RAF COLLEGE CRANWELL
“College 100 Memories”

A Summary of College Items - Chapter 5
College Flying - 1920 - 2020

Prologue

If ever you are required to research something on the heritage of the RAF College - it could be looking up details of a relative who might have been trained at the College, or it could be a more complex review of specific trends throughout its 100 year history - inevitably you will be encouraged to explore the Library's holding of College Journals.

In addition to many other records held within the College and other, third party archives, these journals contain a wealth of information on the milestones, the events and the thinking that underpinned College operations. They are essential reading for anyone who wishes to gain an understanding of how the College evolved and took on the challenges that confronted the world's oldest air training academy throughout its marvellous history.

As its contribution to "College 100" - the celebration of 100 years of officer training at the RAF College - the Cranwellian Association has created a suite of albums that capture RAF Cranwell's heritage. Not least are the albums, one for each year of the College's existence, that reproduce extracts from the College Journals.

This particular album is one of six chapters that portray 100 topics - 'memories' per se - each drawing on Journal extracts in an attempt to summarise life at the College throughout its history, from a variety of perspectives. They are extracts of original articles in the Journals and so their accuracy is dependent on the authors of the day; the dates in each slide title indicate each article's date of origin.

We hope "College 100 Memories" gives you an enjoyable insight into life at the College between 1920 and 2010. Happy reading.

Memories that Symbolise College Flying in 100 Years

To start any specific article:
1. Note the slide number shown in red on this page; then
2. Scroll to the slide number shown in the article, e.g. 4

Spring 1930 - Schneider Trophy (1a)

THE SCHNEIDER TROPHY.

A Viewpoint by Flight-Lieutenant H. R. D. Waghorn, A.F.C.

It was with rather mixed feelings that I took my first look at the sea on the morning of the Schneider Trophy race. After a period of training made up of a series of disappointments, I fully expected that the "Weather King" had some card up his sleeve which he would produce on that memorable day. It did not require much to cause a postponement, which would be a source of disappointment to thousands of people. The slightest swell or white horse on the one hand and dead calm on the other were the limits that bounded our capabilities.

The day was unique, a deep blue sky of a type rarely seen in this country, coupled with an amazingly good visibility. At the time, it was blowing ten miles an hour, and all was bustle on the tarmac. Some machines were already on their pontoons, while others were black with mechanics using the last minute for finishing-touches. The machine that I was to fly, the Supermarine N247, was not out yet.

Only eight hours before, one of the Rolls-Royce mechanics noticed a small bit of metal on the electrode of one of the plugs. Uneasy, they removed the block to find a seized piston and a hopelessly scored cylinder. What bad luck! No one considered it possible to be able to change the cylinder block of this particular engine in the time left. Under ordinary conditions, Rolls would not undertake it while in the machine; and it was midnight before the race! The story of how that block was changed, how their specialists (by chance in Southampton) were woken by police, is well known. Suffice it to say that these mechanics did it, and by so doing saved the trophy.

It was about 10.30 on Saturday morning when N247 came out of the hangar and had its final run-up. Soon after this, she was put on her pontoon and joined the queue of shipping which was still emerging in one long stream from Hamble River and Southampton Water. She had about two miles to go to the place that had been decided on for our take-off point. This was between Lee-on-Solent and Calshot, and so chosen because of the wind which was south-east. Here were already anchored the big pontoon and the three Macchis and our other pontoons with Greig's and Atcherley's machines on board. There was also the official starting ship—the *Medea*.

At about seven minutes to two, my engine was started by Lovesay, the Rolls expert, and was run by him for barely two minutes. I then climbed in and made myself as comfortable as possible. At two minutes to two I was lowered into the water and started to take off immediately.

I will here digress slightly and describe in detail the procedure followed up after opening the throttle, as the S6 was in many ways peculiar. Owing to the slow revs. of engine and propeller, coupled with the great power and consequent great torque effect, the first thing that happened on opening up the engine was that the left wing tried to dig itself into the water. This almost submerged the left float, and the drag so produced swung the machine rapidly to the left, making her quite uncontrollable; the more the machine swung to the left of the wind, the more rapid did the swing become until centrifugal force became greater than the drag of the left float, and she would suddenly throw her right wing down rather violently, making it essential to shut off the engine.

With a fairly fresh wind and full load, it is advisable to take off directly into wind, and with that end in view we found it essential to point the machine about 70 degrees to the right of the wind and to have right rudder on from the start. The machine then runs along with its left wing a few inches from the water across wind, but not swinging. She is clear of the spray, which up to 30 m.p.h. completely envelops the pilot. Having got her, therefore, running across wind at 40 to 50 m.p.h., one is now confronted with what is really the trickiest part of the proceedings, and that is to get her into wind without letting her swing right round, which she will want to do. Once left rudder is applied, the machine will accelerate rapidly and, provided you have not put on too much rudder, should reach her hump speed by the time she is directly into wind. At this point she assumes a new position on the water—very much lower in front—and accelerates rapidly up to taking-off speed. She seems to leave the water at about 100 miles an hour, and I have never been able to take off with full load without two or three bounces.

To return to the race, once off the water I made my way towards Old Castle Point, and then turned left and dived down over the starting-line at about 350 miles an hour. The pylons were mounted on destroyers, and stood out quite well, provided they were not anchored against a background of shipping. We could not get a view directly ahead, and had to pick up the correct line largely while turning the previous pylon. On the long legs, we picked our course mainly by landmarks or shipping which we passed near. As an example, the Seaview turn was anchored, say, half a mile from the shore. By plotting our radius of turn on the chart, and from previous practice, we knew that we should have to have the coast, say, 500 yards on our right. By aiming to do this, we would arrive in approximately the correct position; when about 200 yards off the pylon we could see it, so that the actual turn itself was gauged with the pylon in view.

The first lap was naturally the most difficult, because we were not used to the various groups of shipping which afterwards helped so much to our course-keeping. As an example, while passing the Seaview turn on my first lap, I looked for the Chichester turn-ship and picked out the only isolated vessel in that area. I made for it, and while still some little way from it saw the pylon away on my left. I had been quite unable to see it, as it had had a background of shipping immediately behind it. The ship which I had mistaken for the turn-ship was in fact an oil tanker, and should not have been allowed to stray where it had. Atcherley, indeed, turned round it. My own détour cost me six miles an hour, and that is the reason my first lap speed was only 324. From the Chichester turn I could see the Southsea pylon while still turning and had no difficulty at all in passing it, the esplanade on my right being also a great help. Next I came to what was the most difficult leg of the course—that from Southsea to Cowes—as there was no land and practically no shipping to guide one on approaching the turn. To make matters more interesting for the competitors, someone had conveniently parked a flotilla of destroyers immediately behind the pylon; hence the amazing turns of some of the Italians embracing all the destroyers. I think in any future race (if there is one) the authorities should make quite sure that there be a lane quite clear of ships behind the pylon as viewed from the direction of approaching aircraft; this, of course, is not the same thing as a lane in continuation of the actual course, since the aircraft approach the turn very wide. Once round the Cowes turn the course was plain sailing again, there being plenty of shipping and the shore of the Isle of Wight to help one.

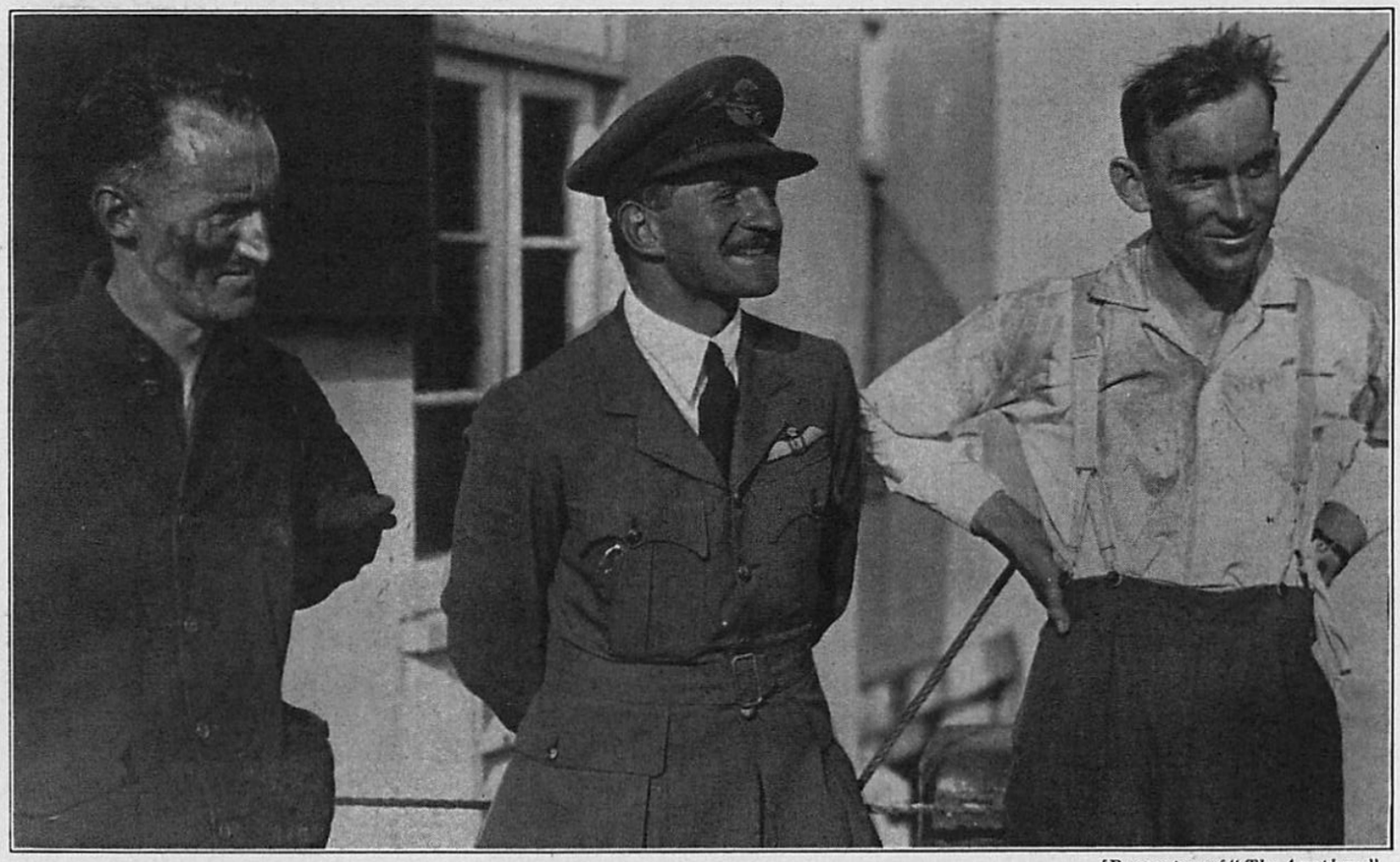
I had completed several laps, everything was going beautifully—never a miss from the engine, and the machine handling perfectly—when I noticed the Italian Macchi diving towards the starting-line just as I was coming up to

Spring 1930 - Schneider Trophy (1b)

the Cowes turn; at the Seaview turn I could not see him at all; at the Chichester turn I saw him a speck in front, and at the Southsea turn I saw him disappearing over Alverstoke—this time much nearer, and as I was obviously overtaking him rapidly, the question was, would I overtake him on the straight before the Cowes turn or just after? I hoped for the latter, for if I should catch him before the turn, I should not be able to see him. However, it planned out as I hoped; for, on rounding the Cowes pylon, I saw him just coming out of his turn a few hundred yards in front. I decided to pass him on the inside, and swung about a hundred yards to the left to clear him. I passed him about half-way down the straight.

By now, I had completed five laps and everything was going just as it should. The air in the cockpit was very hot, but, owing to a stream of fresh air from the ventilating pipe over my face, I was not too uncomfortable. An attempt to rest my knees on the sides of the fuselage was abruptly stopped when I discovered that they were to all intents and purposes red-hot; a slight exaggeration, perhaps, but that is what it felt like, and through my slacks, too! I was flying at about 150 to 200 feet, as I found that at that height I got the best view of the course, and it was sufficiently low to be able to keep level. I had been running all the time somewhat below full throttle, as, owing to the unexpected increase in power and consequent petrol consumption of the engine, she would not last the course with the petrol we were able to carry safely. The rate that petrol can be poured out of a two-gallon tin will give some idea of the rate that the engine was consuming its petrol during that race. I had therefore been told on no account to use full throttle, as I should not finish the course; imagine, then, my feelings when the engine momentarily cut right out and started missing badly just after I had finished what I imagined was my sixth lap! Would the Rolls engineers ever believe that I had not given full throttle? I began to gain height and continued round the course with the engine spluttering and only taking about half throttle. I climbed as much as possible, in the hope that, should she run right out, I could perhaps glide the remaining distance over the line; I was, incidentally, getting a very fine bird's-eye view of the entire course, but under the circumstances was not impressed. I got to the Cowes turn and, while banking, the engine cut out completely, and I was forced to land off Old Castle Point—only a few miles short of the finish. I leave my feelings to your imagination.

It was twenty minutes later that I learnt I had done an extra lap, and I also realized how deadly accurate had been Lovesay's estimation of the petrol consumption.

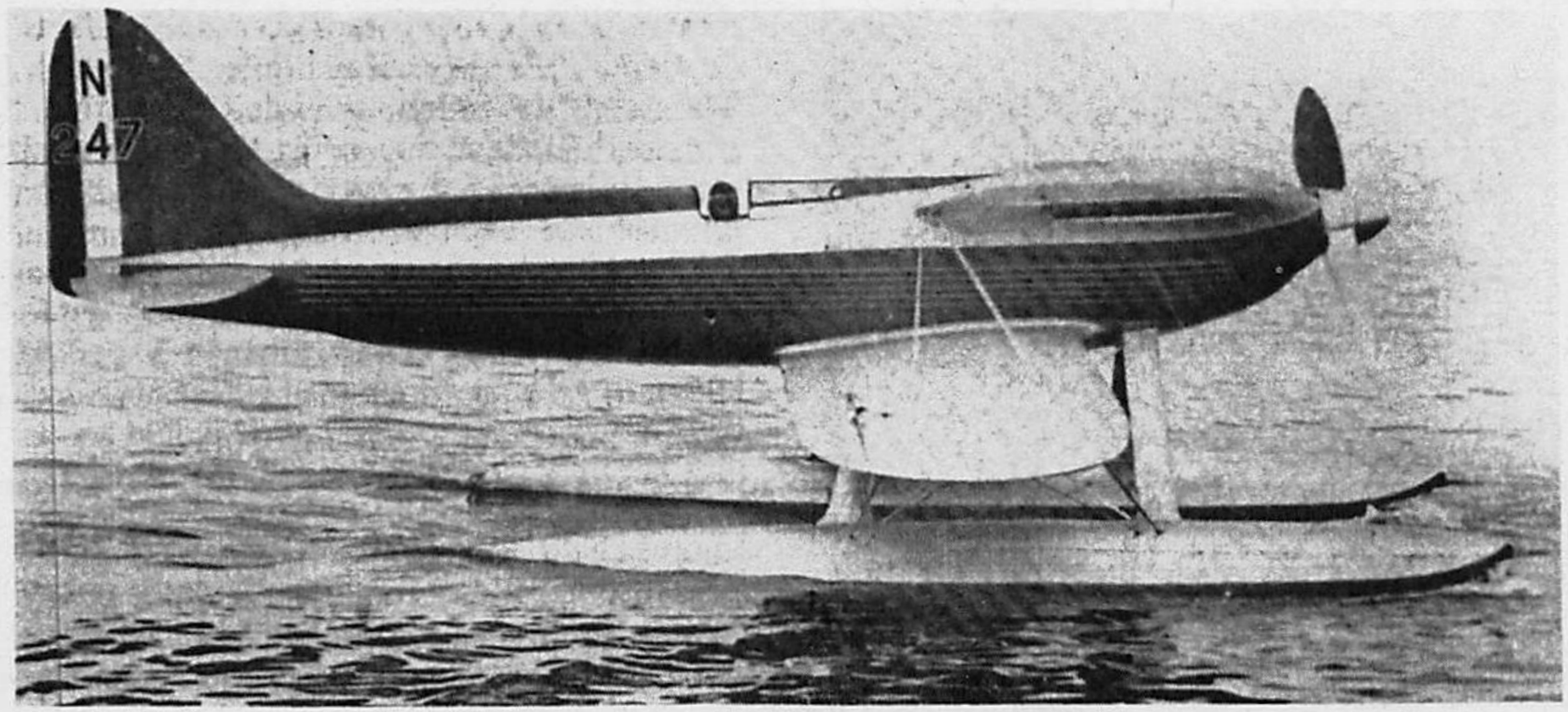


[By courtesy of "The Aeroplane."

F./Lieuts. GREIG, WAGHORN AND ATCHERLEY AFTER THE SCHNEIDER COMPETITION—SUMMER, 1929.

1980 - Schneider Trophy (2a)

THE SCHNEIDER TROPHY



The record breaking Supermarine S6

1980 - Schneider Trophy (2b)

When the French aviator Jacques Schneider conceived the idea of a special contest for sea planes few people foresaw the development of the most coveted international air race of all time. Within 10 years of its inception in 1913 the Schneider Trophy had captured the hearts and minds of aviators throughout Europe and the United States and the frantic race to develop reliability and speed in the seaplane had a far reaching influence on aviation. 1981 is the fiftieth year since Britain won the trophy outright, a fitting occasion on which to recall this historic event and to pay tribute to all those, including 2 famous Old Cranwellians, who played a major role in bringing the trophy to this country.

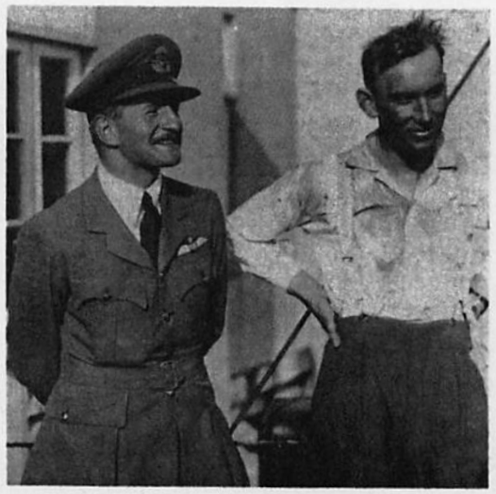
Three wins in 5 years were what was required to retain the trophy permanently. After being curtailed by the 1914-18 war, first the Italians in their Savoias and Maachis and then the Americans in their Curtis bi-planes dominated the race. The success of the Americans with a strong military team, thoroughly prepared and financially supported, changed the course of the trophy. Previously, it had been essentially a private flying club venture; now national prestige was at stake. Britain had had only scant success in winning the trophy. Wins in 1914 and by Henri Biard flying a Supermarine Sea Lion II in 1922 had been our only victories. However, after the Government-backed Italian team wrested the trophy from the seemingly invincible American military team in 1926, the decision was made to form a High Speed Flight within the Royal Air Force. With Air Ministry and Treasury support – albeit reluctantly given – the Royal Air Force at last had the opportunity to prepare for the trophy in a professional way.

The 1927 race was to be held in Italy in September and Britain had very little time to get ready. The aircraft from Supermarine's, Gloster's and Short's arrived just in time for a few quick trials before being despatched to Venice. Nevertheless, the British performances were magnificent. Flight Lieutenant S. N. Webster came first in a S5 with an average speed of 281.65 mph and Flight Lieutenant O. E. Worsley second in a similar aircraft. Flight Lieutenant S. M. Kinkead, who was to be tragically killed the following year going for the high speed record, force-landed his Gloster IV B on the fifth lap. None of the Italians successfully completed the course; the engines of the Maachi M52s had been over-boosted and were unable to withstand the strain of the race. For Britain it was a great victory and the combination of high quality pilots and first class engineering support augured well for the future.

The next race in 1929 brought together 2 Old Cranwellians who had already made their mark in aviation. Flying Officer H. R. D. 'Waggon' Waghorn and Flying Officer R. L. R. 'Batchy' Atcherley were posted in as pilots on the High Speed Flight. They had joined the Royal Air Force College Cranwell on 15 September 1922 and both were to prove themselves airmen of very special qualities. They were commissioned on 31 July 1924, Waghorn demonstrating his leadership potential by winning the Sword of Honour and Atcherley showing his already outstanding airmanship with the Groves Memorial Flying Prize. Both gained international recognition in the late 1920s as star turns in the air shows that Trenchard had introduced to make the British public more air-minded.

The intense interest in the 1929 race at Calshot was heightened because the British in the new Supermarine S6 and the Italians in their Maachi aircraft were flying virtually untried and untested machines. With the seaworthiness trials behind them, the day of the air race over Southampton water was calm and clear. Waghorn went first and miraculously everything went according to plan. His average speed over the 350 kilometres was a record breaking 328.63 mph. Unfortunately, he was unaware of the celebrations below as, believing he still had a lap to complete the S6 ran out of petrol. His despair at 'failure', his bewilderment at the enthusiasm below, were to turn to unbridled delight.

Atcherley was flying the other S6 and, drawn last, he knew exactly what was expected of him. In taking off, however, he porpoised badly in the worsening sea conditions, had to tear off his goggles rendered opaque by oily water and from then on had sighting difficulties. Nevertheless, after a haphazard first lap, he improved rapidly picking up the 50 and 100 kilometre records. His average speed of 325.54 mph gave him second place but the race judges ruled that he had fouled the course by passing inside a turn on the first lap. Although he forfeited second place his records were to stand. He also broke the air speed record with 370 mph. Flight Lieutenant D. D'Arcy A. Grieg was third in the older S5.



Waghorn with 'Batchy' on his left.

