the missile’s mechanical brain must not only select the right stars from the myriads in the heavens, but it must, in effect, be able to read a sextant, figure out the star tables, plot its position on the chart, compute its drift from the last position report, determine a new heading, and deliver the information to the auto-pilot—without error. On top of all these difficulties there remains the further influence of the weather, but the experts say that long-range missiles will undoubtedly fly in the stratosphere well above the overcast, unhindered by storms, clouds or fog.

(“*The Aeroplane*”)

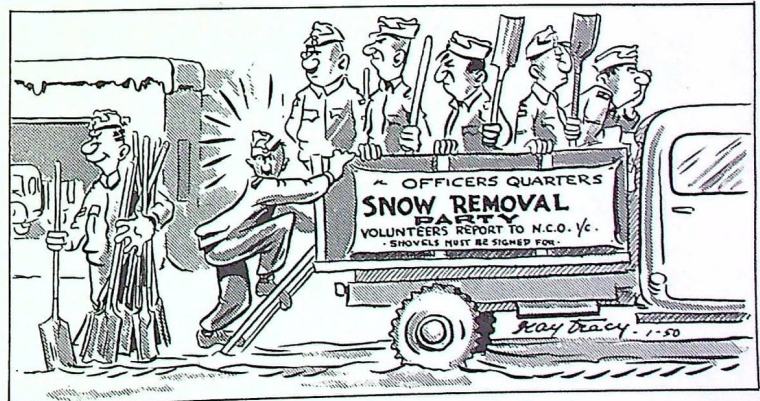
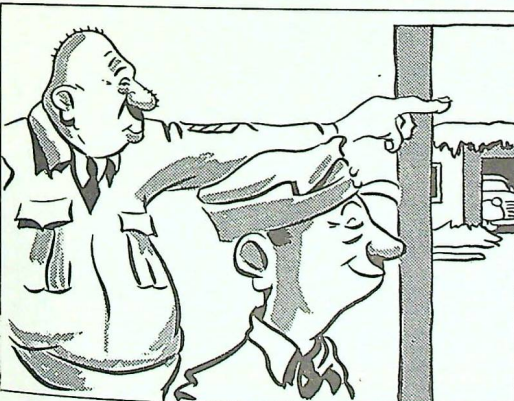
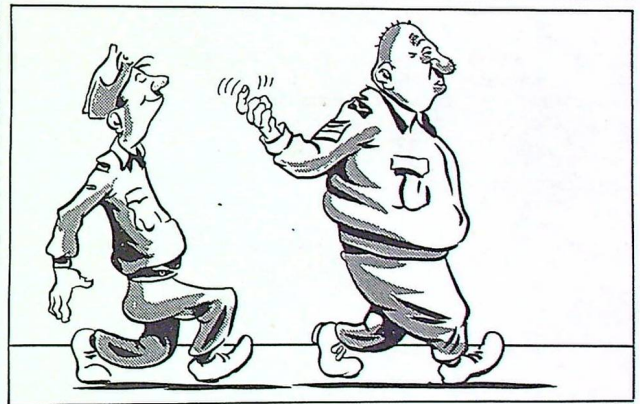
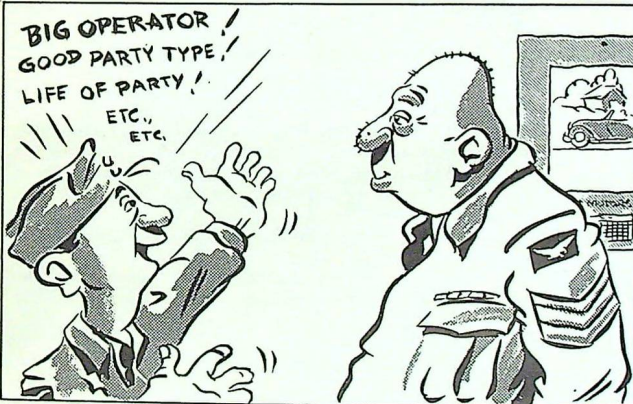
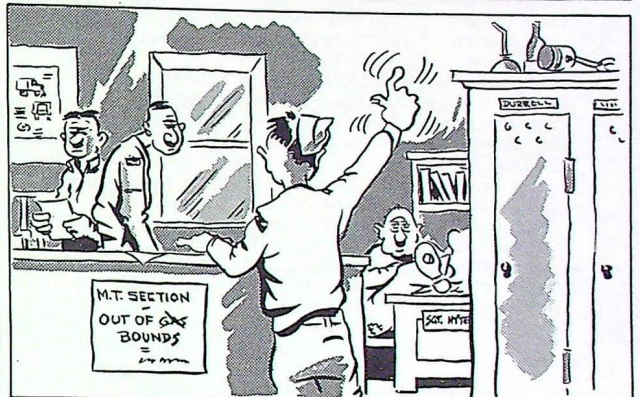
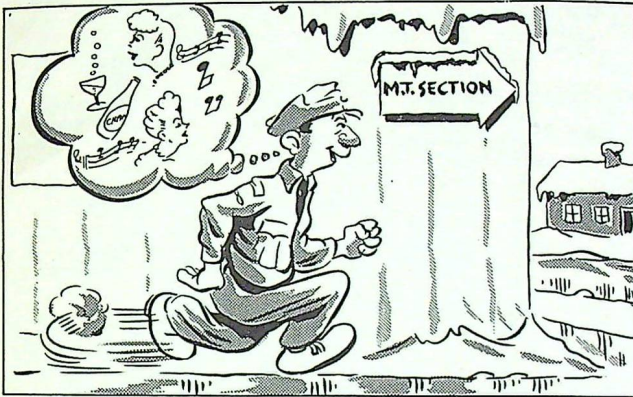
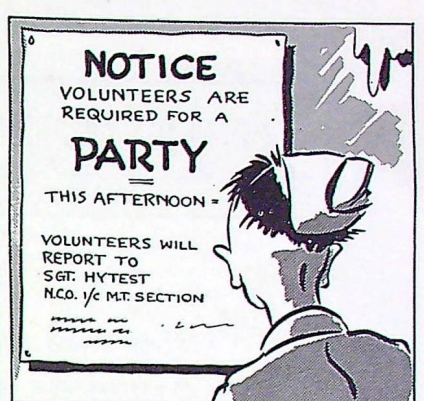
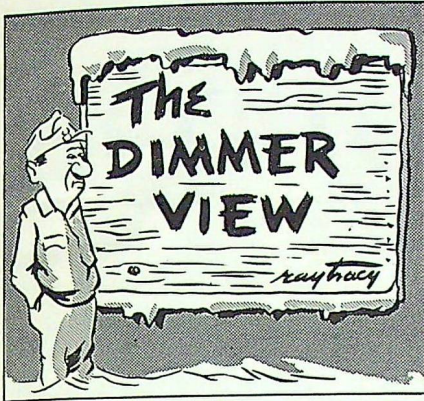
Pilot Ejection

