

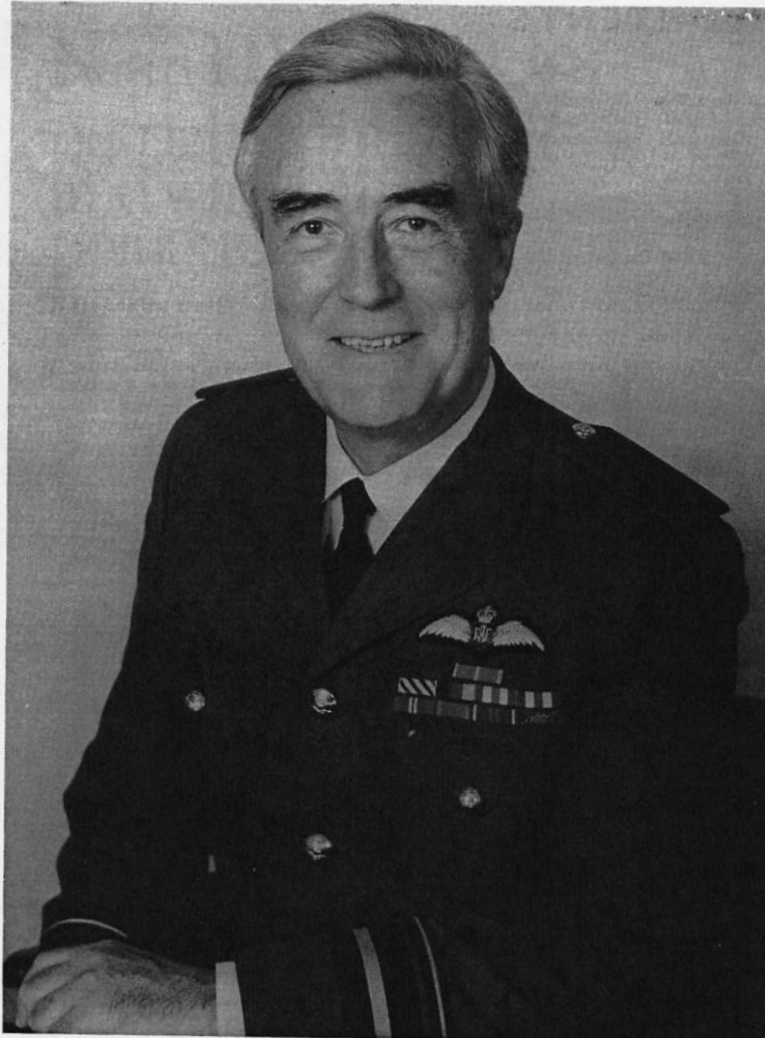
RAF COLLEGE CRANWELL

College Journal Extracts

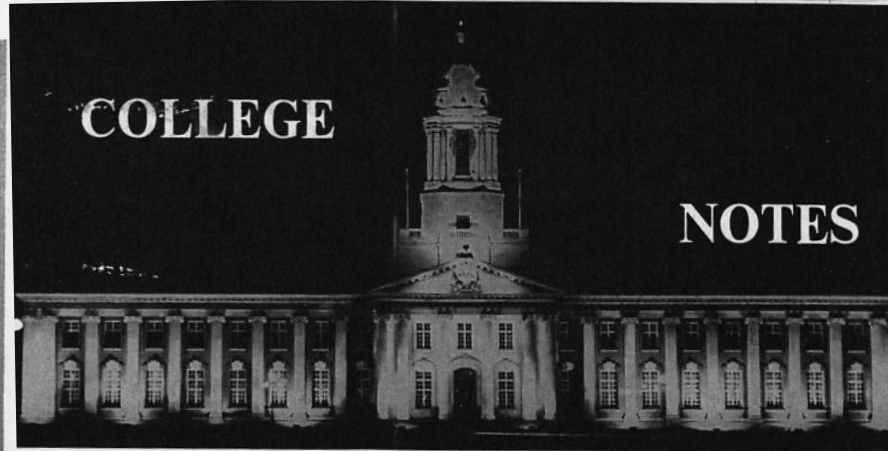


1975

1975 - College Notes



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NEW APPOINTMENTS

THE COMMANDANT AIR VICE-MARSHAL W E COLAHAN CBE DFC RAF

Air Vice-Marshal Edward Colahan became the Air Officer Commanding and Commandant of the Royal Air Force College Cranwell on 19th July 1975. The Air Vice-Marshal served in the Royal Air Force in Italy and France in World War II as a pilot seconded from the South African Air Force — he was born and brought up in South Africa. After the war he transferred to the Royal Air Force. He was a Cadet Wing Squadron Commander at Cranwell in 1958 and 59. Other previous Royal Air Force appointments include Staff Officer to Lord Mountbatten in the 1960s, Deputy Chief of the British Military Mission to the Soviet Commander-in-Chief in East Germany, Air Commander in Malta during the evacuation and return of British families in 1972, and Assistant Chief of the Air Staff (Operations) at the Ministry of Defence.