The British entry for the 1931 race nearly did not take place. The Socialist Government of Ramsey MacDonald refused financial support and, only after persistent attacks in the press and Parliament, reluctantly authorised the defence of the trophy. The British entry was finally saved by Lady Houston who, in a magnificent public-spirited gesture, guaranteed £100,000. Britain had just 7 months to prepare.

Our competitors that year, France and Italy, were dogged by bad luck and losses of both pilots and aircraft. As the day of the race drew near both countries had to withdraw, leaving Britain and the RAF team with the S6Bs as the only competitors. Flight Lieutenant G. H. Stainforth went for the speed run and broke all previous records with an average of 379 mph. Flight Lieutenant J. M. Boothman had the first chance to fly for the trophy. He duly completed the course at an average speed of 340.08 mph thus permanently securing the trophy for Britain.

The 1931 victory brought to the end the greatest international air race of all time and marked the climax of a tremendous surge forward in aviation history. In the Supermarine S6 Britain had produced an all metal monoplane which was the fastest, and arguably the safest, in the world. Moreover, in designing an aircraft to win the Schneider Trophy, Britain had produced the first real prototype of the fighter aircraft of the future, the aircraft from which Mitchell was to design the Spitfire.

Without the vision of Schneider in creating the most thrilling air race of all time, the dedication of British designers and engineers in their pursuit of aeronautical progress, and the brilliance of the Royal Air Force pilots, such as Atcherley and Waghorn, the generation of British Fighters, which were to play a crucial part in saving Britain from defeat by the Germans, would never have emerged.

Sadly, Waghorn never saw the outright victory by his colleagues in 1931. Having won the trophy in 1929 and an AFC for his feat, he left the High Speed Flight in the Spring of 1931 on temporary attachment to the Royal Aircraft Establishment at Farnborough. He had only been there for a few days when he was tragically killed testing a Hawker Horsley. Flight Lieutenant Waghorn died on 7 May 1931. For a man of his very special attainments and immense potential his death was a tragic loss to the Service. In 1975, in recognition of the service he rendered to his country, a memorial, a bronze eagle, was removed from his grave near Farnham and re-erected in the Officers' Mess Gardens at Farnborough. The memorial was unveiled by his son.

After the 1929 race, Atcherley was posted overseas and went on from success to success. He distinguished himself throughout the Second World War as a brilliant leader and a man of outstanding integrity and courage. His progress continued until his retirement from the Royal Air Force in 1958 as Air Marshal Sir Richard Atcherley KBE AFC. He died on 18 April 1970. His life had spanned the birth and growth of the air age; he was born in the year the Wright Brothers made their historic flight and died a few hours after the spectacular voyage of Apollo 13.

The Waghorn Memorial

March 1954 - New Zealand Air Race (1)

The New Zealand Air Race, 1953

From London to Christchurch in One Day

By FLIGHT LIEUTENANT ROBERT FURZE

To Flight Lieutenant Furze, of No. 47 Entry, fell the signal good fortune of flying a Canberra P.R.3 in the England to New Zealand Air Race in October 1953. He, with his navigator, Flight Lieutenant Harper, after several strokes of ill fortune, secured third place, missing second place by only two minutes.

The total time for the journey from London to Christchurch was 24 hrs. 34 mins. and the total distance about 12,300 statute miles. The average speed was 500 m.p.h., or an average airborne speed of 545 m.p.h.

We should like to congratulate pilot and navigator on this fine performance and thank Flight Lieutenant Furze for preparing the account of the flight which we print below.

Preparations

THIS story begins in December 1950 with my posting on to No. 101 Squadron, the first unit in the Royal Air Force to be equipped with Canberras. From the first announcement that the Service would enter a flight of jet bombers in the race, the Canberra squadrons in Bomber Command had been humming with conjecture about the identity of the crews who would take part; but Command Headquarters kept us guessing. Not until my return from a long week-end in April of last year did I know that I was to be one of the lucky pilots on the Air Race Flight, and that in June the flight would be established at Royal Air Force Wyton. The three crews were captained respectively by Wing Commander Hodges (who commanded the flight), Squadron Leader Press and Flight Lieutenant (now Squadron Leader) Burton, with my crew as a reserve.

* * *

Training began there immediately on the B.2, which is the bomber version of the Canberra, until the arrival of the competition aircraft from the makers. These were four standard P.R.3 machines fitted with extra tankage and radio compasses. Finally the prototype P.R.7 joined the flight a month before the deadline. The Mark 7 is also a standard design, but is an improved version of the P.R.3.

Our training flights had a threefold object:

(a) to familiarize the navigators with the route and the aids available;

(b) to evolve a race technique which would give the best results within the performance limits of the aircraft; and

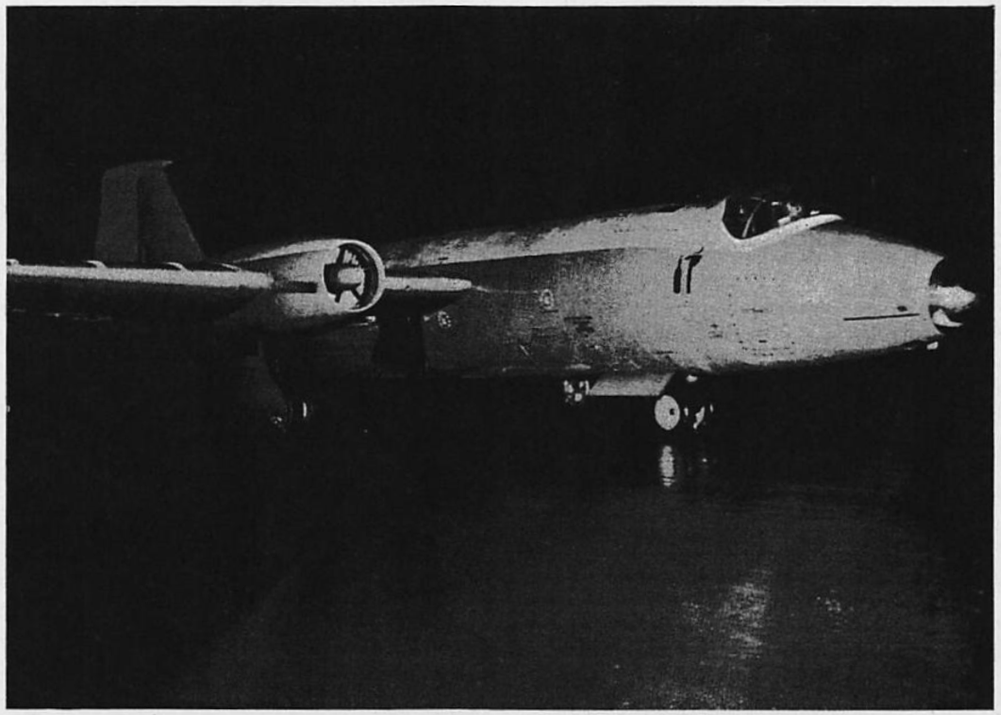
(c) to accustom the crews to flying long distances at altitudes with the minimum of time spent on the ground.

These three requirements were met by flights from U.K.—Shaibah—Malta—U.K. in a day, and others of a similar nature over a different part of the route.

It is outside the scope of this article to examine in detail the navigational methods used. The salient features were the lack of visual pinpoints (since we flew over the land by night and over the sea by day), and our consequent reliance on accurate radio aids. Of equal importance was the need for precise forecasts of upper winds.

The second aim of our training was to find a way of reaching Christchurch as quickly as our aircraft could take us there. This meant striking a balance between the conflicting demands of range and speed. To cover the distances on the longer legs it was imperative that we flew at, or above, 30,000 feet. The problem still remained, however, of determining how fast above the range speed we could fly to leave untouched a safe reserve of fuel. The solution was found in a 'how-goes-it' graph on which speed was plotted against fuel remaining and 'distance to go.' The graph showed these values between thirty and fifty thousand feet so that the cruising altitude could be changed if necessary.

It was found in practice that a temperature increase of 10°C. resulted in an approximate increase of 10 knots in T.A.S. Similarly a change of .02 in Mach number achieved the same effect. Therefore, if the fuel remaining at a given time was above the 'safe line,' then the aircraft could either descend about 5,000 ft. to take advantage of the speed increase from the higher temperature, or the Mach number could be increased at that height. But the captain had to bear in mind other considerations, such as wind changes with height, the height of the tropopause in his latitude (since this affects temperature change with height), and in the second instance, the effect of compressibility arising from an increase in Mach number.



The Canberra aircraft, piloted by Flight Lieutenant Furze and navigated by Flight Lieutenant Harper, landing in the rain in the early morning of 10th October (New Zealand time) after having taken 24 hours 34 minutes to fly from London to Christchurch

The third aim of our training flight was to prepare the air crews for the discomfort and tedium of long distance sorties, and at the same time to give practice to the various servicing teams in refuelling the aircraft as quickly as possible. In both instances this preparation paid great dividends for, as you will see later, crew fatigue during the race was offset by training, and the ground crews at the staging posts achieved excellent results in reducing turn-round times. In order to decrease further the time spent on the ground, navigators at the stopping places had charts prepared in readiness for the next stage of the journey.

With so much to do our four months at Wyton passed very quickly, but not without incident. It was on a flight from Negombo to the Cocos Islands, when I crossed the Line for the first time, that the ceremony took an unusual and unwelcome form. We were flying in cirrus at 43,000 ft., when, without warning, the aircraft entered a cumulo-nimbus cloud, and promptly flipped over on to its back. This, I am told, is not the usual way of entering the Southern Hemisphere and I made sure that the procedure was not repeated on later flights.

Although we had covered the first three legs of the course during our training, none of the Royal Air Force crews had landed at Cocos or gone beyond that point before the actual race. It would have been to our advantage to do so in order to familiarize ourselves with the airfields *en route*, but the risk of the aircraft becoming unserviceable too far away from the base made this plan impracticable.

* * *

Saturday, 3rd October, saw our arrival at Uxbridge, where we stayed till the day of the

March 1954 - New Zealand Air Race (2)

race. The five days at London Airport were spent in checking our equipment and in briefings. The latter included an explanation of the Air Race rules and the latest navigational warnings along the route. The navigators checked their flight plans together and the aircraft were air tested before being sealed by officials of the Royal Aero Club.

It was with mixed feelings that I heard on the eve of our departure that I was actually to take part in the race. Squadron Leader Press, the captain of Canberra No. 2, unfortunately caught a severe cold the day before the start of the race and so had to drop out. I considered myself very lucky to be given the chance to compete, but felt sorry for Squadron Leader Press, who had put so much work into the preparation of the aircraft and into the training programme.

In Flight Lieutenant Harper, who was to have flown with Squadron Leader Press, I had a very experienced and capable navigator, and we immediately went over the details of the flight in readiness for the take-off. That evening, still feeling rather dazed at my good fortune, I had to take part in a television programme featuring the Air Race. Shortly afterwards I returned to Uxbridge and, taking the sleeping pills which we had been given, retired to bed. The next day, having packed our bags and stored them in the aircraft, we had our final briefings. We were then inspected standing by our aircraft, by the Duke of Gloucester. Before dressing up ready for taxi-ing to the take-off position, I had a final word with my parents who had come to see me off, and collected flasks of hot coffee which were to sustain me on the first leg.

The Race

We took off at dusk on 8th October and I immediately swung the aircraft on course for Shaibah, our first stopping point, trying not to think of our terminal forecast of fog. With the radio compass being almost our sole aid on this leg, we were unlucky enough to suffer from serious night effect over Europe. This was doubly unfortunate, as, coupled with the difficulty of fixing our position, there was a wind change which drifted us south of track and thereby lost us a few minutes. On landing at Shaibah, thankful that the fog had not materialized, we realized that we had lost time and were therefore impatient to start off on the next leg. After stopping the engines, the aircraft was quickly refuelled, but when starting up again eight minutes later the safety disc on the starboard engine turbo-starter blew out. Normally it is rectified in a few minutes, but this time the entire turbo-starter had to be changed. Naturally we were very despondent, especially as we heard the other two aircraft take off while we were waiting.

Distance : London—Shaibah—2,900 s.m.

Time : 5 hrs. 25 mins. Average speed, 535 m.p.h.

Time on ground : 71 minutes.

Taking off on the second leg, and now almost 400 miles behind the others, I coaxed the maximum possible speed out of the aircraft. Owing to contrary winds, however, this did not make an appreciable difference in our ground speed. My navigator informed me that on take-off our average speed from London Airport to Shaibah had dropped to 440 m.p.h. When dawn broke, we were leaving the Persian Gulf and I could distantly hear the other aircraft ahead of me talking to the Washington aircraft which was acting as V.H.F. link to the shore. Eventually I saw the coast of India loom up ahead and soon afterwards started my let-down through the clouds of the inter-tropical front into Negombo.

Soon after shutting down my engines I was told to my horror that because of a brake fault at Shaibah our starboard wheel would have to be changed. Despite this the ground crew did a wonderful job, and we were soon in the air again, having lost yet another 10-15 minutes.

Distance : Shaibah—Negombo—2,640 s.m.

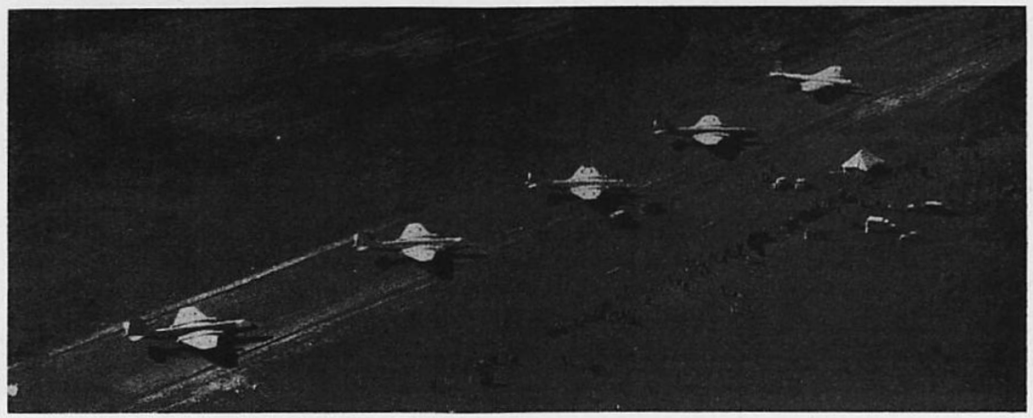
Time : 4 hrs. 54 mins. Average speed, 540 m.p.h.

Time on ground : 26 minutes.

The next leg to the Cocos Islands was a short one; we were able to fly at a high Mach number and at a fairly low altitude to take advantage of the increase in air temperature. Once again, head winds prevented our ground speed from increasing appreciably. We encountered the usual cloud formation at the Equator, but, although apprehensive (following our experience on the training flight), continued through and later saw the Cocos Islands below.

We landed down-wind as briefed and as I was braking I saw Wing Commander Cummings's aircraft, the first Australian entry, at the side of the runway with a burst tyre. Not realizing at this time that this meant we should now be at least fourth, I taxied to the refuelling position. In an incredibly short time we were refuelled and trundling down the runway again on our take-off run.

Distance : Negombo—Cocos Islands—1,780 s.m.



A line up of the five Canberras in the Speed Section of the England—New Zealand Air Race at Harewood Airport, Christchurch. This photograph was taken after the arrival of the aircraft piloted by Wing Commander Cummings on 12th October

Time : 3 hrs. 17 mins. Average speed, 540 m.p.h.

Time on ground : 12 minutes.

The next leg was also a short one and, aided by a slight tail wind, I expected to improve my average speed considerably. Soon after taking off I could hear that Wing Commander Hodges (who had over-flown the Cocos Islands in his P.R.7) was now leading the field but having trouble with his electrical generators. Flight Lieutenant Burton was now about three-quarters of an hour in front of me, but there was no news of Squadron Leader Raw, the other Australian. About an hour before arriving at Perth, it began to get dark again. This was the beginning of the second night without sleep, and I naturally felt tired. However, a flask of hot black coffee and some caffeine tablets refreshed me and we landed at Perth soon afterwards.

On reaching the refuelling position I found Wing Commander Hodges still there and having serious trouble with his generators. This could put us in third place, and, although it was hard luck on the Wing Commander, I felt that after all we were now well in the running. Once again we were refuelled very quickly, but when I started to taxi away to the take-off position the taxi track lights were not on, and, since I did not know the airfield, I had to grope my way along very slowly. Eventually I took off down wind on the runway in use.

Distance : Cocos Islands—Perth—1,840 s.m.

Time : 3 hrs. 7 mins. Average speed, 588 m.p.h.

Time on ground : 14 minutes.

Perth was our last stop before Christchurch and, about an hour and a quarter after sunset, we took off on what we knew to be the longest leg of the route. A reliable forecast for our destination was not available, so the flight was planned to leave an adequate fuel reserve should bad weather necessitate a diversion.

On all of the previous legs we had flown a great circle track, but for this stage we chose a rhumb line track to use the west-east jet stream which is normally encountered over the Great Australian Bight at that time of the year. This plan kept us near the Australian coast. Thus we passed over Melbourne instead of Tasmania on our way to New Zealand. The jet stream was a disappointment, for, although on the previous day the winds had reached 120 m.p.h., our tail wind dropped to 90 m.p.h. for the first few hundred miles and then decreased still further.

During the flight we chatted with radio stations on the south Australian coast who told us of Squadron Leader Raw's take-off time from Woomera, and from this information we calculated that he was five minutes ahead of us. The stations also passed weather forecasts for Christchurch, but these proved to be optimistic. It was not until we spoke to the aircraft carrier stationed halfway across the Tasman sea that we learnt that cloud and rain were obscuring Christchurch. On the strength of the earlier forecasts I had increased speed as far as I dared to overhaul Squadron Leader Raw, and had reduced our safe reserve at Christchurch. This left us in a critical position such that I was now forced to throttle back and fly for range. This more than offset the time gained when cruising fast earlier on.

March 1954 - New Zealand Air Race (3)

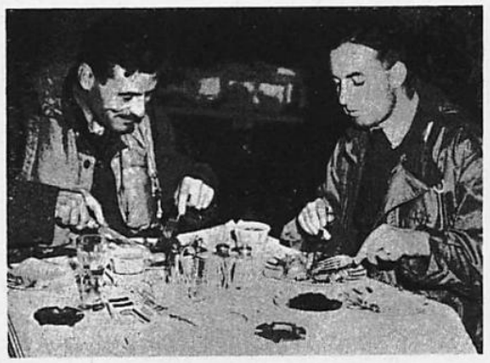
A radio interview held immediately after arrival. Left to right: Mr Hume D. Christie (President of the Canterbury International Air Race Council), the Right Hon. Walter Nash (Leader of the Opposition), the Right Hon. Sidney G. Holland (Prime Minister), Lieutenant-General Sir Willoughby Norrie (Governor-General), Flight Lieutenant Furze

The final hour before touching down at Christchurch was an anxious one. The thought of a blind approach at a strange airfield in bad weather was not encouraging, especially after 24 hours of flying. But fortunately the effect of the caffeine tablets had not entirely worn off. To my great relief we picked up Christchurch G.C.A. who brought us safely round the hills and into the aerodrome where we landed about fifteen minutes after the original contact.

We landed in the dawn twilight and taxied off the wet runway to our dispersal. As the noise of the engines died away, I savoured for a few seconds the relief at being safely on the ground with our journey finished. Then the pressure door opened and I heard for the first time the welcome from the crowd of ten thousand who had stood in the pouring rain to greet our arrival. Both my navigator and I were very much moved by this reception since it was so unexpected.

We climbed out, or rather, in my case, fell out of the door into the arms of a waiting policeman. We were then introduced to Mr Hume D. Christie, President of the Air Race Committee. He bundled us into a car in which we drove along a line of cheering people. After meeting the Governor-General, the Prime Minister and the Leader of the Opposition we were taken off to a news conference. A meal of steak and eggs followed—our first hot food for 30 hours, and we relished every mouthful.

It was immediately after this meal that we learnt that we had been officially placed third in the race, Squadron Leader Raw having beaten us by *just over 2 minutes*. Tired, disappointed, but thankful, we went to bed.