MARTIN-BAKER HAS A new version of its ejection seat ready for experimental flight testing. The new seat operates automatically after the pilot pulls down the canvas protective screen over his



face. The motion also fires the seat. A six-second time switch automatically releases the pilot from the ejected seat after a small drogue chute has slowed and stabilized it. The new seat uses a double charge of nitrocellulose to ease the shock of ejection on the pilot. Seat travels 10 inches from impact of first charge before the second charge is fired. The automatic time switch has a safety gadget that will not release the pilot from the ejected seat over 10,000 ft.

(“*Aviation Week*”)



LETTERS to the EDITOR



A WORD FROM THE RESERVE

Sir:

Herewith a word of appreciation for "The Roundel," from one who was transferred—screaming—to the Reserve, some three bleak years ago and who has been brooding about it off and on ever since. "The Roundel" has supplied the first bright spot. Contact once again!

It's gratifying now to catch up on Service news, to struggle happily and foggily through technical treatises, and to join vicariously in the great Eagle-Albatross feud where I left off. But above all, I earnestly assure you, the most heartening touch is to discover Sgt. Shatterproof still at large in this shaky world, holding the troops together in spite of Hades and high Brass, winning the peace for us the hard way.

And as for those familiar profiles portrayed by Tracy, they have evoked persistent pinings for the good old days and the good old congenial types. At least, they did until the September "Dimmer View" re Postponed Inspections revived a few seething personal memories. You mean they're still doing THAT to the lads?

Mary L. Mark,
Woodstock, Ontario

GERMAN LESSON

Sir:

It is perhaps unfortunate that I have always been interested in languages and things academic for, so it seems, it has made of me a pedant. Since reading Part 2 of Flt. Lieut. Mahoney's article on Stalag Luft III, I have been puzzling your derivation of the term "kriegie." The footnote on page 4 explains that it is "from the German word 'briegsgefanger,' meaning 'prisoner of war.' Should the correct word not be 'kriegsgefanger?'"

LAC J. J. Bidley
(LAC Bidley is indeed a scholar and we humbly acknowledge our error.—Editor)



G!

IN THE JET aircraft division of the Thompson Trophy race, held at Cleveland on September 5th, Captain B. Cunningham of the U.S.A.F., flying an F-86 Sabre, is reported to have completed the ninth lap of the 15-mile circuit at an average speed of 635.4 m.p.h. Fuel shortage on the tenth and final lap reduced his average for the course to 586.173 m.p.h.—in itself a remarkable performance for a closed-circuit race.

48

A HOWL FROM THE PRAIRIE

Sir:

The ever increasing and persistent indifference of your estimable magazine to the mere existence of R.C.A.F. Station Winnipeg is becoming a matter of gravest concern to the very sensitive though bright spirits of personnel of said Station.

Whether this indifference might be termed in the nature of "mental cruelty," "incompatibility," "with malice aforethought," or whether "The Roundel" is merely exercising the prerogative of the wily coquette who, with haughty demeanour and shrugged shoulder, entices the adored to pursue, is somewhat difficult to determine. Whatever the reason, R.C.A.F. Station Winnipeg is huffed, repeat huffed, and simply refuses to be ignored any longer; although, mark you, as disciples of the prophet Browning "we choose never to stoop."

Arguing in all fairness, therefore, we feel that R.C.A.F. Station Winnipeg, comprising 111 T.A.C. Group, 402 Reserve Squadron A.T.H.U., etc., is one of the finest in Canada, bar none. Was not R.C.A.F. Station Winnipeg the proud and blushing foster parent of the Air Cadet Summer Camp at Gimli, nourishing the brat in its infancy, teaching the arts of walking, talking, swimming and flying; in short molding from the earth earthy, the stuff of which airmen are made? Did we not flourish a banner at the Minneapolis State Fair? Do we not possess the most intelligent Signal's Officer in the Dominion? Have we not the hardest working O.C.'s and Accountant Officers (two of the latter being bottle-fed products of A.F.H.Q.) interpreting Air Force Regulations with the persistence and calm assurance of bishops interpreting Holy Writ, though with a faint difference in vocabulary? Does this Station not possess a conscientious S.W.O. who exhumes the latent and oft-times non-existent housekeeping proclivities of the humblest AC2 to make of the Station itself a "thing of beauty and a joy forever"?

R.C.A.F. Station Winnipeg lives, loves and has its being in all of these things.