Pilot and navigator tackling steak and eggs in the airfield restaurant at Christchurch, their first solid meal for over 30 hours. It was fitting that the steak had been cooked by infused rays in a few seconds

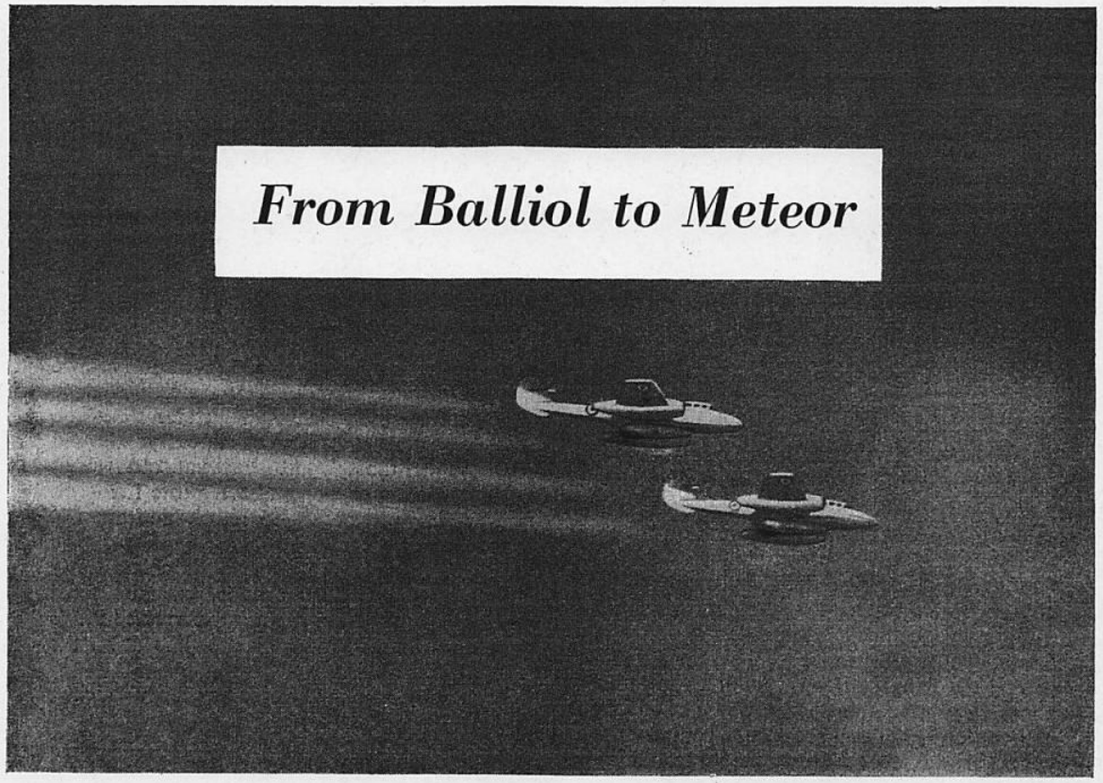
Pilot and navigator being driven away from the aircraft along the front of the crowd of ten thousand people who stayed out all night in the pouring rain to witness the finish of the race

After the Race

At four o'clock that afternoon a newspaper photographer burst into our room and woke us with a loud yell, thus securing an unusual photograph of two startled and sleepy competitors. Then on, for the next fortnight, our programme was filled with all manner of engagements, beginning with an official reception at Christchurch. There we were introduced to girls from all districts of New Zealand who, as Air Race Queens, looked after us for the period of our visit. This, you will agree, was a most thoughtful gesture and was typical of the hospitality which was lavished upon us so wholeheartedly whilst we were 'Down-Under.'

(Please turn to page 62)

March 1955 - From Balliol to Meteor (1)



'ALL Visiting Vehicles Report to the Guard-Room' said a notice, which was displayed with a prominence clearly indicating that this was a new procedure at Royal Air Force stations and one that applied to 8 F.T.S. Driffield in particular. Whatever my squadron commander may have said about arriving at a new station, there it was in black, white and underlined in red. I do not know the exact definition of 'reporting' but since my arrival at the guard-room appeared to cause no interest, I deduced that as a visiting vehicle I was a failure. I was about to ask for the Officers' Mess when another disconcerting thing happened; as I moved forward to question the face in the blancoed window, I caught sight of myself in a full-length mirror, above which a notice asked menacingly if I was a credit to the Service. I averted my gaze from the bulbous scarecrow that stared back at me with incredulous eyes and, wondering if any motor-cycling gear could ever be a credit to the Royal Air Force, vowed never again to arrive at a new station on a motor cycle.

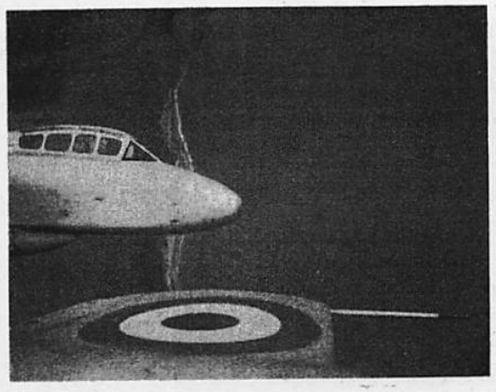
By

Pilot Officer T. H. Sheppard

I found the Mess and a room not far from it that was to be mine. It was in a wooden hut, small but warm and draught-proof—features I have come to worship with fanatical fervour during the past few years.

Nine others from No. 62 Entry made up our course—No. 97, the third of the 'All-Weather Era.' We had a fortnight of Ground School together, attempting to absorb details of fuel, oil and hydraulic systems which as yet meant nothing to us. We revised meteorology, radio and navigation in the light of the Meteor—and quite a different light it shed, especially on navigation. As the fortnight crawled to a close, the general picture of things began to assume a coherent shape. Then began a week of half flying and half lectures before going on to full flying.

We were slow to start on account of the weather, which seemed determined to stop us



The author's Meteor flying in formation and turning steeply. The coastline of Bridlington Bay can be seen below

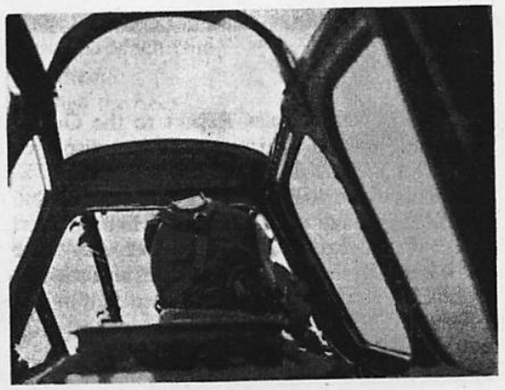
getting into the air. But fly we eventually did and it was well worth the wait. Initial impressions, once we had got into the air, were of popping ears, quietness, and a sort of fluidity in handling that gave us amazing freedom in the vertical direction. Impressions on the ground were a completely different matter, especially after our first 'famil.' trip, when we were expected to start getting the hang of things. At first the Meteor appeared to me to have immense bulk, of which a disconcertingly small proportion comprised the wings. It was the quintessence of solidity. It crouched—crouched resolutely on its under-carriage, covered with grimy silver dope, and waiting potently, as a gun waits to be fired.

Leaving the crew-room in the wake of your instructor, fighting the awkward mass of your parachute and dinghy, you catch fragments of his by now familiar briefing: '. . . hurry up your checks . . . go steady with those throttles. . . .' It's really rather like trying to carry a recalcitrant octopus, the weight and all those bits and pieces '. . . and remember, main wheels first and keep the nose wheel off as long as. . . .' The smell of a badly trimmed paraffin lamp assails your nostrils as you cross the pan to the aircraft and hear the whine of the next one starting up. There's a click as the last lug of the parachute release box is used up, and you waddle, bent under your burden and apparently decrepit, to negotiate the entrance to the cockpit. Getting in is not as simple as one might expect; initially it seems a feat of immeasurable strength and skill. In the first place, there is a definite order in which the steps should be tackled (different, of course, for front and back cockpits). An early error in the magic sequence may well result in the would-be pilot getting himself wedged into the cramped cockpit and facing not only the tail, but, worse still, the angry visage of his instructor, by now well ensconced in the back seat. Your efforts are eventually crowned with success and a sympathetic, albeit grinning, airman helps you get settled, miraculously sorting out all the straps that you inevitably sit on, as you lower yourself into the seat.

'All right in the front?' says a strained but cheerful voice, as the portcullis-like cockpit slams down with the uncompromising clang of a safe door. The fact that you are clearly not all right does not hold back the inevitable 'O.K., Start up!' To your surprise you remember the procedure and the turbines respond. You are relieved, too, with that intense relief which stems from the knowledge that had they not started you would not have had the slightest idea what to do about it. After frantic checks (mustn't waste fuel) you nonchalantly wave away the chocks and attempt to taxi. . . .

A Meteor leaves the dispersal, lurching wildly across the taxi track, the rudder springing from full left to full right as each over-corrected brake application fights for that yellow line down the centre.

Eventually, one might even say fairly quickly,



'. . . the portcullis-like cockpit slams down with the uncompromising clang of a safe door.' The instructor's view of his pupil

the art of taxying is mastered, as is the art of doing checks quickly and even getting into the cockpit. The actual flying is fun and, at first, slightly astonishing. The way in which the aircraft has to be heaved off, up and round in circuits and bumps is against one's instincts of self preservation, while the amount of bank needed for a normal rate-one turn makes rate-three beyond the

March 1955 - From Balliol to Meteor (2)

Main wheels first, then nose wheel (and perhaps some crack about No. 62 Entry !) The photograph on p. 51 shows Meteor 7s at No. 8 F.T.S. at Driffield doing high-level formation at 36,000 feet. The pilots are Pilot Officers Sheppard (nearest) and Crook, both of No. 62 Entry

black-out threshold. But once these things and the sheer power have ceased to cause amazement, the flying is smooth, brisk and free. First solo comes and goes, and the introduction to the Meteor 4 with its big, clear hood makes one feel like the conventional spaceman or, more mundanely, a goldfish. The pressurization is welcome, except for the weird noises in these old aircraft. No doubt I followed in the footsteps of many in being so carried away by the pleasantness and ease of the flying that I did not realize the staggering rate at which fuel is absorbed. I learned my lesson within a week of my first solo, when I had to fly back shakily on one engine in order to conserve the precious stuff. This asymmetric flying is a thing that causes great amusement to your instructor. An extra engine is another thing to go wrong, so you pretend the fire went out and do circuits on one. At low speed (160 knots) and high r.p.m. (14,000) the force required on the rudder pedal to keep the aircraft straight is, as the good book says, only just 'within the capabilities of the average pilot.' It is curious to note that it is always at such moments of stress when one is pitting one's muscles against the wind that one's instructor is in his most frivolous mood.

Alarmingly soon, intermediate handling tests are taken, and one comes to what was to me sheer misery—trying to fly a Meteor on instruments. To some it came naturally, but I was painfully slow in mastering the art; presumably the word 'ham', which occurred all too frequently in my flying report had something to do with this. However, it was another lesson and showed that even if the aircraft flew by brute force, it certainly could not be accurately controlled by it—not to the standards required by the instrument rating test anyway!

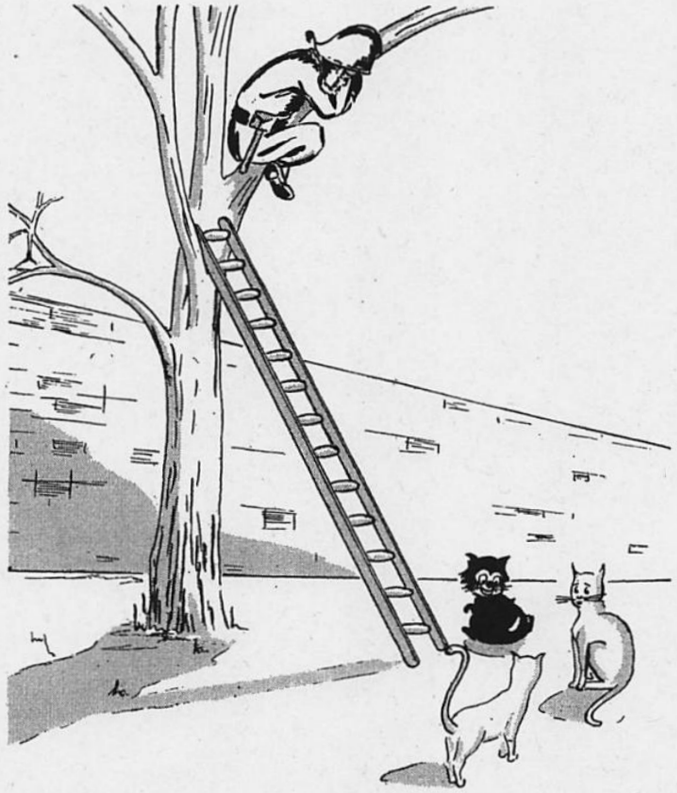
When the sentence of I/F was at last rescinded, formation flying started, but again it was an object lesson in how to relax in the cockpit. It was, however, a very pleasant lesson and a beautiful one too. Two aircraft in formation at 30,000 ft. with clean, white contrails behind them against a deep blue sky are a magnificent sight. Tail chases are tremendous fun, if a little exhausting—especially if you are in a Mk. 4 chasing a Mk. 7. The 7s generally have spring tabs on the ailerons, feather-light in comparison to the aged 4s and the chase becomes a two-handed, high 'g' affair.

As an all-weather course, we had to have a fair share of night flying in the form of a compressed day syllabus—circuits, normal and asymmetric, high-speed runs and navigation. The navigation is all solo and comprises 'pundit-crawls' and high-level trips when the usefulness of radio is made forcibly apparent. Flying high at night with a full moon is a wonderful experience. Somehow everything seems to be mellow and peaceful—even the pressurizing relief valve stops making a noise if you are really lucky!

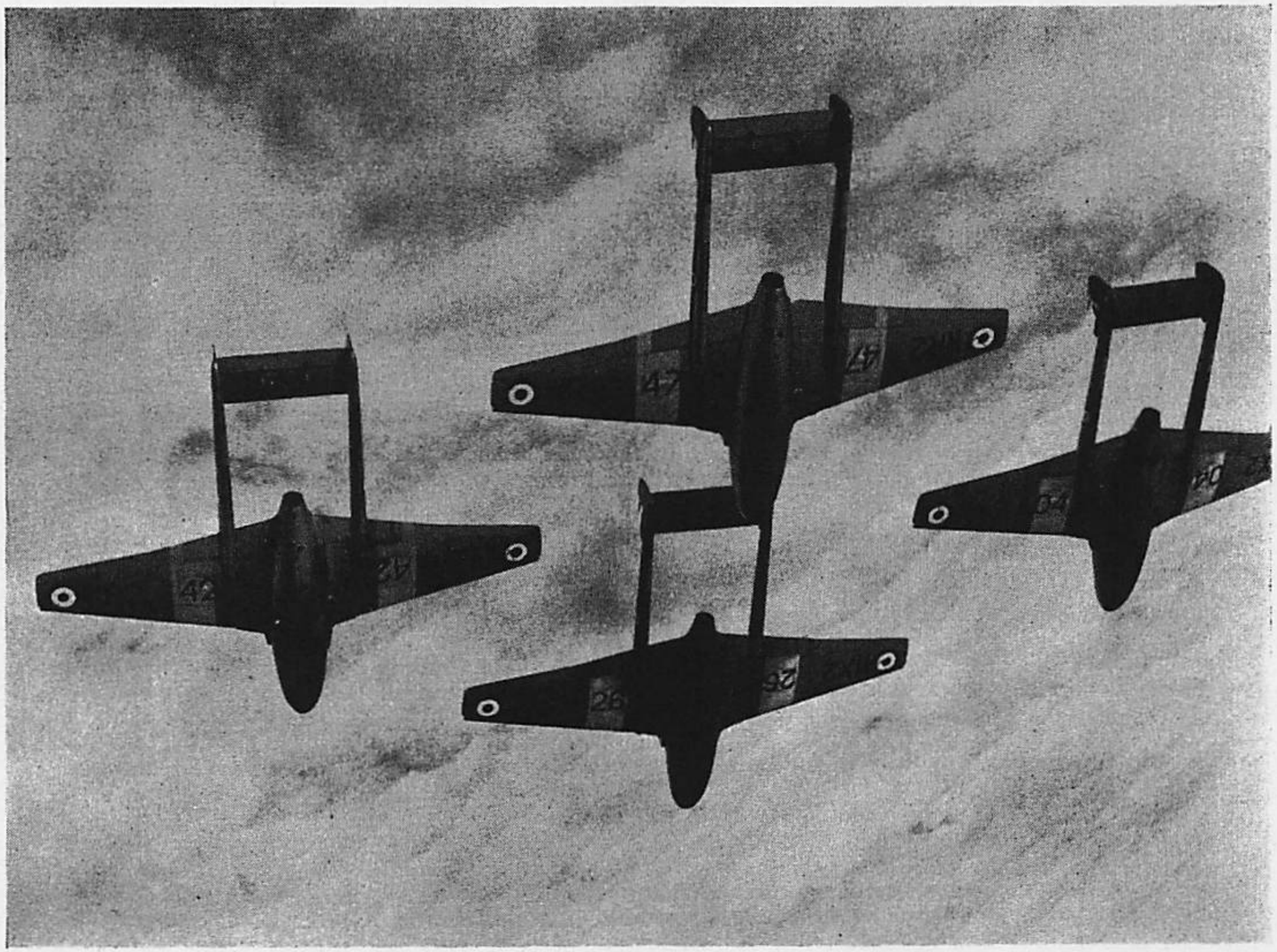
American G.C.As are an education in their accuracy and fast patter. My introduction to this aid was most convincing, as the talkdown director drawled over the R/T: '. . . double-check-yer-gear-diawn-an-larked-Farx-Item-you-are-just-tien-feet-high-orn-the-glide-path-ease-her-diawn-a-bit. You-are-faive-mahls-frerm-terch-diawn-an-twenny-feet-left-I-say-again-left-uv-the-glide-path. . . .' Not bad! Is it time to produce a G.4.F marked in tenths of a degree?

The night flying, apart from the final handling test, night flying test and a final I/F check, finishes the course—twenty-two weeks of it, weather permitting.

The pupil-instructor relationship we found to be ideal and the Meteor a delightful machine to fly. Some of the Mark 4s have seen three times as much service as we have, but one develops an affection for their robustness and good natured tolerance towards youth and inexperience. Each aircraft has its own idiosyncrasies; one of ours snakes along rhythmically at low as well as high speed—we like to think it just wants to wag its tail because it's happy. Perhaps it is.

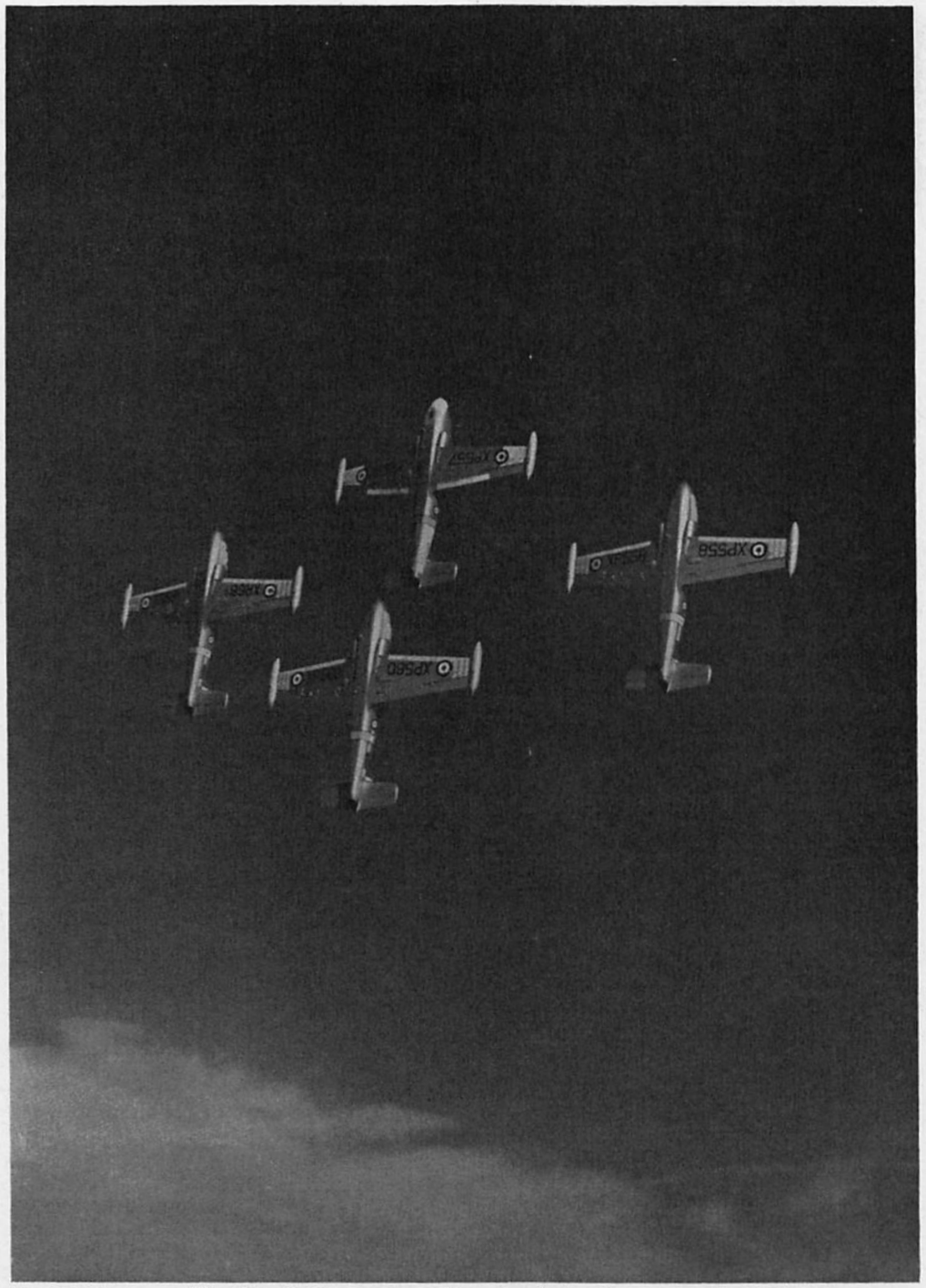


March 1957 - Cranwell Aerobatic Teams (1)



The Cranwell Aerobatic Team

Winter 1964 - Cranwell Aerobatic Teams (2)



The Royal Air Force College Aerobatic Formation Team
" The Poachers "

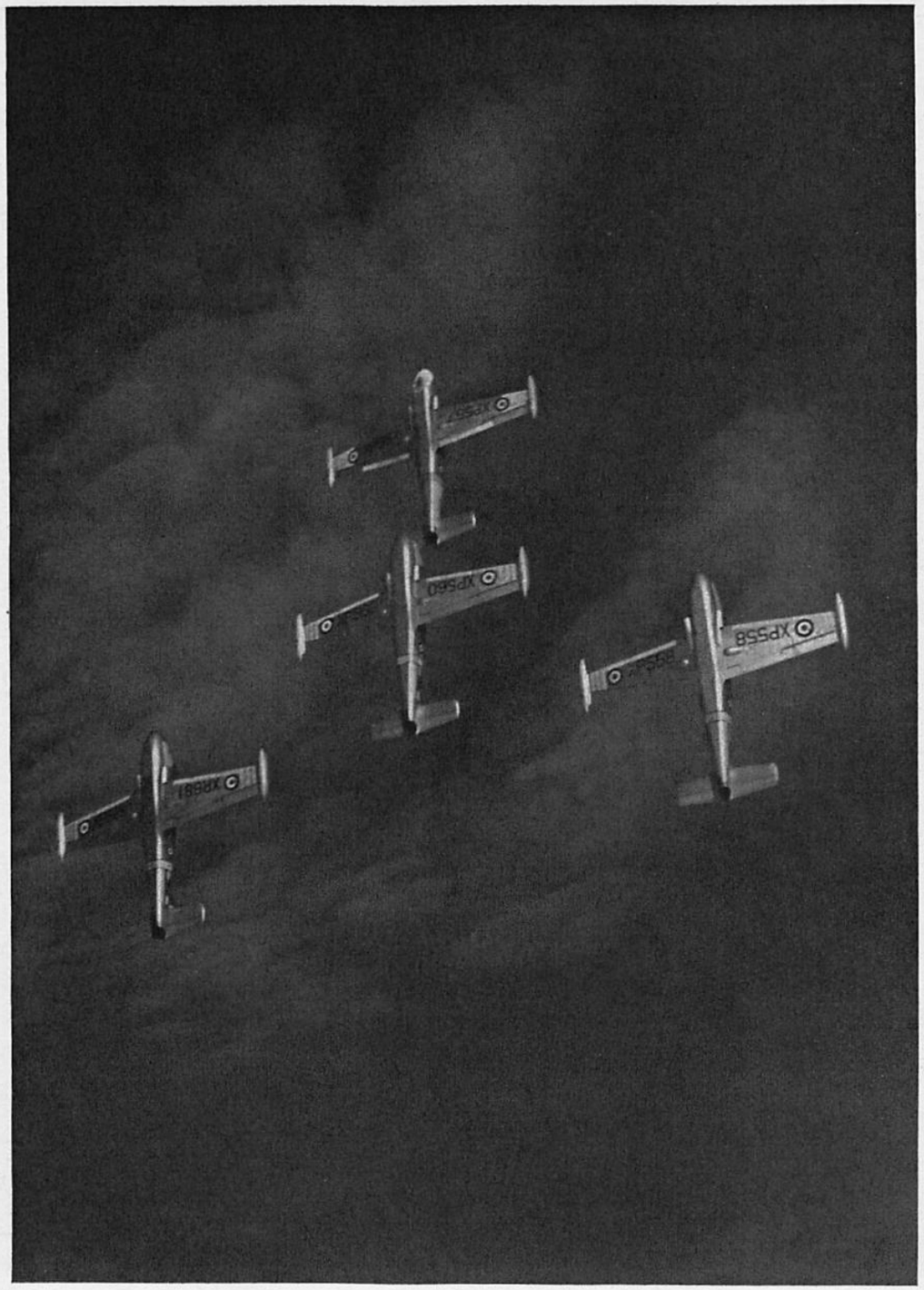
Winter 1964 - Cranwell Aerobatic Teams (3a)

The Poachers

If that notorious old scoundrel the Lincolnshire Poacher could have been consulted about the use of his title by the 1964 Cranwell Formation Aerobatic Team, it is doubtful whether he would have objected since he and the Poachers have many qualities in common — in addition to similar tastes in beer and headgear. Poaching both on the ground and in the air, is a pursuit which requires an artful sense of timing, a sharp eye, a supple, cunning wrist and not least of all a shrewd awareness of the need to keep out of trouble. Also, poaching cannot remain one's sole occupation : poaching forays must be interspersed with spells of honest toil ; as with the countryside poacher, so with the aerobatic Poachers. The Poachers are, of necessity, a part-time formation aerobatic team ; their daily job comes first and poaching practices are arranged as far as possible to avoid disrupting the normal training programme.

Over the years, Flying Wing at Cranwell has formed many aerobatic teams to show the flag to visitors and to take part in graduation day flying displays. Since the Summer Term of 1963, No. 2 Squadron has had the privilege of providing the team. This team, which coined the present title and uses it as its R/T callsign, comprises one squadron commander, two flight commanders and one part-time College flight commander. Perhaps to the more junior members of the Squadron the process of selection does not appear very democratic but at least the team is run on (fairly !) democratic lines.

Every new team sets out with enthusiasm to solve the problem of devising new manoeuvres, different formation patterns and slicker formation changes and so add novelty and interest to its show. However, it soon becomes apparent, after much head scratching and squeaking of blackboard chalk, that there is very little new in the realm of formation aerobatics. There are only the four basic aerobatic manoeuvres in which it is possible to fly in formation : the barrel roll, the loop, the steep turn and the wing-over. These manoeuvres form the framework of the display which is given substance by the pattern of the formations flown and the style in which the show is presented. Many methods have been devised of enhancing the visual effect of shows. These range from gay ribbons used to link the wing-tips of the " tied-together " teams seen long before the War, to the use of coloured smoke which was a popular feature at the Empire Air Day displays at Hendon over thirty years ago. More recently, powered controls have made possible sophisticated variations of the basic manoeuvres, such as " twinkle " rolls, and have also added to the scope and precision of changes of formation. After-burners have added to both the visual and aural effect of displays ; teams have grown



Swan-neck

Winter 1964 - Cranwell Aerobatic Teams (3b)

larger until it has become necessary to strip-off sections to permit the more difficult manoeuvres to be included ; teams have divided so that one half performs aerobatics in co-ordination with the other, and some teams have amalgamated to perform together at the one display — and so on. However, the Poachers draw the line at wearing ribbons and, as one would expect, cannot afford to " smoke " ; they are not blessed with powered controls and as Poacher Four frequently complains, we are fresh out of after-burners. Finally, the team is limited to four and is therefore too small to " split " effectively into two sections. However, in one respect the smallness of the team is an advantage because a small formation can be highly manoeuvrable, and this fact enables the Poachers to aim for a tight, compact display — most of which can be contained within the Cranwell airfield boundary. For this reason speed is kept low : 220 knots is used for both looping and rolling manoeuvres (this gives about 100 knots " on top " of the loop and about 150 knots halfway round the roll). Although the show is tight, +3.5G is not exceeded in any manoeuvre except during the " ripple " break.

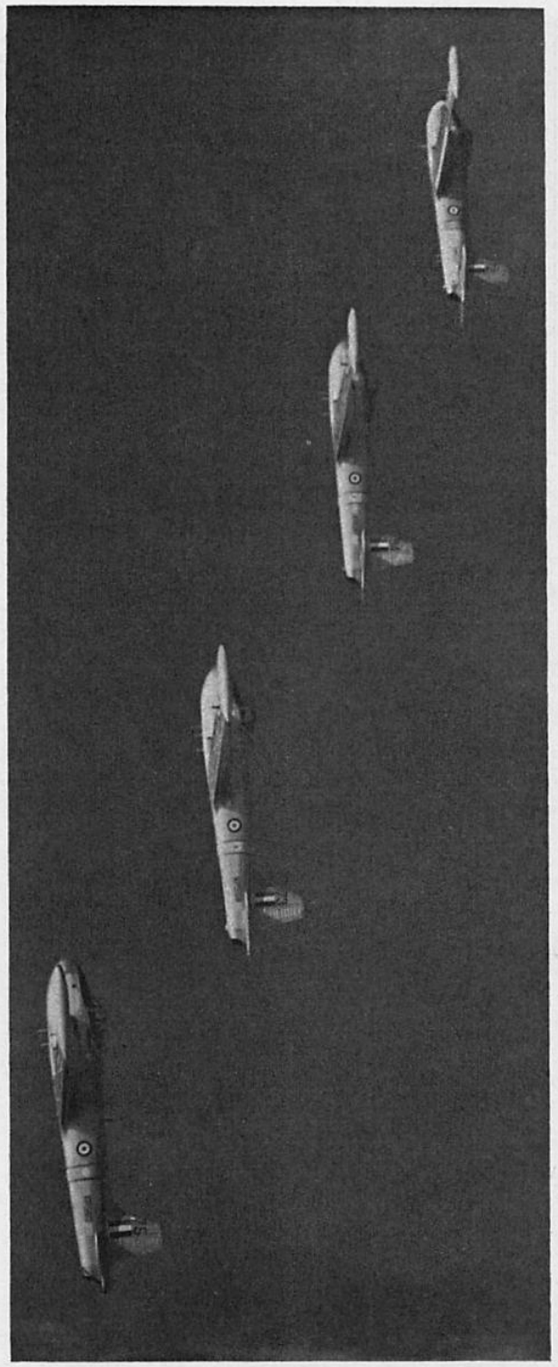
With a unit of four aircraft, it is possible to fly over a dozen different formations but not all are practical or symmetrical and pleasing to the eye. One must beware of the temptation to include too many changes of formation because this can bewilder the spectators — quite apart from giving the impression that the leader cannot make up his mind ! In their nine minute show the Poachers have settled for eight different formations. To achieve an integrated, smooth-flowing display, it is necessary to plan the sequence of changes so that the majority can take place neatly and unobtrusively during turns and wing-overs. They must follow in a carefully arranged order so that each change involves the least amount of place shifting. Some formation patterns lend themselves to a change to another pattern during the actual manoeuvre; although this is not particularly difficult to do, it does require considerable practice and a high degree of anticipation in order to make the most of the capabilities of the aircraft.

The Poachers have no close season and practise throughout the year in order to perform at both Winter and Summer graduation displays. Therefore, to cater for the vagaries of the English weather, both fair weather and bad weather programmes are necessary. The " presentation " of the show is the keystone of a successful performance. This means that the manoeuvres should flow one into the next without any momentary lulls ; each manoeuvre must be accurately performed and precisely positioned so that the team remains in full view of the spectators throughout the programme. In the fair-weather show the Poachers aim to keep within a radius of less than a mile of the spectators. The display starts with an unheralded arrival from the North, running in low over the hangars, carefully timed to avoid the opening remarks of the commentator. A tight turn through 360° follows, changing formation from line astern to swan-neck, then a pull-up into a wing-over to reach the minimum height above which the team is cleared to perform aerobatics. The diameter of the loops is about 2000 feet and thus the fair-weather show can be completed with a cloud base of 3500 feet. (The rest of the fair-weather show is given on page 206). The bad-weather show starts in a similar way and consists of a continuous steep turn at low level during which the team changes into the eight formations. The turn is flown at 240 knots with a diameter of 800 yards. After eight turns the Poachers unwind by rolling out and then slow down for a low speed run into wind, with wheels and flaps extended. Opposite the spectators the Poachers clean-up, open-up and pull-up into a dumb-bell turn, coming back for a fast run before the formation landing. This show can be performed with a cloud base as low as 800 feet.

No. 2 Squadron was lucky to have four pilots who had previous experience of formation aerobatics (covering a range of six types of aircraft). This naturally reduced the time taken to knit the team together and achieve a high standard of station-keeping. The chief advantage of this experience is that the team requires relatively little practice to remain at this standard. The success of any formation aerobatic team depends upon fine teamwork. This can only be achieved by careful planning and briefing : each pilot must know precisely what he has to do. As an example a snatch of conversation at a Poacher briefing would sound like this : " . . . . after the change to Diamond in the roll, we pull into a wing-over left. Going down left I'll call ' Square-go,' Number Four calls ' Four clear ' and moves right to line astern on Number Two who, by then, will have moved forward to line abreast of me at one span interval. Number Three moves to line astern of me and calls ' Three In.' At 220 knots I'll call ' pulling up ' and will ' flatten ' the loop on top, reducing from 87% to 80% to give Three and Four some extra poke. Going down I'll call ' tightening ' and at the bottom of the loop I shall progressively increase to 87%. As we go up for the wing-over left I shall call the change to line astern : remember, Two does not move until Three calls ' Clear ' and Number Four calls ' In ' when astern of Three." Only about 50 seconds would elapse during the sequence just mentioned, so clearly there is little time for enjoying the view.

R.T. calls must be crisp, clear and well timed. A wing man may be unable to see whether his next " slot " is vacant and will not move into it until he hears that he is clear to do so. If that call is a fraction of a second late the other pilots' anticipation will be upset and this will make the difference between a polished, neatly executed change and one that is rushed and untidy. When the team is " worked up " most of the briefing is " Standard Poacher " and only variations to the routine and the effect of the weather are covered in detail. After every practice there is a painstaking " inquest " to detect and analyse any faults there may have been. The debriefing commences over a welcome coffee in the crewroom : a little steam is let off here (" . . . I was busted again on top, Boss," " . . . who started the yuck when we hit our slipstream ? ", " . . . fed up being interfered with by your tip tank," " . . . can't pull up smoothly with Number Four's nose affecting my trim," and so on), before the team moves inevitably to the blackboard for the serious stuff. Much is learnt at the de-briefing — no one's blushes are spared and the team is severely critical of itself — but this, of course, is the only road to improvement.

The compelling attraction that formation aerobatics holds for many pilots is difficult to define. It is gruelling, exacting work, unremitting in concentration, sometimes frustrating, but never dull : it is spiced with exhilaration, tempered with challenge and leavened with satisfaction — satisfaction because, when done well, it is one of the finest expressions of teamwork.



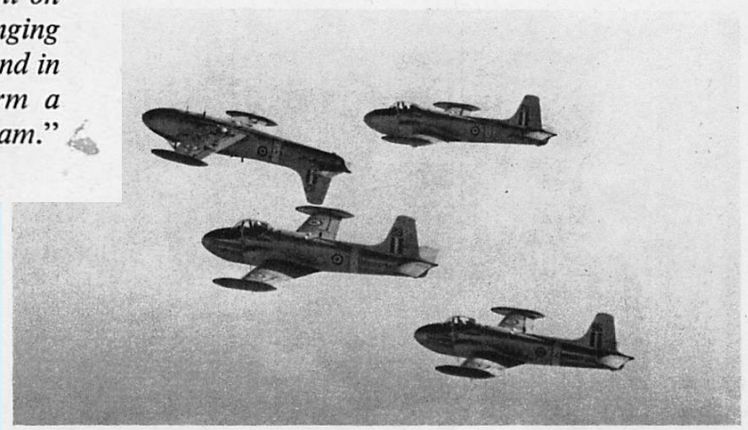
Looping in Line Astern

Winter 1964 - Cranwell Aerobatic Teams (3c)

The Poachers, 1964
Left to right, Flt. Lt. Mayes (No. 2), Sqn. Ldr. Panton (No. 1), Flt. Lt. Ord (No. 4) and Flt. Lt. Blackford (No. 3).

The Poachers' Show

Take-off is in Diamond, with a change to line-astern for the run-in. The show starts with a tight 360° turn changing formation to Swan-neck, and rolling out into a wing-over right. This is followed by a roll, changing to Diamond halfway round the roll then comes a wing-over left, fanning out into Line Abreast. The formation is looped in Line-Abreast, then immediately looped again with a change to Trident. A wing-over precedes another roll in Diamond after which the formation performs a wing-over to return back down the runway, opening out into Square and looping in that formation. As the Poachers wing-over to return, they slip into Line Astern, roll right and change to Diamond during the roll. Winging-over to return, they change into Swan-neck for a roll to the left ; altering formation to "T" Bone in the ensuing wing-over, then pull-up for a loop with a change to Diamond in the vertical. They half roll on top of the loop and pull out at right angles to the line of entry changing to line Astern in the dive. From there the Poachers can either land in formation or change into Echelon Starboard, loop and perform a "ripple" break as they pull out of the loop and land in "close stream."



One Up-manship . . .

1972 - Cranwell Aerobatic Teams (4a)

POACHERS '72

by

FLYING OFFICER K. JACKSON

Precision for its own sake is inanity or art. But to a child, reflecting on his chaotic life, precision signifies a mastery of things which he will not achieve in forseeable time. To a simple man it signifies a mastery of things which he will never achieve.

There are those among us to whom flying will always have an inexplicable fascination ; those who will always watch an aeroplane in flight. They may make light of it, criticising, airing their knowledge, but if there were no-one else there they would still watch.

The Poachers perform throughout the summer at air displays across the country, and two visits to the continent are planned this year. This defines their audience ; comparison with the thoughts above may be interesting.

The purpose of the Poachers must be to provide public relations ; fostering the tolerance of the populace to our expense and our noise, and to encourage recruiting by imprinting an image of glamour and precision on young maids. Success in these tasks is hard to evaluate. No one knows how many more complaints or how many fewer recruits there would be if the Poachers did not perform. Success in the aim of the Poachers to fly a sequence to appeal to the audience is much easier to assess.

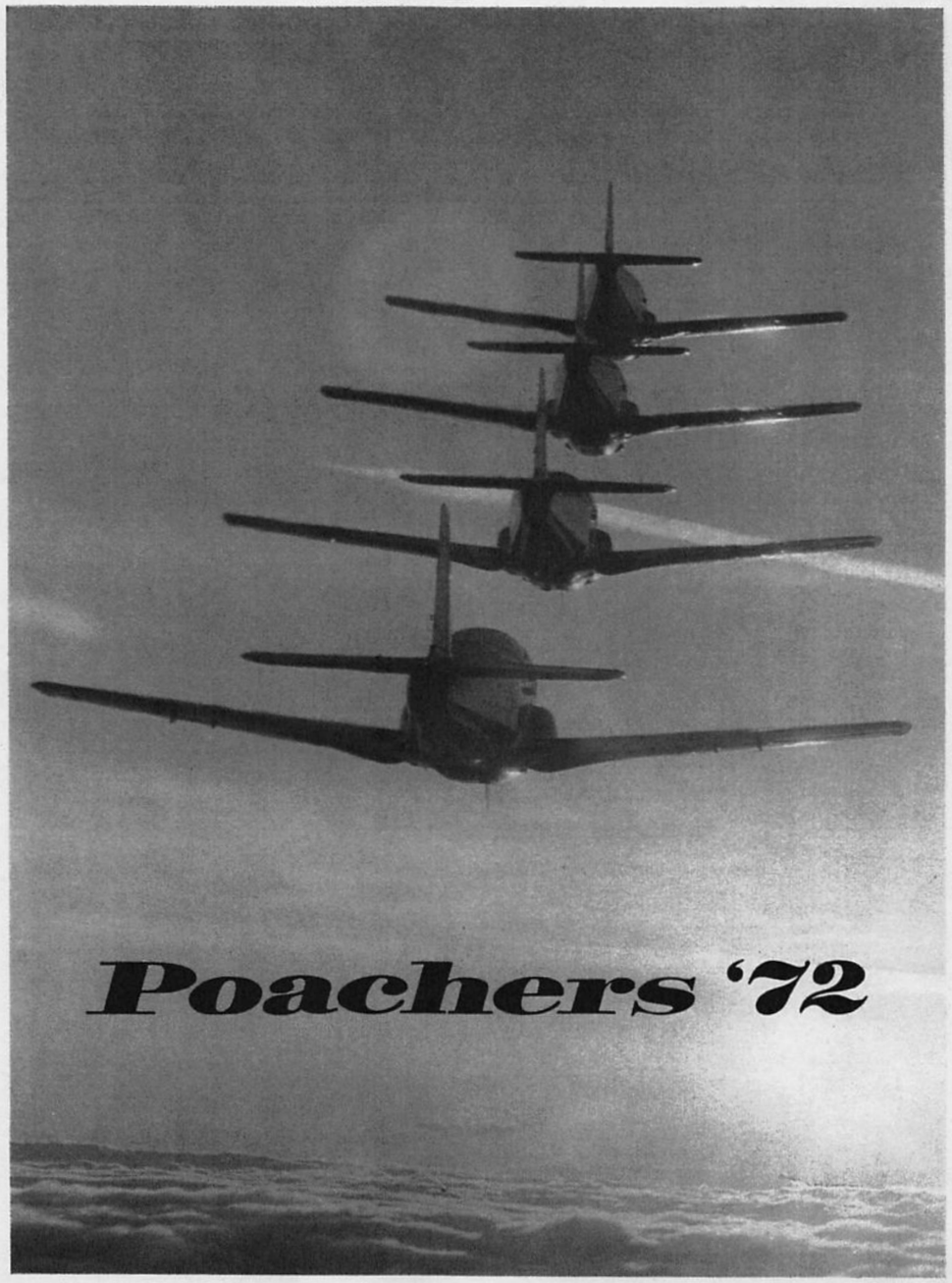
I watched their earlier practices with some scorn, and watched no more for a while. Hardly fair of me, but they made a lot of noise early in the morning, and made us short of aeroplanes at all times of the day. All this and then a synchronised lowering of flap and shutting down of engines ! I was forgetting the intended audience. Then the Wing Commander asked me with a big smile if I'd like to write an article on the Poachers. Well, you probably know the feeling, of course I said yes. This meant that I had to look at them again, and by this time they were wearing their royal blue flying suits and white polo-necked sweaters ! Is my chip showing ?

I got up far too early one morning and flew with Geoff Roberts, number 4 in the team. They had improved since those earlier practices, and they looked a lot safer from the air. Mind you it was nice to see them sweating a bit, formation flying always looks so effortless from the ground when its done properly, and by this time it was. Yes, I was impressed.

The sequence lasted about 15 minutes but seemed shorter. They've discarded last year's ' twinkle ' roll at the start, which is just as well. The JP hardly twinkles, and diverges sloppily. The join-up loop remains, and looked very nice. Its quite exciting in the number four position ; with a little too much overtake Geoff let the aeroplane slide underneath the leader so that we looked up through the canopy at him. ' You can't tell from the ground,' said Geoff.