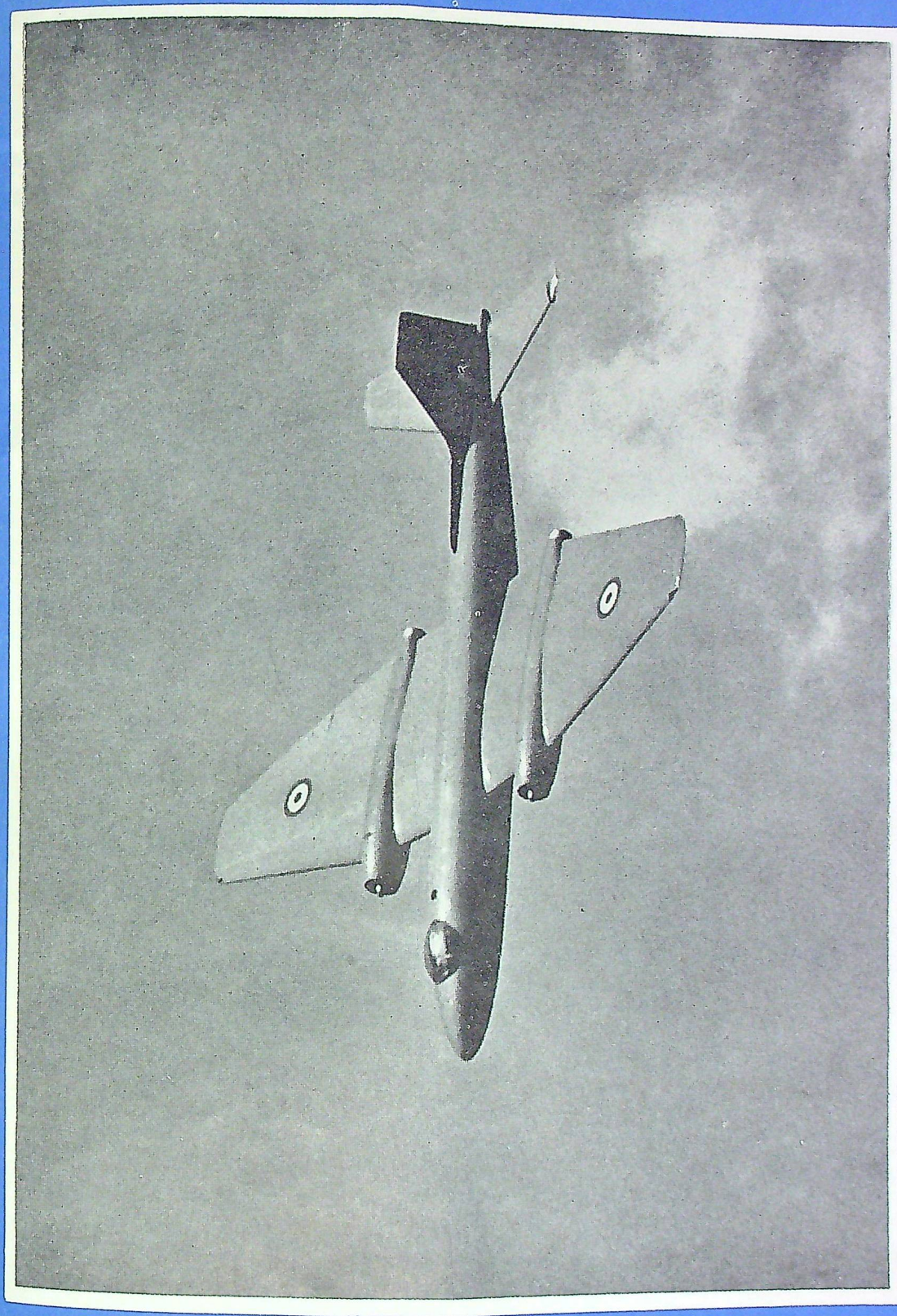
And, after all, as the kitten said when she investigated the airman's boot, "It's the sole of the thing that counts."

THE RECORDING ANGEL



Answers to "What's the Score?"

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



Shell Aviation News

The English Electric Canberra

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