The first loop is followed by a wingover, a loop and a barrel roll with formation changes through swan, box, card, line astern (quite lively at the back) and back to box. Then they do a loop in line astern which is probably the one thing that looks better from the ground than from the air. After this they loop in wingless, change to card and split for a cross-over and half loop in two pairs, to roll-off the top and join up in line astern. I liked this bit, an ' aidmaker ' call for one pair means ' put them out,' for the other pair means ' put them in,' and they end up in line astern !

A further loop is followed by a barrel roll, wing over and loop through box, swan, tee and card into line abreast for the Prince of



1972 - Cranwell Aerobatic Teams (4b)

Wales bomb-burst, where everyone disappears.

It takes little time or effort to recount the sequence and the formation changes. It is far more impressive to see it than to read about it.

The leader is Squadron Leader John Robertson, for the second year. He used to fly Canberras before a tour as a QFI at Church Fenton. He then had a tour at CFS before coming to Cranwell.

Number two is Colin Woods whose boyish good looks belie his past as a potentially genocidal Vulcan captain.

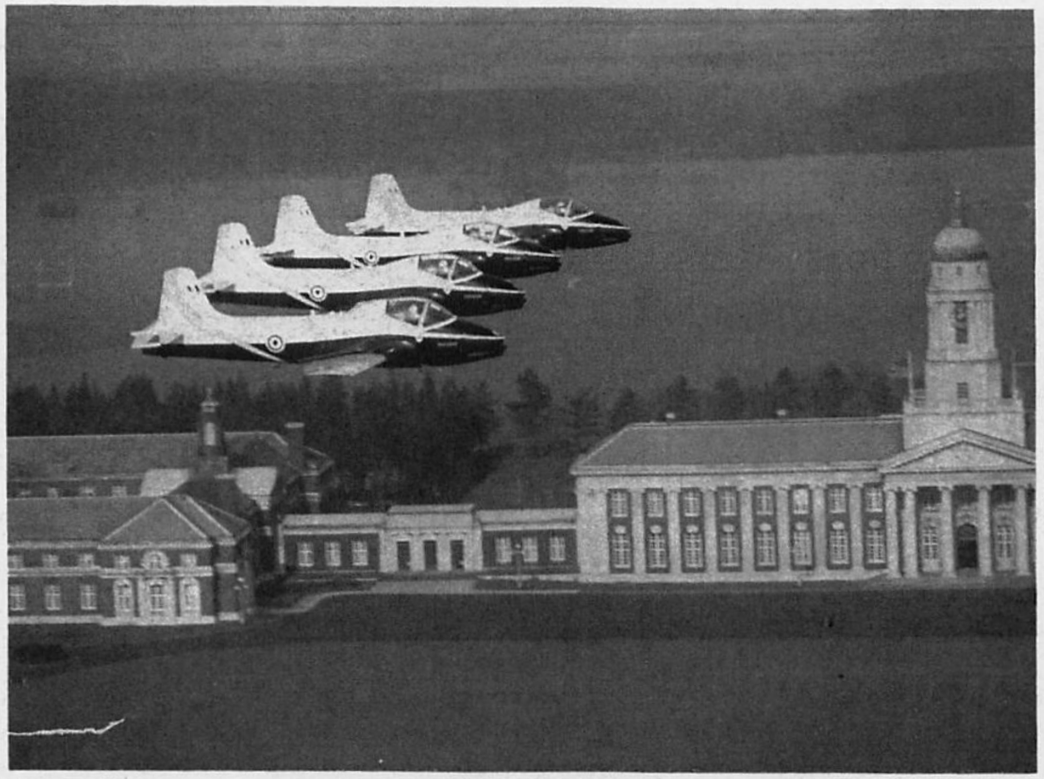
Number three is Ian MacFadyen who graduated from Cranwell in 1963, and did a tour on Lightnings in Germany followed by a tour as an ADC before returning to Cranwell as a QFI. He is now a flight commander.

Number four is Geoff Roberts about whom I have probably said enough. He was going bald before he started this formation flying.

The Adjutant and Number five is Mark Micallef-Eynaud who graduated from Cranwell in 1970 and came back a year later as a QFI.

The aeroplane is the Jet Provost T Mk 5. It has similar performance to the Mk 4 but is prettier, quieter (from the inside), and has the feel and handling characteristics of a far more modern aeroplane.

Well done Poachers, you're doing a fine job, but I'm still not sure if its art or inanity.



Summer 1960 - Training Aircraft at Cranwell (1a)

[*By kind permission of Hunting Aircraft Ltd.*

FAREWELL TO THE PROVOST

SINCE this term is the last during which the piston Provost is scheduled to fly at the College, *The Journal* considers it most appropriate that a short note of adieu should appear in this issue.

The prototype of the Hunting Provost was first flown on 24th January 1950, and with modifications it was eventually accepted by the Royal Air Force as its standard basic trainer, followed by the Air Forces of Rhodesia, Eire, Burma, Iraq and the Sudan. In all, 461 aircraft were made. By no means all these were used for training purposes; some of those sold abroad carried two machine guns and an assortment of bombs, rockets or cameras. A few versions were installed with aerial cameras and used for survey work.

The Royal Air Force College first began using the Provost during 1955, when it succeeded the Chipmunk as the primary trainer. Since that time the Provost has seen numerous cadets through all the aspects of their basic flying with few complaints. Most students have found the Provost delightful and look upon it with affection as the first aircraft in which they have flown solo.

Although the entries now coming to the College have the pleasure of *ab initio* jet flying to look forward to, those who flew the Provost before graduating to jets are mostly grateful that they have gained piston experience, believing they are, as a result, more the complete pilot.

Spring 1961 - Training Aircraft at Cranwell (1b)

The Jet Provost—the new Trainer

Autumn 1961 - Training Aircraft at Cranwell (2a)

Training Aircraft of the RAF College

WHEN the Royal Air Force College was officially opened in 1920, training equipment consisted of the well-tried and faithful Avro 504K, the D.H.9A, the Sopwith Snipe and a Vimy or two for wireless training. The Avros, with their old-fashioned rotary engines, remained in service until the late twenties, when they were replaced by the 504N, or Lynx-Avro, which had a re-designed undercarriage, fixed radial engine, and a correspondingly increased performance. The Sopwith Snipes, with a maximum speed of 121 m.p.h., were used for solo experience for Senior Flight Cadets, and in 1920 were still front-line fighters. (How about bringing in a few Lightnings?) The next aircraft to arrive at the College was the dual Bristol Fighter, which proved an excellent trainer, witness this comment in the College *Journal* of 1930:

> "Consider now the slotted 'Biffs'
> They stall not, neither do they spin,
> And yet a Christmas Tree in all its glory
> Was not arrayed like one of these."

Another change in equipment took place in 1931 when the Armstrong-Whitworth Atlas arrived, a large cumbersome army co-operation machine. This replaced the D.H.9A. The Snipe had also been replaced by the dual controlled Siskin, another fighter type aircraft, with a maximum speed of 150 m.p.h. The Lynx Avros soldiered on until 1933, when they were

From 1929 to 1936 the British Bulldog Single-Seater Fighter was a front line aircraft of the R.A.F.

The Hunting Percival Provost was a side by side two seat basic trainer

replaced by the Avro Tutor, an attractive biplane which had considerable aerobatic potentialities. Also in 1938 the Hawker Hart trainer, a delightful aircraft to look at, replaced the ugly 'Atlas' and remained in service until 1939. They also were superb machines for aerobatics in spite of the fact that their basic design was that of a light bomber, and they had a maximum speed of 165 m.p.h. The Siskin was replaced by the two-seater Bristol Bulldog in the middle-thirties, which had a scintillating performance. As well as being a trainer, they were front-line fighters until 1937, when the last squadron of Bulldogs was re-equipped with Gladiators. Tiger Moths and Magisters began to appear, until in 1939 the College was closed on the outbreak of the war.

There were also other less well-known aircraft which flew from Cranwell between the wars, notably those of the Long Range Flight. In 1927 a Hawker Horsley attempted to fly from Cranwell to India, but was forced to ditch in the Danube, without serious casualities. The same year another Horsley was slightly more successful and flew 3,470 miles in 34½ hours until forced down in the Persian Gulf. This record stood for two years, until Lindbergh broke it on his New York—Paris flight. The Fairy Monoplane completed four notable flights from Cranwell. In April 1929 it flew 4,130 miles to Karachi in 50 hours, and touched down with eight gallons to spare. The next attempt was less successful, and the aircraft crashed in the Atlas Mountains on the way to South Africa, killing both pilots. Another aircraft was built and in 1931 it flew from Cranwell to Egypt. Then in February 1933 it flew from Cranwell to Walvis Bay, 6,309 miles in 57 hours 25 minutes. This was a world long-distance record.

Another aircraft associated with the College was the Cranwell light aeroplane, of which there were two versions. The first flew in 1925 and was somewhat underpowered. The second aircraft followed a short time later and was reasonably successful. Also used at Cranwell for radio instruction (not for the College) were the Vickers Vimy, Virginia and Valentia, and the D.H.86B.

Autumn 1961 - Training Aircraft at Cranwell (2b)

During the War, the College was closed, but at Cranwell there was an F.T.S., an Instructors' Course, and numerous other trade groups under training. As the College was closed, this period will not be examined in detail. However, the famous first flight of the Gloster-Whittle E.28/39, on 15th May, 1941, Britain's first jet aircraft, took place on the South Airfield, a special runway being constructed for the occasion.

When the College reopened in 1946, its equipment consisted of the perennial Tiger Moth, and the Harvard. The Tiger needs no introduction, and was much beloved, despite the fact that in winter, when the Lincolnshire north-easter blew, the open cockpit was very unpleasant. The North American Harvard was the advanced trainer, its main characteristic being its peculiar rasping note caused by the high tip speeds of its directly driven propeller.

In the summer of 1948, the ever faithful Tiger Moth departed, not without pangs of regret from instructors and pupils. To replace it, the Percival Prentice arrived, a brand new British trainer. This was a three-seat, low wing monoplane with fixed undercarriage and an enclosed hood, and also with full radio aids, flaps, brakes and variable pitch airscrew, a great advance over the Tiger Moth. However, the usual teething troubles accompanied the Prentice, and an unceasing duel between aircraft and airfield took its toll ; tyres burst, stern posts cracked, and the Prentice fleet grew smaller until eventually there were insufficient aircraft to continue the operation, and the Tiger was used again ! However, by January 1949 everything had been cured, and the aircraft was demonstrated to the Press. at Cranwell.

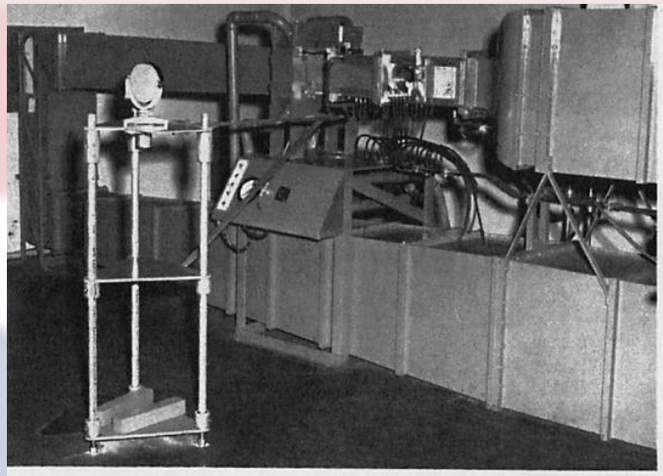
In the winter of 1952, the Prentices were replaced by a new primary trainer, the De Havilland Chipmunk. This aircraft, designed in Canada, was powered by a D.H. Gipsy Major engine and used tandem seating. It was a great advance over the Prentice in that it was fully aerobatic, and was much lighter. The noisy Harvard was also due for replacement, and, in 1953, this was replaced by the Boulton Paul Balliol T.2. This machine was powered by a Rolls Royce Merlin 35, had side by side seating, and a maximum speed of 288 m.p.h. at 9,000 ft. It had one Browning machine gun, and provision for four 60 lb rockets. Balliols served only at Cranwell and at one other F.T.S., their production being cut back in favour of the new jet trainers.

Jet aircraft had now appeared at Cranwell in the form of the Meteor 7, of which there were three, despite the fact that no runways had yet been constructed. In November 1954, the Chipmunk was replaced by the Hunting Percival Provost, which remained at Cranwell until 1960. This was a much more powerful aircraft, being sturdily and robustly built, with side by side seating and a maximum speed of 200 m.p.h., and with a service ceiling of 25,000 ft. The aircraft was capable of a rate of roll of better than 90° per sec. and had excellent aerobatic qualities. Provosts flew from the North Airfield during the construction of the runways, and from Spitalgate when Cranwell and Barkston were used by jets.

In 1956, upon completion of the South Airfield's runways, the De Havilland Vampire advanced trainer arrived to replace the Balliol. This was Cranwell's first jet trainer, and it is only just leaving us now. A great advance over anything used before at Cranwell, with glamorous pieces of equipment like " Bang-seats " and bonedomes associated with it, the Vampire had a maximum speed of 550 m.p.h. and a service ceiling of 40,000 ft. Cranwell entered the jet-age at last. The Provost/Vampire scheme of training was now used, in conjunction with the rest of Flying Training Command. Cadets now passed out having completed their advanced training.

Valettas and Varsities were then, and still are, used for navigator training. Meteors still flew from Cranwell, mainly for the benefit of those cadets, who, because of their excess stature, could not squeeze themselves into the somewhat cramped cockpit of the Vampire. In 1960, the next big change took place. The " New System " meant that cadets started straight away on jets ; advanced training was carried out after leaving the College. The faithful Chipmunk reappeared on the North airfield, to give once-weekly flights to those who were not yet flying on jets, and has gained quite a reputation. Jet Provosts, the last word in modernity and spaciousness, are taking over from the Vampire, and cadets now start on them. With a maximum speed of about 330 m.p.h. they are excellent aircraft, and will be supplemented later by the Mark 4 version. Finally, there are the weekend aircraft—Tiger Moths, Turbulents and gliders which fly from the North airfield on Saturday and Sunday afternoons making a welcome change from the noisy jets.

Spring 1962 - Cranwell Wind Tunnel (1)



General view of tunnel

CRANWELL'S SUPERSONIC WIND TUNNEL

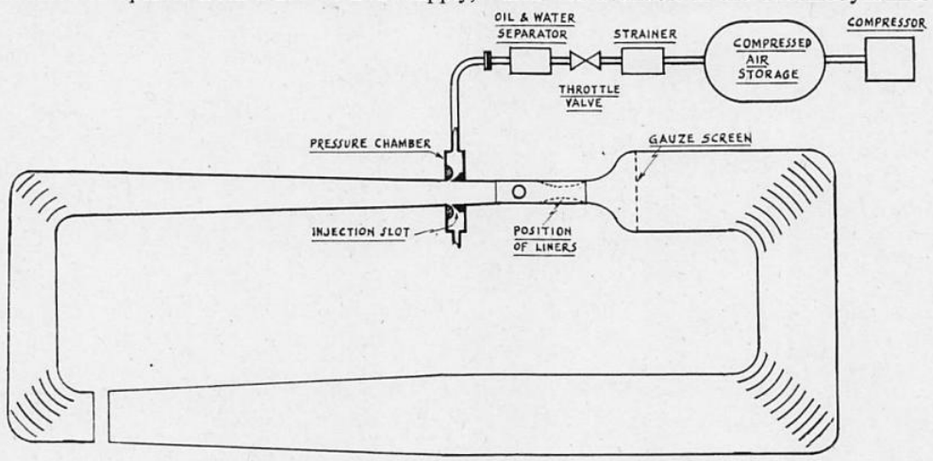
DURING the early 1950's it was felt that there was a need for a high speed wind tunnel at Cranwell. The cost of even a small tunnel would obviously be high. It was therefore decided to construct one using the resources available in the Science Wing. Although some work was done on this project it was not until 1956 that a complete development programme was set in motion.

The tunnel is an induced-flow type. Air is compressed and stored in a reservoir ; it is then released and passes through slots downstream of the working section causing the air in the tunnel to flow through the working section, giving the required airspeed round the model for a short period.

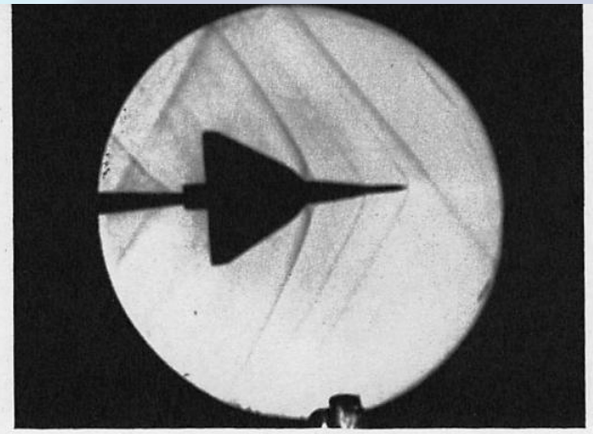
This type of tunnel enables high speeds to be attained without large-power requirements, but has only a limited running time. This means that the compressed air storage system must be re-charged after two or three runs. Running times vary from about 4 minutes at M = 0.5 to 15 seconds at M = 1.55 with a model at 6° of incidence. This latter period has proved to be quite adequate for pressure plotting, and the re-charge time is about 30 minutes.

Compressed-air Supply

A two-stage single-acting air compressor is driven by a 15 H.P. 400 V. D.C. electric motor modified to operate from a 200 V. D.C. supply, which was available in the Thermodynamics Lab. This motor, originally used in the Station Workshops, became redundant during the final stage of the D.C./A.C. conversion at Cranwell. The compressed air-storage tank of approx. 200 cu. ft. capacity is charged to a pressure of 200 p.s.i. This tank is a relic of the days of airships at Cranwell !



The Tunnel is an induced flow type



Model of Fairy Delta 2 at M = 1.3

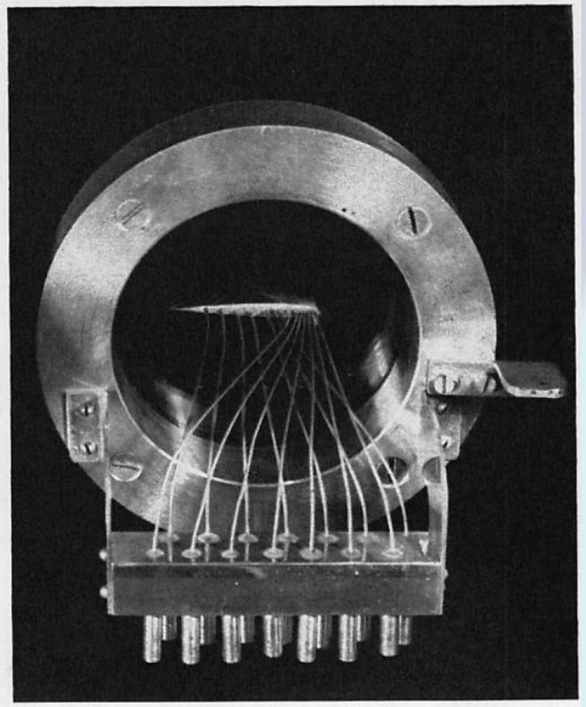
The storage tank and 4 inch diameter compressed air line are fitted with water traps and oil and water separators and a phospher-bronze strainer to remove any particles of scale that may be carried in the air from the storage tank.

During tunnel runs the air supply from the storage tank to the tunnel must be regulated to give a constant-speed airflow in the working section. This is done by throttling the air as it passes through the control valve.

After passing through the control valve the compressed air enters the pressure chamber. This chamber is connected to the tunnel by four slots, one on each side of the tunnel, each slot being 0.050 ins. wide. The slots are so shaped that the compressed air is forced to flow downstream of the working section thereby causing the air in the tunnel to flow round the tunnel circuit. As the blowing pressure is increased so the velocity of the air is increased. The opening following the second corner allows some of the air to escape and the stagnation pressure of the tunnel is at atmospheric pressure.

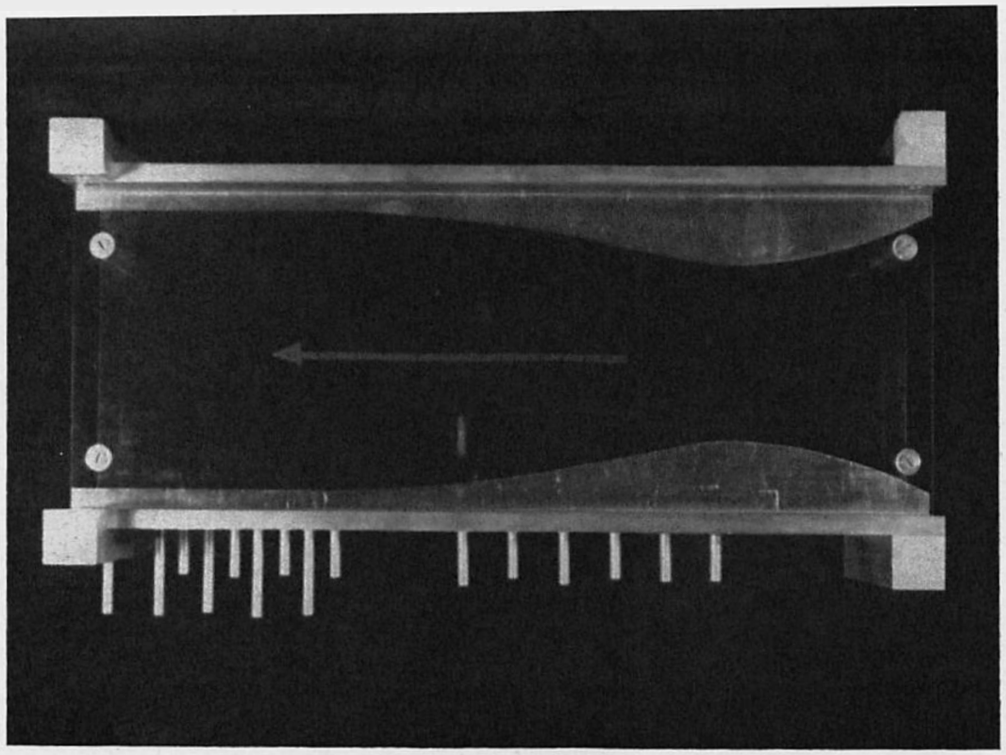
Working Section

The working section is 6 ins. high and $2\frac{1}{2}$ ins. wide. For subsonic speeds the walls are parallel except for boundary layer allowance on the top and bottom walls. The two side walls are parallel since they contain the windows of the optical system. Aerofoils may be tested at Mach numbers up to approximately M = 0.9 depending on size of aerofoil and angle of incidence. For tests in the transonic range, M = 0.9 to M = 1.10, perforated walls are fitted in the working section.



Hypodermic tubing is used to connect the pressure points on the model

Spring 1962 - Cranwell Wind Tunnel (2)



Liners form a nozzle

This system avoids blockage problems which make tests with solid walls virtually impossible at transonic speeds. Each wall contains approximately 1500 holes, those in the first 3 ins. of the wall being graded in size to ensure a reasonably smooth flow.

In supersonic testing the walls of the working section, known as liners, form a convergent-divergent nozzle. Mach number changes in the supersonic range can be obtained only by changing the contour of the supersonic nozzle since, for each contour, only one specific Mach number can be obtained. These liners are required to be machined to very fine limits in order that the air flow may be smooth. Liners for use at M = 1.35 and M = 1.55 have been designed and manufactured at Cranwell.

Optical System

In order that the shock wave pattern on and around the aerofoil may be observed a 4 inch Schlieren system is used. Either black and white or a coloured pattern is available.

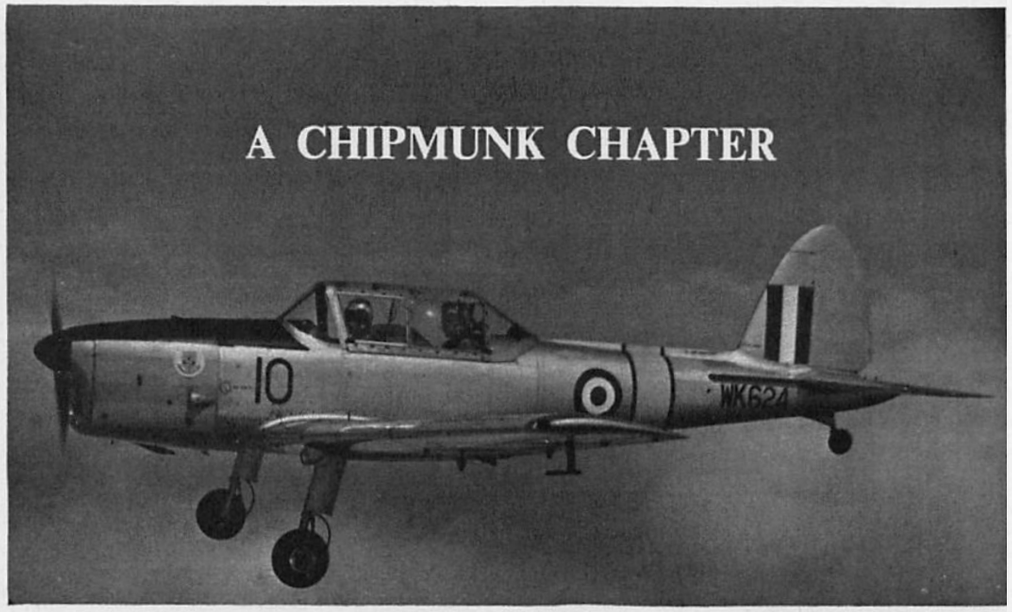
Model Making and Measurements

For quantitative work pressure plotting is used. Due to the restrictions in model size, chord length from 1½ to 2 ins. and a thickness/chord ratio from 10 per cent to 8 per cent, model making presents a problem.

All models are machined from aluminium alloy and are fitted with from four to fourteen pressure points. Hypodermic tubing, external diameter 0.040 ins. is used to connect the pressure points on the model to adaptors on the outside of the tunnel working section and so to a manometer bank. The manometer tubes can be clamped and readings taken after shutting down the tunnel.

Contrary to accepted practice, each pressure plotting aerofoil is mounted on its own window. The window is made from ¼ in. " Perspex." It has been found that the use of " Perspex " does not materially effect the optical quality of the picture since the optical system is only used for demonstration purposes.

Winter 1965 - A Chipmunk Chapter (1)

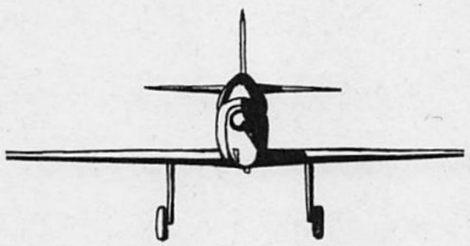


Photographs
A. J. Steel

At last, a chance to blow our own trumpet; an opportunity to record the fact that the Cranwell Chipmunk Flight really did exist, and despite sceptics, served a useful purpose.

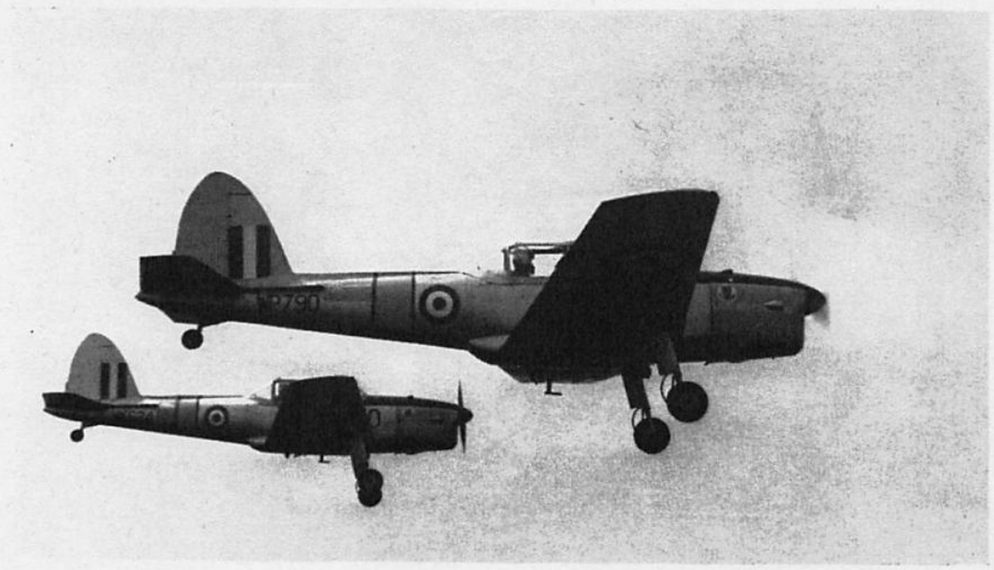
But this record must be nostalgic because by the time this article is being read the Flight will have closed down, the Chipmunks will have bolted into their holes (or whatever Chipmunks do on demise) and the users of ' Lighter than Air ' road will be able to pass along its length with their heads held high.

Those of us who staffed the Flight can also hold our heads high because we made it work, despite having neither an official task nor terms of reference; besides this each instructor had an average of fifteen cadets per week to fly — a fact which other Q.F. I's will appreciate. To make our task easier and the cadets' flying more interesting a syllabus was produced domestically to ensure that as far as possible every cadet enjoyed his flying with us ; I an sure that all the cadets who flew with us wil agree that this was so. Now that the Fligh no longer exists we will be sorely misse by the instructors at Barkston and Cranwel South.



Chipmunk flying for the cadets started i 1959 to give air experience for the first yea cadets. This was soon developed into givin the u/t pilots flying instruction and we als included, depending on their inclinations the u/t navigators, equipment, secretarial, an regiment cadets. S again we were mor active than was antici pated and we ca boast of equippin secretarials with a ability to aerobat, c regimenting equipper to the circuit patter administrating the re imenters to formatio flying, and losing th navigators ! All c them gained some benefit from these aeri activities which will have a lasting effect eve if their pre-flight meals did not.

During the Flight's short history we had our moments, and any visitor to the crew room would have remarked upon the preponderance of grey hairs (I am referring to the staff) not entirely due to advancing years. This fact can be verified by questioning any members of the audience who witnessed our bi-annual, misnamed spot landing competitions. They saw that our proteges' skill in handling the Chipmunk included an enthusiastic determination to commit suicide, which, but for the intervention of the rear seat passenger would have included murder as well. But before an impression is gained



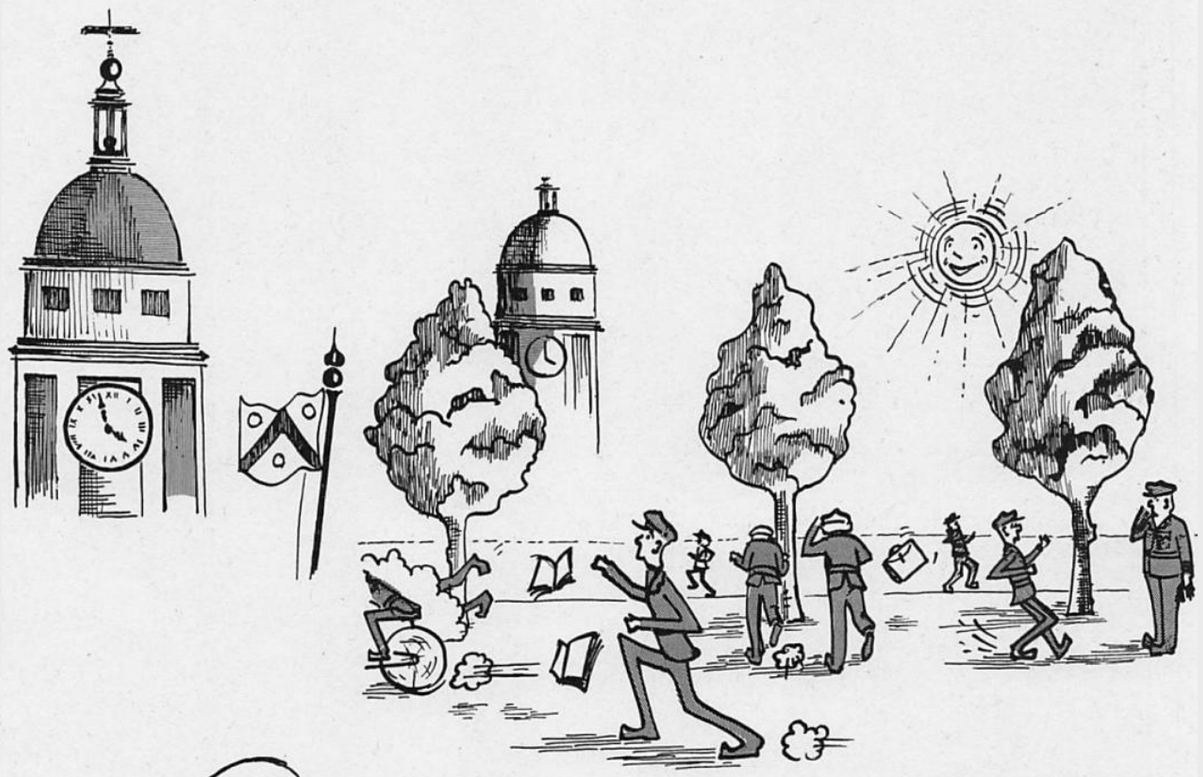
Winter 1965 - A Chipmunk Chapter (2)

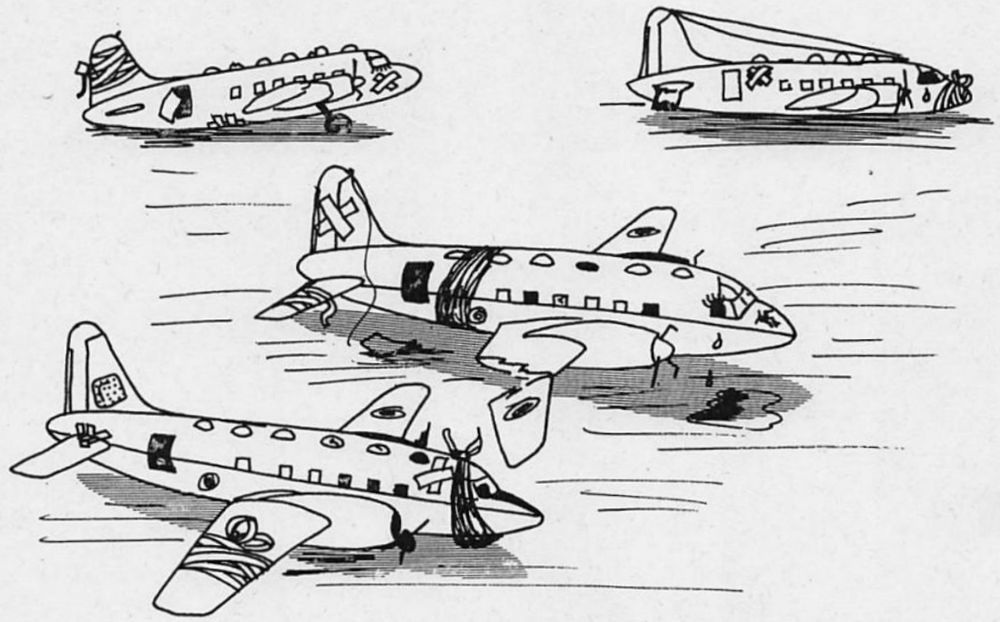
from the foregoing that the cadets' performance during the (ouch !) landing competition was a mirror of their flying skill, or more precisely a censure on the flying instruction they had received, I must in all loyalty defend both their effort and ours. It was as much due to the circumstances — some competitors had less than three hours solo in their log books — as to our choice of days, which, as many of the spectators will confirm, did not include good weather. To my knowledge 85 Entry's competition was held during a snowstorm, 86's in rain, 87's landings were downwind, 88's in a thunderstorm, 89's in a gale and only 90's effort was in good weather conditions.

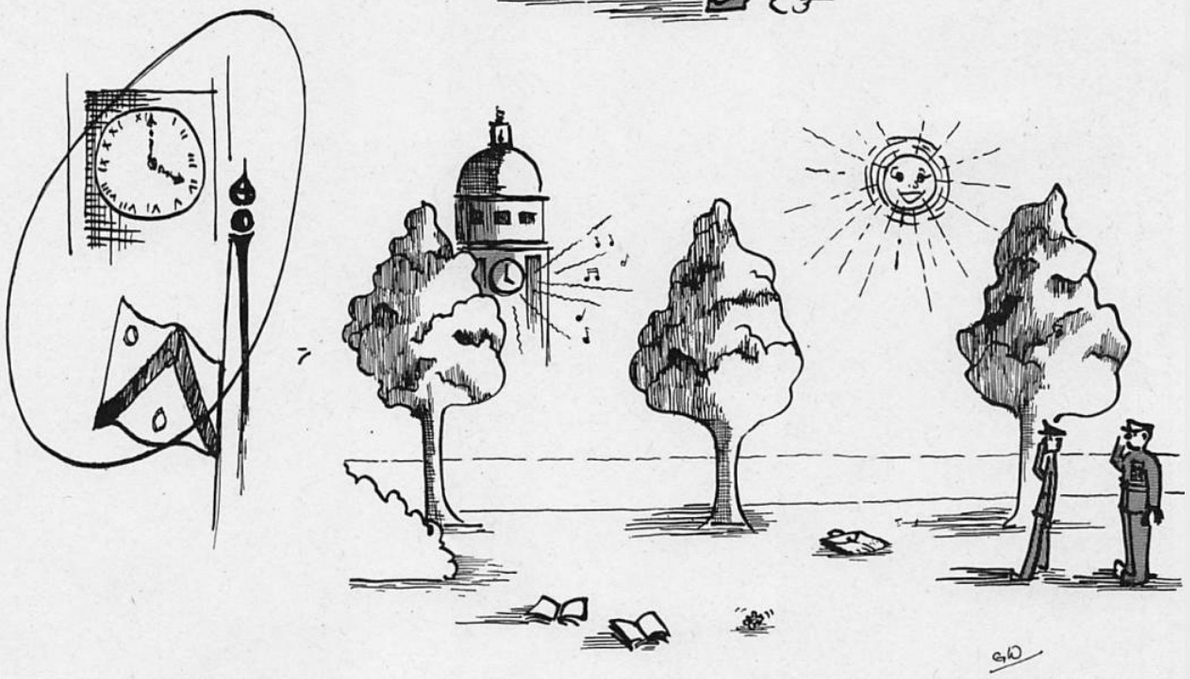
I think also that we must seek recognition as being the original all weather flight ; with conditions that stopped our paraffin partners participating we were flying a full dual programme. Because of our lower limits we had to develop our own recovery procedure — I think it is now safe to release the details of the system whereby we turned right at the Ashby water tower, turned left at the Brauncewell telephone and then homed overhead the sewage farm. The only weather condition that defeated us was strong winds which was just as well, as our main homing aid was completely unreliable in such weather.

Well the Chipmunks have gone, but not completely from the minds, I hope, of all who were associated with them ; those of us who join hands in a mental Auld Lang Syne will offer a prayer that should they return please may the aircraft be fitted with cockpit heating and the bumps of the North Airfield be flattened.

Flight Lieutenant J. Neale.

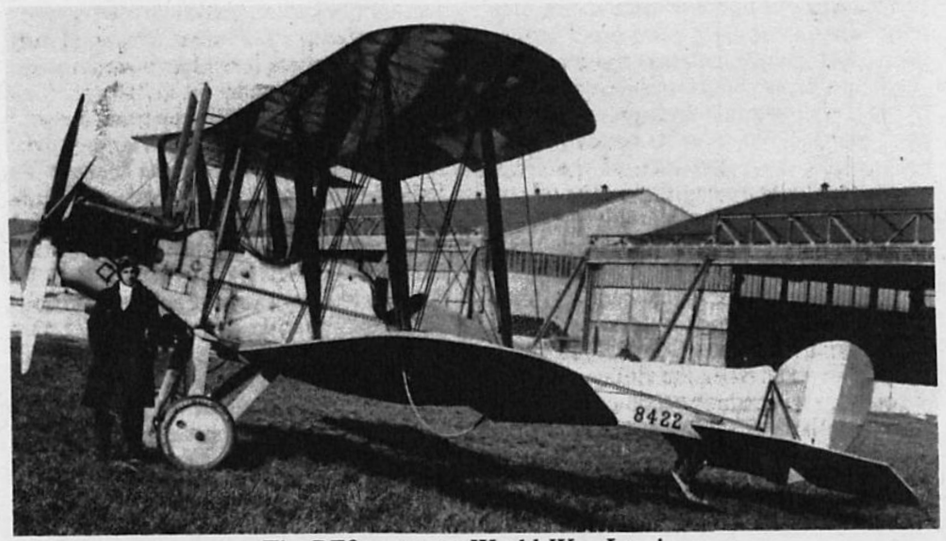






1980 - 65 Years of flying at Cranwell (1)

65 YEARS OF FLYING AT CRANWELL



The BE2c – an ex World War I trainer

The origins of flying at Cranwell date back to before the official records of the RAF. The site of Cranwell was requisitioned in 1915 by the Royal Navy to become a Naval Air Station. In 1918 the station was transferred to the newly formed Royal Air Force who re-named it Cranwell. A subsequent Act of Parliament established Cranwell as a military air academy, the first in the world, and in February 1920 the first formal flying course began.

The Courses lasted 2 years and all officer cadets learned to fly. As early as 1920, cadets were given thorough training in ground as well as air subjects and, as an incentive to understand the workings of the internal combustion engine, all were issued with a temperamental World War One motorbike. The cadets were expected to maintain the motorbike in good running order and to this end there was a free issue of oil and petrol. Not surprisingly, motorcycle accidents exceeded the flying accidents by a factor of 14:1, but it was the 'press' of the day and not the Air Staff who were responsible for the withdrawal of the motorbikes. The free issue of oil and petrol was too much for the news-hungry journalists who condemned it as an utter waste of public money. This adverse publicity was unusually beneficial to the RAF; the motorbikes were withdrawn and the accident rate was correspondingly reduced.

In the early days of flying training, the cadets learned to fly the Avro 504 and the more able students progressed to advanced training on ex-World War One machines such as the DH9 and Vickers Vimy. During the depressed post-war years, there was little money available to spend on flying training and it was not until 1934 that the aircraft were modernised with the introduction of the Avro Tutors, Bulldogs and Hawks. Cranwell was also the scene of other flying activities. The grass runway on the south airfield was then the longest available in the country and Cranwell became the departure aerodrome for the attempts on the long distance record. To ensure the successful take-off of the heavily-laden potential record-breakers, a special hump was constructed at the end of the runway to 'help' the transition from ground to air; it thus predated the Sea Harrier ski-jump by some 50 years.

When war broke out in 1939, the College as such ceased to function but the flying training continued. The RAF College Flying Training School (FTS) came into being and functioned as a normal FTS. By today's standards, its inventory of aircraft was phenomenal; there were 150 Oxfords on charge. A signals school was established at Cranwell to train wireless operators; a Number 2 Central Flying School was formed and rapidly moved on. A Coastal Command Operational Training Unit also arrived and one of their aircraft was responsible for the only large-scale war-time damage to Cranwell when it hit the College roof in fog. The year 1941 saw Cranwell as the site of the first flight by a British built jet-powered aircraft when Sir Frank Whittle brought his newly designed prototype to make its maiden flight. Throughout the war, the task of the FTS remained essentially the same while the title of the organisation varied considerably. In 1944 the FTS was renamed 17 FTS and in June 1945 it became 19 FTS which lasted until April 1947 when the College reopened its doors and once more took-over the responsibility for flying training at Cranwell. In 1979 history was reversed when the College ceased to control flying wing which became part of the station as a re-born FTS.

the Jet Provost Mk 5a – Formation Take Off

Post-war, Tiger Moths and Harvards were used for flying training, but those types were soon replaced by the newer Chipmunks, Piston Provosts and Balliols. The flying 'pigs', the Valetta and Varsity, arrived and stayed only for a short spell during which they were used to train navigators. Concrete runways were built and then in 1957 a new noise was heard as the first jet aircraft, a Meteor, arrived. It was used to give advanced students some jet experience and was soon replaced by a Vampire. In 1961, as a result of new Air Staff Policy, the Jet Provost was introduced at Cranwell; shortly afterwards, the Chipmunks were withdrawn and the RAF became the first air force to introduce all-through pilot training on jet aircraft. In 1968 the Chief Instructor led a newly formed aerobatic team, the Poachers, which gave excellent displays and continued to represent Cranwell at the air shows until 1974 when the fuel crisis, financial cuts and pressure of work forced its disbandment. The severe defence cuts of 1975 paradoxically seemed to make Cranwell even larger. The College of Air Warfare, together with its Dominie Squadron, and the Central Flying School with its Jet Provosts and Bulldogs became lodger units. However, the skies and runways became too crowded so the Dominies left for Finningley, and the Central Flying School, like its war-time predecessor, moved out, this time to Leeming.

Over a span of 65 years the method of instruction has been developed and refined. The first Commandant of HMS Daedalus attended a 2 week course; he spent the first week learning to fly and the second week learning to instruct! The modern day instructor usually has accomplished at least one operational flying tour and has attended the instructors' course at the Central Flying School. In general, he arrives at Cranwell with upwards of 1500 flying hours. There is the odd exception in the form of the 'Creamy', an instructor with no operational flying experience who on completion of flying training is selected to become an instructor.

The background of the Cranwell student has also changed. In the late sixties, the Air Force Board realised that many potential officers when faced with the choice of 3 years higher education at University or at Cranwell opted for the former, and were then lost to the

1980 - 65 Years of flying at Cranwell (2)

RAF. Since the RAF had always recruited a small number of graduates and because it was now less expensive to sponsor an officer through 3 years of university than 3 years training at Cranwell, the Graduate Entry System was evolved. Number One Graduate Entry commenced in 1970, and after completing officer training, the students were joined by the Prince of Wales for their basic flying training. The new scheme was not quite the hoped-for success; the more developed mind of the 22 year old graduate proved to be far less malleable than that of his 18 year old flight cadet predecessor, and some graduates could not make the transition to military life. With the closing of the Officer Cadet Training Unit at Henlow, all officers are now trained at Cranwell and the students who arrive at the flying squadrons are a mixed bag. A student may have already learned to fly with a University Air Squadron or he may have flown the Chipmunk at RAF Swinderby where the Command Flying Selection Squadron is located. Alternatively he may have gone through a full flying scholarship or he may never have flown at all. On arrival at one of the 3 Cranwell Squadrons, he learns to fly the Jet Provost T5A, a 2 seat side-by-side jet trainer. The course lengths are continuously reviewed, but a student can expect to spend one third of the course learning the basic flying techniques to a high standard. When he has successfully demonstrated his ability in this task, the pace is increased and he is introduced to some applied flying in the form of advanced handling and low level navigation. The student is then 'streamed' for further training. Those who are destined for multi-engined and fast jet training remain at Cranwell; the former complete a short course which is biased to instrument flying while the latter undertake a 60 hour course comprising advanced handling, advanced low level navigation and formation flying.

Although the principal function of flying wing at Cranwell is instruction, other flying does take place. The GD Aerosystems course make an annual flight to the North Pole and the Dominies from Finningley are frequent visitors. As recently as 1978 one young officer set out from Cranwell to fly round the world in a private aircraft and on his successful return he commenced flying training with the RAF. There is also a thriving Flying Club which was formed in 1960. There were 35 club members then and the charge was 36 shillings (£1.80) per hour for officers and 26 shillings (£1.30) per hour for airmen. The charge is now £30 per hour which surprisingly is still good value. A recent visitor to Cranwell had been an instructor with 19 FTS (when the present Deputy Commandant trained) and he was given a free trip in the Club's Tiger Moth to stir old memories. The club is now expanding and has acquired 2 new machines, one of which is fully kitted for airways flying.

As we close for press, one of the new aircraft has been raced in the King's Cup Air Race. A thriving RAFGSA Gliding Club shares the North Airfield with the Flying Club. While military flying training takes place on the south airfield, the North still offers the opportunity to feel the wind in your face and hear the wires hum; long may it remain so!

20 SQUADRON

No 20 Squadron is to hold a Reunion and Open Day, on 4 July 1981, at RAF Bruggen. Further details of this, and the formation of the No 20 Squadron Association, may be obtained from Flt Lt Mike Bryan, RAF Bruggen, BFPO 25.

1980 - Britain's First Jet Flight

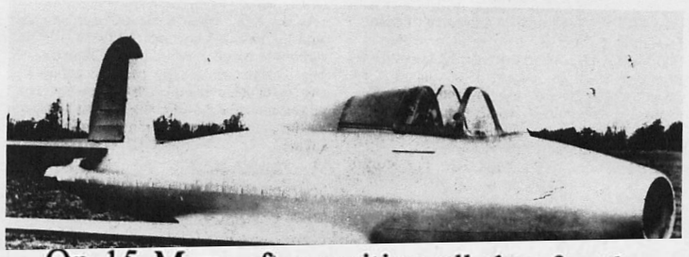
Forty years ago on 15 May 1941 the first British jet aeroplane, the Gloster Whittle E28/39, successfully completed its historic initial flight at RAF Cranwell. The development of this revolutionary design, which proved the principle of jet propulsion for aircraft and led directly to the first generation of jet fighters, the Meteor and Vampire, was due entirely to the brilliance and dedication of a famous Old Cranwellian, Sir Frank Whittle.

It was at Cranwell as a Flight Cadet (1926-28) that Whittle wrote the thesis that stimulated the train of thought which led ultimately to the jet engine. The thesis, which won him the Abdy Gerrard Fellowes Memorial Prize for Aeronautical Sciences, planted the seed in the mind of this brilliant aviator and scientist. As the seed germinated he began to work on his ideas for the development of a turbo-jet engine. Whilst at Cambridge University from 1933-36, where he graduated with a first class honours degree in Mechanical Sciences, he worked on the preliminary design of an experimental engine and sought to interest the Air Ministry and industry with his ideas.

Eventually, in 1936 a company called Power Jets, to which Whittle was loaned by the Air Ministry, was set up. His first engine ran successfully in 1937, and 2 years later in September 1939 the Gloster Aircraft company was granted an Air Ministry contract to design an aeroplane capable of jet propelled flight. The flying test-bed became known as the Gloster Whittle E28/39 ('E' for experimental and 28/39 from the number of the Air Ministry specification).

In less than 2 years the E28/39 was undergoing secret taxiing trials at Brockworth and on 11/12 May 1941 was taken by road to Cranwell for the flight test. Cranwell was chosen as the location because of its long runway, clear approaches and a certain remoteness which aided wartime security. After a few further taxiing trials the E28/39 was declared ready to fly.

BRITAIN'S FIRST JET FLIGHT



On 15 May, after waiting all day for the weather to clear, P E G Sayer, Gloster's chief test pilot, took the E28/39 down the runway. Everything went according to plan. The machine took off at 1940 hours, recorded a 17 minute flight and landed without a hitch. Frank Whittle, George Carter, the chief designer of Gloster's, and a handful of technicians were the only spectators. During the next 12 days the aeroplane completed some 15 flights and the 10 hours flying for which the engine had been cleared. From the birth of an idea in the mind of a young unknown RAF Flight Cadet, a unique event had taken place. History had been made.

Whittle remained on the Special Duty List attached to Power Jets until 1946 when he became the Technical Adviser on Engine Design and Production to the Controller of Supplies (Air), Ministry of Supply. He retired from the RAF in August 1948 as an Air Commodore. Just before his retirement he received a Knighthood, having previously been granted a reward for his invention from the Royal Commission.

In the epilogue of his book 'Jet – The Story of a Pioneer' he recalls with pride and a touch of sadness:

"As the King touched me on each shoulder with his sword, I became the first Old Cranwellian to receive the honour of Knighthood. The satisfaction this gave me overshadowed any regret at leaving the Service in which I had served since the age of 16 and which had given me the training which had made possible the jet engine".

1983-1984 - King's Cup Air Race (1)

KING'S CUP AIR RACE

This article has been prepared by Sqn Ldr D Wooldridge, OC Northumbrian UAS

One late afternoon I received a phone call from Gp Capt UAS who, in his normal cheerful salutation said: "Dave, what do you know of the King's Cup Air race?" I hesitated to show my ignorance but eventually had to admit to knowing very little.

"Well you had better find out" he said laughing. "You're competing for it this year".

So started my entry into the National Air Race Season which was to prove both rewarding and exciting. I began by searching through a number of flying magazines but found very little about the event; fortunately, Yorkshire UAS had competed during the previous season and they kindly sent me their files which provided good background reading. Delving through the reams of paper and numerous letters on the file it soon became apparent that air racing was not only a demanding sport but also a very professional one run by the Royal Aero Club of which Prince Andrew was the President. The season consisted of 8 National Air Races flown over different courses throughout the country. To be eligible to compete in the King's Cup Air Race, the final race of the season, the pilot must have successfully competed in 4 of these qualifying races and the aircraft in 3 of them. The races varied in length from 185 miles to 92 miles; most races consisted of flying 3 times around a course of approximately 30 miles, with each turning point marked by a "day-glow" marker and then once around a shorter course of about 10 miles. The markers were manned by members of the Royal Observer Corps whose job was to ensure that the aircraft went around the pylon and that it was not below minimum race height of 500' AGL; failure to comply with either of these rules meant disqualification. The most difficult job for the organizers appeared to be the handicapping. In these events, where machines varied greatly in engine power and performance, the handicappers' job was a nightmare. The winner invariably says the handicappers got it right whilst the rest of the field chastise them for getting it totally wrong.

I must admit to being very impressed with the standards set by the official handicappers: using a micro-computer they produced handicapping times that, throughout the season meant that if competitors flew accurately around the course and flew the aircraft to its maximim they stood a chance of being amongst the leaders (although I believe they got it totally wrong for us on the King's Cup Race itself!!).

So to the start of the season. Preparation for the first event at Goodwood involved selecting our fastest aircraft, preparing suitable maps and experimenting with turning performances. I also decided to fly each race dual with the other pilot, Flight Lieutenant Jerry Kirk Hope also of NUAS, assisting with the navigation and lookout. Our theory was simple: keep exactly on track, turn as tight around each corner as possible and be aggressive in overtaking. The theory worked to an extent but the first race proved we were not alone in our thinking. The Goodwood race had 33 competitors of which 6 were newcomers. The race was 109 miles long and consisted of 4 laps of a course that was fairly straight forward. We were one of the slowest aircraft and started off 12th. At the end of 3½ laps and with only 14 miles to go we were lying 3rd and feeling fairly confident until I looked behind me to find the sky full of aircraft closing rapidly. The race for the line was to say the least 'hairy'; we flew at 100' (the limit is 50' across the line) to be overtaken by an aircraft going below us. We eventually finished in 10th place and although reasonably pleased with our performance decided to rethink our tactics.

Two points had been obvious during the race. The first was that seconds counted; the first 18 aircraft crossed the line within 30 seconds. The second was the variation of cornering techniques; the recommended method was to fly reasonably wide around the pylon using 60° of bank and 2G to ensure no speed was lost and the corner not cut.

Back at base we experimented and found that a 4G turn and a – 1G push out, although losing a little speed, gained approximately 1-2 seconds on each corner. In addition, we found that we could virtually fly over the top of the pylon before turning and still not cut the corner; a saving of another 1-2 seconds. With a total of 16-20 corners on each race the saving in time could prove critical as it did during our next race at RAF Cranwell, which co-incided with their Air Day in July. The race was held in marginal weather conditions with the visibility down to 2km in places; this was to our advantage as we knew the course well. We won the race with a reasonable margin in hand and were awarded the City and Livery Trophy and £100 prize money. The handicappers, however, added 20 seconds to our time for the next race at Shobdon.

The Shobdon event was unforunately marred by an accident; during the race practice 2 aircraft collided at a turning point and one aircraft and its pilot were lost. The committee decided, however, that the race should go on. The course length was only 92 miles, and 38 competitors started the race. The conditions were again marginal and we managed a creditable 4th place. The next race was the longest and contained the biggest field of the season; it was also unique to the National Air Race season. The Round London Air race had 54 competitors racing once around a course of approximately 135 nms in length. Our cornering technique was to be of little advantage in this race as there were only 4 corners; we therefore decided that to ensure we stayed exactly on track we would draw the course on Ordnance Survey Maps. We used 14 in all and after initial concern that the map would take over the cockpit, managed to organize them in an acceptable manner. The race was given a great deal of publicity both by the press and the TV and the prize money of £1000 obviously attracted the large number of entrants. We were narrowly pushed into 5th place losing 3rd place and the prize money of £500 that went with it by just 2 seconds. Despite feeling disappointed we believed we had given a good account of ourselves.

Unfortunately, we had to miss 2 other air races. One was a race to Northern Ireland for which we were unable to obtain security clearance; the other was at Rochester during a Squadron stand-down. However, having returned refreshed from a holiday I was somewhat taken aback to receive a letter from the Royal Aero Club telling me that with one race left before the King's Cup I was lying second in the British Championships and that the final race for the Stewards Cup at RAF Finningley would decide the winner. I was now faced with a dilemma; if I went flat out for the Stewards Cup I would have nothing in reserve for the King's Cup. Having listened intently to the seasoned competitors' bar-talk throughout the season I knew that everyone held back something during the Stewards Cup to ensure a favourable handicap for the King's Cup. However, if I saved something for the King's Cup it might predjudice my chances in the Stewards Cup and would probably lose me the chance of winning the British Championship. The decision was made to go for the Stewards Cup and expect to get handicapped for the King's Cup; the tactics worked to an extent. We won the Stewards Cup and £250 but then found that we were now lying joint first in the British Championships; the winner was to be decided by the highest placing in the King's Cup. We felt slightly dismayed as our overall speed of 144.23 mph in the Stewards was above our average time for the other races; the handicapper, therefore, had a hey-day on our start time for the big race.

The King's Cup was held at RAF Finningley and was part of the Battle of Britain Open Day. Thirty nine competitors were started by Prince Andrew and the first 29 finishers crossed the line in 30 seconds; a credit to the handicappers. We finished a respectable 12th and although we unfortunately did not win the British Championships we gained a consolation prize in winning the Outram Trophy which was awarded to the newcomer to air racing who had gained the most points in a season. We finished the season with 2 National Trophies, the Outram Trophy and a joint first on points in the British Championships; we were, needless to say pleased with our first season's work.

Air racing is a well established sport but for the RAF it is a relatively new venture; I hope that the RAF can continue to participate in these events which are well organized by the Royal Aero Club who jealously guard their reputation for professionalism. The competition is fierce.

1983-1984 - King’s Cup Air Race (2)

the rewards high, and the prestige and public relations gained for the RAF are valuable. I count myself fortunate in being the RAF representative in a most enjoyable and exciting sport but realise that without the backing of my peers and my Squadron, especially my groundcrew, any thoughts of success would be futile.

THE FLYING TEAM

Sqn Ldr DAVE WOOLDRIDGE (Clutching the City and Livery Trophy)

Flt Lt TERRY KIRKHOPE

No 45(RESERVE) SQUADRON HISTORY AND TRAINING

by Flying Officer Thomas Fox

Formed on 1 March 1916, No 45(Reserve) Squadron celebrated its 90th Anniversary in 2006. The Squadron has served all over the world, notably in Egypt and Iraq, where in the 1920s it adopted the nickname 'The Flying Camels'. This was chosen, along with the winged-camel motif, as an appropriate identity for a squadron acting as the 'ship of the desert' flying the Baghdad-Cairo mail route. The Squadron left the area in 1942 after being deployed to Burma, starting a long association with the Far East. Subsequent areas of operation include Ceylon, Malaya and Singapore flying several different aircraft types such as Venoms, Vampires and Canberras. Here, whilst taking part in Operation FIREDOG, the Squadron successfully flew over 4000 operational sorties against the communist terrorists. After nearly 50 years of continuous service overseas, the Squadron returned to the UK in 1972 to fly the Hunter and subsequently Tornado GR1, becoming the 'shadow' identity - hence the Reserve(R) status - of the Tornado Weapons Conversion Unit (TWCU) at RAF Honington. In 1995, 45(R) Squadron arrived at RAF Cranwell, after a brief spell at RAF Finningley, with their Jetstream training aircraft. The role of training all the RAF multi-engine pilots continues today with the Beechcraft King Air B200, all 7 of which are owned and serviced by Serco.

Those pilots selected for multi-engine training undertake a period of general service training on arrival at Cranwell, including the joys of survival training. The survivors join 45(R) Sqn, and proceed to fly approximately 30 hours during Multi-Engine Lead In Training (MELIN) on the Slingsby Firefly provided via civilian contract with Babcock Defence Services. MELIN acts as a bridging course between EFT and operating a true multi-engine trainer, and introduces the essential concepts of a 2-crew cockpit and Crew Resource Management (CRM) on an easily managed platform. An understanding of the human factors of a multi-crew cockpit is a crucial requisite to successfully carrying out the huge range of missions asked of today's military pilot.

Beechcraft King Air B200

Basic phase flying on the King Air allows limited use of the aircraft's extensive avionics and flight system. It focuses on general handling of the aircraft, basic instrument flying including radio aids navigation and introduces the student to operations at night. It also provides essential training in asymmetric engine control, whilst continuously improving the student pilot's ability to operate within a multi-crew environment. Extensive use is made of the 2 King Air simulators, ensuring that the student can progress rapidly to advanced exercises and maximising the training value of every precious airborne hour.

Once the students can fly the aircraft, they must learn to operate it as a military platform. The King Air advanced phase introduces more complex sortie profiles, low level flying, formation flying, flights in foreign airspace and more demanding simulated combat missions. Additionally students are expected to operate safely within controlled airspace, exercising proper radio discipline whilst mixing with commercial traffic at busy civilian airports. All these elements are intended to advance both the student's skill-set, and also to continue to develop their airmanship, CRM, systems management and captaincy.

The course ends with a final handling test, and, for the successful pilot, the award of the coveted Wings at a solemn ceremony in College Hall. The final hurdle is role disposal, where the new pilot discovers, at a much less solemn ceremony, to which frontline aircraft type he is posted. Then it's off to an Operational Conversion Unit, sometimes within a matter of a few days and the certainty, with today's operational tempo, of combat flying in the near future. It is this operational imperative that drives the training on 45(R) Sqn. Military multi-engine pilots are expected to operate in all roles, in all theatres, and must be prepared for operations in the tactical, low-level and night environments. Crews must operate a plethora of aircraft and role-specific systems, often simultaneously with other aircraft, whilst also ensuring their own safety utilising defensive, tactical, and even offensive aids. To this end, it is the proud boast on 45(R) Squadron that our training does not produce transport pilots. Instead it graduates combat pilots who operate large aircraft.

No 55(R) SQUADRON AND THE ITALIAN CAMPAIGN

by Flying Officer Kevin Beale, 495 Weapons Systems Officers Course

The modern role of 55(R) Squadron based at RAF Cranwell is:

"To Train Aircrew in Systems Management, Decision Making, Air Leadership and Teamwork to meet the Operational Demands of the Royal Air Force."

It is one of the largest training squadrons in the RAF. It trains Weapons Systems Officers (WSOs) and Weapon System Operators (WSOps) to progress to Operational Conversion Units (OCUs). This year saw the 90th Anniversary of the Squadron and the consecration of a new standard. Marked on that standard are many battle honours (see end of article) including The Gothic Line.

By understanding the past, training and leadership can be best prepared for the future. With this aim in mind, current members of 55(R) Squadron conducted a visit to the Commonwealth War Graves in Italy over the Remembrance Weekend 2006.

No 55(R) Squadron Wreath laid at the Commonwealth War Grave - Padua

Despite a gap of over 60 years, many similarities exist between elements comprising the RAF's expeditionary role today and the Squadron's role in the Italy campaign. Despite having much less written about it, compared to the advance through northern Europe, this was an equally grim and bloody struggle for victory.

History

The Squadron was originally formed as a training unit in April 1916 and its role developed to bombing and reconnaissance duties as part of Trenchard's Independent Force for strategic raids over Germany until the end of WW1. Between the Wars, the Squadron performed Air Policing over Iraq for a period of 19 years. During the initial stages of WW2 the Squadron patrolled the Suez Canal area until Italy joined the War and bombing raids over Libya began. The next stage of the Squadron's history begins in 1940 in the North African desert and ends with the removal of German forces from Italy in 1942.

THE ITALIAN CAMPAIGN

Strategy

The strategic disagreement by the Allies on how to win WW2 was fierce. The US Service Chiefs argued for an invasion of France as early as possible and no other operations should be undertaken which might delay that effort. The British advocated a Mediterranean strategy arguing that the presence of large numbers of troops trained for amphibious landings in the Mediterranean made a limited-scale invasion possible and useful. Eventually the US and British political leadership made the decision to commit to an invasion of France in 1944, but with a low-priority Italian campaign to tie up German forces in the meantime.

The primary strategic goal of the campaign was to force the German Army to tie down units in Italy, which both sides knew was a secondary theatre. Furthermore, it forced German troops from the Eastern Front to defend Italy and the entire southern coast of France, thus aiding the Soviets.

Time Line

- The combined British-American invasion of Sicily began on 10th July 1943.
- Forces of the British Eighth Army landed in the 'toe' of Italy on 3rd September 1943.
- The Italian government surrendered on 8th September, but the German forces prepared to defend without their assistance.
- On 9 September forces of the US Fifth Army landed at Salerno.
- The British Eighth Army under Montgomery was able to make progress for a while up the eastern coast capturing the port of Bari and the important airfields around Foggia. But as the Allies advanced north, increasingly difficult terrain - characterised by a succession of fast flowing rivers and intervening ridges running at right angles to the line of advance - prevented fast movement and proved ideal for defence.
- In early October 1943 Adolf Hitler was persuaded by his Army Group Commander in south Italy, Field Marshal Kesselring, that the defence of Italy should be conducted as far away from Germany as possible. This would make the most of the natural defensive geography of Central Italy whilst denying the Allies the easy capture of a succession of airfields each one being ever closer to Germany.
- Kesselring was given command of the whole of Italy and immediately ordered the preparation of a series of defensive lines across Italy south of Rome. Two lines, the Volturno Line and the Barbara Line were used to delay the Allied advance to buy time to prepare the most formidable defensive positions which formed the Winter Line, the collective name for the Gustav Line and two associated defensive lines on the west of the Apennine mountains, the Bernhardt Line and the Adolf Hitler Line.
- The Winter Line proved a major obstacle to the Allies at the end of 1943, halting their advance on the Fifth Army's front, the western side of Italy. Although the Gustav Line was penetrated on the Eighth Army's Adriatic front, blizzards, drifting snow and zero visibility at the end of December caused the advance to grind to a halt. Landings at Anzio behind the line were intended to destabilise the German Gustav line defences, but the hoped for early thrust inland to cut the German defences off did not occur and the Anzio forces became bottled up in their beach head.

- It took four major offensives between January and May 1944 before the line was eventually broken by a combined assault of the Fifth and Eighth Armies (including British, US, French, Polish, and Canadian Corps) concentrated along a twenty mile front between Monte Cassino and the western seaboard. At the same time the forces at Anzio broke out of their beach head but an opportunity to cut off and destroy a large part of the German Tenth Army retreating from the Gustav Line was lost when, on the brink of success, the Anzio forces changed their direction of attack to move parallel with the coast to capture Rome.
- Rome fell on 4th June.
- In the period from May to September the Allies advanced beyond Rome taking Florence and closing up on the Gothic Line. This last defensive line, just south of Bologna, was not broken until April 1945.
- In the winter and spring of 1944-45, extensive partisan activity in northern Italy took place. Because there were two Italian governments during this period, one on each side of the war, the struggle took on some characteristics of a civil war.

Air Power in Italy

The Italian air campaign remains one of the finest examples of the potential of Air Power to make a decisive difference to land operations.

The Desert Air Force was formed in North Africa to provide close air support to the Eighth Army in its campaigns between 1941 and 1945. It was made up of squadrons from the Royal Air Force (RAF), the South African Air Force (SAAF), the Royal Australian Air Force (RAAF) and the United States Army Air Forces (USAAF) together with individuals from other Allied air forces.

Joint

The role of the Desert Air Force in the 1943-1945 is what we now define as 'Joint Force Employment'. Recognised by General Arnold as "the greatest lesson of the Second Word war," joint operations saw their foundation in a number of different areas, but many regard the Italy campaign as the birth of successfully using air support to friendly forces on the ground.

Up to this time, aircraft had seen 3 different roles: Coercive bombing aiming to destroy a country's will to fight; Reconnaissance, to find out what was going on behind enemy lines; Air Defence to prevent enemy aircraft doing the first two roles. The Second World War saw a revolution in the diversity of Air Power and one of the major elements of this was the development of air support to ground operations.

March 2007 - 55 Sqn of RAF Cranwell (1b)

Air Interdiction

The Desert Air force had a staggering numerical advantage and enjoyed air supremacy over Italy. This gave aircraft the opportunity to operate where they wanted and to use air power in support of operations on the ground, rather than defending troops from enemy attack.
The Desert Air Force contributed significantly to the development of Air Interdiction:

"Operations conducted to destroy, disrupt, neutralise or delay the military potential of opposing forces before they can be brought to bear effectively against friendly forces" (AP3000).

Beyond the range of most land-based systems, air power offered reach and flexibility – two of the key characteristics that we preach in today's air power doctrine – to fly behind the enemy to attack supply lines, reinforcements, front line defensive positions and command and control systems. The objective was to reduce the enemy's capability to fight, and weaken their defences prior to the main land force attack.

Doctrine

The actions of the Desert Air Force in Italy proved to be a testing ground for airmen in the development of tactics, techniques, and procedures for the employment of airpower in a combat environment. Lessons learned over the Mediterranean in coordination with ground commanders benefited airmen and soldiers landing in Normandy and have continued to make a major difference to conflicts throughout the world ever since.

In spite of the lack of experience in joint operations, dogged determination, innovative thinking, and sound leadership helped the Allied forces overcome the friction and fog of war and, although the Germans fought cleverly and tenaciously, history suggests that this was no match for the decisive contribution made by Allied Air Power.

The coordinated air campaigns that supported the offensive operations throughout Italy allowed the Allies to secure beachheads and advance inland, fighting an adversary with broken supply lines, broken morale and with minimal support from the air. The intensity of the Allied air campaign compelled the Germans to withdraw forces first from Sicily, then from southern Italy. This reduced their ability to mass their effort to oppose attacks and drained German combat power that could have been used on the Eastern front or to reinforce France.

Remembrance

In remembrance of the service of all those who fought and died in operations in Italy WW2, 55(R) Squadron Personnel visited Commonwealth War Graves in Northern Italy. Thirty one Squadron members who lost their lives were visited and each grave was marked with a symbol of our respect.

At each location, visiting members performed presentations consisting of briefings, readings and discussions. Topics included Organisation of Commonwealth War Graves, The Italian Campaign, Allied Strategy, Air Power and 55(R) Squadron history and ethos.

Sites Visited: Argenta
Coriano Ridge
Ravenna War
Forli
Padua War

The Visit concluded with a Service of Remembrance at Padua, led by Officer Commanding 55(R) Squadron, Wing Commander Steve Richards. There was a reading from John 15: v9-17. All personnel then observed a 2-minute silence.

The primary role of 55(R) Squadron in Italy was the bombing and reconnaissance of road and rail communications, stores dumps, factories and enemy aerodromes.

The aerial interdiction and close air support campaigns helped to achieve major strategic goals but, perhaps more importantly, the lessons learned in Italy also helped refine the doctrine which shapes the Royal Air Force we see today. In turn, this relates to the techniques being taught by the modern 55(R) Squadron in its role at RAF Cranwell.

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Flt Lt Hughes
Flt Lt Nash
Wg Cdr Richards

RAF Cranwell
College Hall Officers Mess Library
55(R) Squadron Diary WW2

55(R) Squadron Battle Honours

* Indicates Displayed on Squadron Standard

Western Front 1917-1918*
Arras, Ypres 1917*
Independent Force and Germany 1918*
Iraq 1920
Kurdistan 1922-1924
Iraq 1928-1929
Kurdistan 1930-1931
Northern Kurdistan 1932
Egypt and Libya 1940-1943*
El Alamein* El Hamma*, North Africa 1943
Sicily 1943,
Italy 1943-1945, Salerno, Gustav Line, Gothic Line*
South Atlantic 1982
Gulf 1991

Nominal Roll of Sqn Graves Visited

Sqn Ldr Ronald Stringer RCAF DFC (Pilot)
FO Robert Horne (WOP/AG)
FO James McGurk (WOP/AG)
FO Patrick Pilcher (NavB)
FO John Stone (Pilot)
FO Godfrey White (Pilot)
Lt Leonard Douglass SAAF (Nav)
Lt Martin Farrell SAAF (NavB)
Lt H Thistleton SAAF (Nav)
2Lt S Kovacovic RYAF
PO Jack Dean (Pilot)
PO Donald Noyes (NavB)
WO Edgar Brown (WOP/AIR)
WO Clifford Crawley (AG)
WO Leonard Flynn (WOP/AG)
WO Ronald Graham RNZAF (Pilot)
WO Edward Wheatley (AG)
FS Frederick Amey (WOP/AIR)
FS Anthony Cauchi (AG)
FS Roy Flood (AG)
FS Leonard Fowler (Pilot)
FS H Hawtin (WOP/AG)
FS Edwin Lea (WOP/AIR)
FS Ronald Patterson (AG)
Sgt John Alves (NavB)
Sgt John Brown (AG)
Sgt Kenneth Butler (Pilot)
Sgt Thomas Hawthorne (WOP/AG)
Sgt Leslie Platts (NavB)
Sgt Herman Toplikar RYAF, (WOP/AIR)
Sgt William Walklate (AG)

Dr J Hayward,
Dean of the Royal Air Force College

Achieving With No 3 Flying Training School

Articles complied by Squadron Leader Ian Pallister RAFR, SO2 Force Development, No 3 Flying Training School Headquarters, RAFC Cranwell

Introduction

In December 2011, the amalgamation of No 1 Elementary Flying Training School into No 3 Flying Training School (FTS) created the largest and most diverse military flying organisation in the country. Encompassing Air Cadet Gliding, the University Air Squadrons (UAS), Elementary Flying Training (EFT) and Advanced Multi-engine Flying Training together with the broad range of associated ground schooling, makes 3 FTS truly multi-cultural. Regulars from all 3 Services, Reserves (FTRS, VR (UAS) and VR(T)), contractors (pilots and engineers), and MOD civilians, all work alongside each other to fulfil a multitude of tasks and provide the best possible experience for the trainees. In this article from 3 FTS, we have provided a series of short pieces which offer a flavour of this year's various tasks and activities.

Aircrew Survival Training Centre

The Aircrew Survival Training Centre (ASTC) conducts Survival, Evasion, Resistance, and Extraction (SERE) Training for all ab initio aircrew from the RAF and Army Air Corps. Notably, in the last year, 14 International Defence Training (IDT) Trainees from Bahrain, Iraq, Kuwait, Qatar and Saudi Arabia have also completed training at the ASTC. The aim of Aircrew SERE Basic Training is to equip aircrew with the necessary skills to be able to survive indefinitely, in a permissive peacetime environment, with only the equipment they would have at their disposal on abandoning their respective aircraft type.

Trainees are taught how to survive after an aircraft crash, in a broad range of environments.

Trainees ride out the extreme sea-states in the Environmental Tank, Lowestoft.

The Course is split into 2 distinctive phases: the first deals with the harshest of environments - not the desert, but water. To help achieve the training objectives, practical drills are conducted in Environmental Tank Training Facilities – the nearest to the College being Lowestoft. Here the trainees can experience all manner of sea conditions from a calm Mediterranean (although not as warm!) to a stormy North Sea together with waves, simulated lightning provided by a strobe light (a real electrical storm was thought to be a little harsh), wind and water spray - courtesy of a hosepipe and Instructor's thumb!

Once the trainees have lost their sea legs, the Land Survival phase starts in earnest. The first half is mainly classroom-based, with a day of practical application spent outdoors. This initial phase includes theoretical and practical instruction encompassing the 4 priorities of survival (Protection, Location, Water, Food) and parachute training on an indoor rig. Following appropriate briefings and kitting, the second phase

The weather phenomena of early-2013 tested land-survival drills to the limit.

is spent in field conditions culminating in practical Basic Land Survival Training (BLST) known as Exercise MOORTREK. Both the last Exercise of 2012 and the first for 2013 took place in Forestry Commission Land North of Pickering where conditions were arduous with snow and low temperatures - zero by day and -8°C overnight. Through the 5-day deployment, trainees honed their skills, culminating in an 18-hour assessment during which the construction of shelters and lighting of fires became a real-time priority. All involved were physically and mentally tested to their limits, and displayed character and determination to emerge at first light to implement a recovery plan. Despite the challenging conditions, the overwhelming majority of the students successfully met the Exercise objectives, and all returned safely to the College with renewed confidence and both the knowledge and skills to survive.

Elementary Flying Training At Barkston Heath

RAF Barkston Heath has been home to Elementary Flying Training (EFT) for the Army and Royal Navy since 1995, 2 years after the creation of the Joint Elementary Flying Training School (JEFTS) in 1993 at RAF Topcliffe. Operating the Slingsby Firefly, JEFTS was run by Hunting Contract Services who provided the aircraft and civilian instructors. The RAF withdrew from EFT at RAF Barkston Heath in 1999, and following the downsizing of the JEFTS contract in 2003, withdrew from the school entirely, electing to carry out EFT on the Grob Tutor in the existing University Air Squadrons (UAS). The school at RAF Barkston Heath was renamed the Defence Elementary Flying Training School (DEFTS) and consisted of 2 squadrons, 703 Naval Air Squadron and 674 Army Air Corps. DEFTS continued to operate the Slingsby Firefly until the winter of 2009 when it was replaced by the Grob Tutor. While it may only be just over 3 years since the Grob Tutor began operating at RAF Barkston Heath, many of those that have been utilising it as the EFT platform to deliver the syllabus to Army and Royal Navy ab initio pilots have been around a great deal longer. The importance of having dedicated civilian flying instructors, air traffic controllers, engineers, ground handlers, flight planning and ops staff is immeasurable. This group of committed civilian staff, many with decades of experience in the EFT environment, have brought a deep understanding of the standards required and have acted as the much needed continuity throughout various command changes, enabling a clear retention of corporate knowledge. Alongside this continuity lie the dedicated military staff who ensure that the students have a frontline focus and can see what is achievable with hard work. The benefits of EFT are well understood, including the clear cost savings of operating a relatively cheap light aircraft, to teach the fundamentals of airmanship and situational awareness prior to moving onto more complex and costly types. The hugely valuable experience of piloting a machine for the first time in the dynamic 3-dimensional real-time airborne environment cannot be replaced by even the most modern synthetic training devices. As we look forward to the continued progress of the UK Military Flying Training System (UKMFTS), the benefits of a dedicated core of staff that have been present throughout the evolution of EFT will remain equally important in its continued success.

International Defence Training (IDT) on No 16(R) Sqn

The first-class training received by RAF pilots is respected throughout the world. For this reason many Foreign and Commonwealth countries choose to send their ab initio pilots to the RAF to conduct both Initial Officer Training and EFT.

16(R) Sqn delivers RAF EFT, Multi-engine Lead-In, Fast Jet Lead-In and, indeed, IDT. International students now represent about 25% of the EFT student intake on the Sqn, and will be an enduring task for the foreseeable future. Most have completed English language training courses in the UK prior to attending EFT, which prepares them for any language barriers they may otherwise face. 16(R) Sqn is currently training student pilots from the Kingdom of Bahrain and the State of Kuwait, and will shortly welcome officers from the Kingdom of Saudi Arabia. The students broadly follow the same syllabus as the UK RAF and RN EFT course (currently around 55 hours flying instruction, of which 8 are solo).

A Grob Tutor flies over the RAF College.

The main difference between IDT students and their UK counterparts is that the former have not undergone the UK pilot aptitude tests. Moreover, they are most unlikely to have any previous flying experience. In contrast, many UK trainees have flown on an Air Experience Flight (AEF) or UAS and this, albeit limited, exposure to flying leaves them significantly more comfortable with the basic principles of the controls and instruments. Consequently, in the early stages of the course, IDT students find the learning curve very steep, and often require more focussed tuition to supplement the core syllabus. It is therefore essential that the instructor takes particular care to be concise and not to overload the student with unnecessary talking. The many challenges of learning a

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45(R) Sqn flew AOC 22(Trg) Gp to his appointment with the Red Arrows, in the skies about the Olympic Stadium, London 2012.

new skill are exacerbated by the introduction of a second language for the student; naturally, everything from pre-flight briefing through to post-flight debrief takes that little bit longer.

The early flights can appear rather daunting for the IDT student as he gets to grips with not only the tidal wave of new information but also the demands of deciphering Radio Transmission phraseology over a sometimes less-than-perfect radio. With careful direction from the instructor, however, performances steadily improve as the students approach first solo: a milestone that often brings increased confidence before progression to the applied phases. Instrument flying and navigation often bring further challenges as both phases require more interaction with Air Traffic Control, hence more difficult and complex radio calls. Additionally, the cerebral pressures increase with evermore complex mental arithmetic and airmanship tasks required, all of which require initiative, flexibility, and critically a rapidly increasing spare mental capacity. It is at this point that the lack of pre-selection aptitude testing can sometimes be most clearly evident.

Overall however, the staff of 16(R) Sqn are always impressed by the determination of all the IDT students. The challenges delivered by EFT are significant enough for the RAF and RN students, let alone their international counterparts and all those who succeed, regardless of their nationality, are assessed against the same EFT course standards. When our IDT students are repatriated, they return to their respective homelands with a world-class qualification and a wealth of hard-earned professional experience in a military training environment that is second to none.

Flying Camels at the London 2012 Olympics

The 27 July 2012 was a warm, sunny, if not slightly hazy, day. A 45(R) Sqn crew waits, engines running, on the down-sloping ramp at RAF Benson, surrounded by Puma helicopters. Air Traffic informs the crew that their passenger has been delayed. The flight plan is put on hold; the fuel carefully checked. Finally, a staff car pulls through the gate and onto the ramp. The aircraft commander salutes AOC 22(Trg) Gp, AVM Lloyd, and escorts him to the King Air B200GT aircraft. Minutes later, the aircraft is soaring up into the recently created London 2012 Airspace. Flying straight over central London, ASCOT7090 is routing to Manston. After a 30-minute transit, the AOC steps off the aircraft and is greeted by RAFAT staff. That evening he will fly with the Red Arrows in a flypast to mark the Opening Ceremony of the London 2012 Olympic Games. Command Task 122 is almost complete. The crew safely returns to RAFC Cranwell, landing with seconds to spare before the routine airfield closing time.

45(R) Sqn, known as the 'Flying Camels', has the following mission: *to train aircrew in systems management, decision making, air leadership and teamwork to meet the operational demands of the RAF*. The King Air's normal role is Advanced Flying Training; the Sqn provides up to 35 *ab initio* pilots to the front line each year. Post Strategic Defence & Security Review 2010 (SDSR 2010), however, during a period of reduced throughput in the flying training pipeline, the Sqn took on a variety of operational and communications tasks.

Alongside routine training sorties, the main focus during the Olympics was Op PROTEGO. The objective was to deliver Typhoon pilots from 6 Sqn, based at RAF Leuchars, to their temporary deployed base, at RAF Northolt. The Typhoon deployment was a key element of the Air Defence strategy to ensure safety at the largest sporting event in the world. The King Air contribution enabled the 6 Sqn pilots to remain current at RAF Leuchars, where the Northern element of the UK's Quick Reaction Alert (QRA) is located. The flight schedule –from July to September – was designed around crew rest regulations for the Typhoon pilots. Approximately 70 hours were flown in support of Op PROTEGO, each series of transits requiring a King Air and 2 Qualified Flying Instructors (QFIs). Despite the significant demands on the Sqn's resources, Op PROTEGO was completed successfully and did not adversely affect the Sqn's ability to train aircrew.

Summer 2012 was an incredibly busy period for 45(R) Sqn. Shortly after the Olympics, there was a proud moment as the Sqn was invited to conduct a flypast alongside the Battle of Britain Memorial Flight, as part of the Queen's Diamond Jubilee celebrations. The King Air element was led by the Officer Commanding 45(R) Sqn, Wing Commander Rich Berry.

University Air Squadrons Shine At Bomber Command Memoral

The most significant event of the year for the UASs was undoubtedly their involvement with the unveiling of the Bomber Command Memorial in Green Park, on 28 June 2012. The task had started quite informally in November 2011 when the University of London Air Squadron (ULAS), through their Honorary Air Commodore HRH The Process Royal, was invited to assist with providing hosts and escorts for the veterans attending the ceremony. At the next planning meeting held in the RAF Club, it became clear that the task would involve far more students than those available on ULAS. In the event, some 200 students, representing all 14 UASs, took part; however, this was only the beginning. At the meeting in April, SO2 P1 Ceremonial revealed that the majority of the Queen's Colour Squadron (QCS) were committed to performing at the Nova Scotia Tattoo in Canada and would not be available for the Bomber Command ceremony. Knowing that Flt Lt Forster, the RAF Regiment officer responsible for UAS Force Protection training, had himself served with QCS, he enquired as to whether the UAS students were trained well enough to provide a Royal Guard of Honour (RGOH) for Her Majesty the Queen, alongside the remaining contingent of the QCS. After seeing film footage of East Midlands UAS and the Liverpool and Manchester & Salford UAS conducting 'Armed Forces Freedom Parades', he was suitably impressed and the formal task was received the following day; the hunt was then on to find 28 cadets who could make the grade.

Thereafter followed an intensive period of selection & training, arrangement of London accommodation for 200 cadets, a route recce, uniform checks and perfection of arms drill. All of this occurred during the period of university exams and other UAS summer exercises. Indeed, during the week of the ceremony, most of the contingent and staff were at Bisley taking part in the inter-UAS shooting match. On the big day all hosting troops did their job brilliantly in blazing hot weather. Working tirelessly with veterans and VIPs, the youngsters drew nothing but praise for their deportment, immaculate turnout and willingness to help. As for the Guard of Honour, marching past Buckingham Palace just 10 minutes before the changing of the Guard to the cheers of thousands of well-wishers was an experience they will never forget. The whole day was a resounding success; the Chief of the Air Staff himself commented that it was difficult to differentiate between the students and the regulars, such was the quality of their performance.

Two King Airs and the BBMF Dakota, on their way to the Mall to display for the Queen, in celebration of Her Majesty's 2012 Diamond Jubilee.