Air Vice-Marshal Colahan and his wife Anne, who was born in Berkshire, liked Lincolnshire very much during their first stay and bought Northbeck House in Scredington last year; they intend to retire there in due course. During the Colahans' first tour at Cranwell, the Air Vice-Marshal ran the Shoot and Mrs Colahan hunted occasionally with the Belvoir and the Blankney Hunts. They have a married daughter, Jeanette, who is a school teacher in Norfolk, and another, Deirdre, who is studying French at Lausanne University. Their 11 year old son, John Dermot, is at a prep school for Stoneyhurst.

The *Journal* extends a warm welcome to the new Commandant and his family.

1975 - Passing Out 14, 15 and 17 GE (Supply)

PASSING OUT CEREMONIES

NUMBERS 14 & 15 GRADUATE ENTRIES

The Passing Out Ceremony of No 14 Graduate Entry (General Duties and Engineer Branch) and No 15 Graduate Entry (Secretarial Branch) took place on 16th August 1974. The Reviewing Officer was Air Chief Marshal Sir John Davis GCB OBE MA RAF.

PRIZE WINNERS

The Sword of Honour

Flying Officer R G A Westlake

The Philip Sassoon Memorial Prize

Flight Lieutenant J R McCaughey

The R M Groves Memorial Prize and Kinkead Trophy

Flying Officer E H Ball

The Dickson Trophy and Michael Hill Memorial Prize

Flying Officer M D Beech

The Chicksands Cup

Flying Officer M J Parker

LIST OF PASSING OUT OFFICERS

General Duties Branch (Pilots)

Flight Lieutenants P D Dye; J R McCaughey; D Turbitt; D B Wildridge; Flying Officers E H Ball; M D Beech; S M Evans; R L Gould; R D Hutchinson; P S John; P K Keating; P J Lawrence; G B Milton; G W Unsworth; R G A Westlake; N J Wilcock.

Engineer Branch

Flying Officers C G Cooper; B D Harvey; M G Headland; P M Hoyes; C M Hubble; V R March; D J Palmer; M J Parker; M J Robertson; G M Watson.

Secretarial Branch

Flying Officers A J Greaves; P F Tomlinson.



Fathers and sons from No 14 Graduate Entry

NUMBERS 15 & 17 GRADUATE ENTRIES

The Passing Out Ceremony of No 15 Graduate Entry (GD and Engineer Branches) and No 17 Graduate Entry (Supply Branch) took place on 1st November 1974. The Reviewing Officer was Air Chief Marshal Sir John Barraclough KCB CBE DFC AFC RAF.



PRIZE WINNERS

The Sword of Honour and R S May Memorial Prize

Flying Officer A G Willenbruch

The Philip Sassoon Memorial Prize

Flight Lieutenant R C Norriss

The R M Groves Memorial Prize and Kinkead Trophy

Flying Officer R A Barker

The Hicks Memorial Trophy

Flight Lieutenant D A Hamilton

The Dickson Trophy and Michael Hill Memorial Prize

Flight Lieutenant T L Evans

The Battle of Britain Trophy

Flight Lieutenant R C Norriss

The Chicksands Cup

Flying Officer A G Willenbruch

The Prize for Supply Studies

Flying Officer S P Murphy

LIST OF PASSING OUT OFFICERS

General Duties Branch (Pilots)

Flight Lieutenants T L Evans; J A Goddard; D A Hamilton; I A Maxwell; R C Norriss; N G Osborne; M Rank; P J Rogers; R Utley; Flying Officers R A Barker; G McG Dempsey; N L Digings; I C Mattimoe; M D Simpson.

Engineer Branch

Flying Officers R E M Bowes; A R Charlton; F J Clarke; D A Coleman; K J Curtis; P I Danks; C A Elkins; P J Jenkins; G B Sadler; A G Scott; D P Thow; A G Willenbruch; B M Wyn.

Supply Branch

Flying Officer S P Murphy; Pilot Officer T G Howson.

1975 - Passing Out 16, 17 and 18 GE (Supply)

NUMBERS 16 & 17 GRADUATE ENTRIES

The Passing Out Ceremony of No 16 Graduate Entry (GD and Engineer Branches) and No 17 Graduate Entry (Secretarial Branch) took place on 17th January 1975. The Reviewing Officer was Air Chief Marshal Air Anthony Heward KCB OBE DFC AFC RAF.



LIST OF PASSING OUT OFFICERS

General Duties Branch (Pilots)

Flight Lieutenants J D Babbington;
R V Carter; G H Edge; G E Finch;
P J Gill; P W Grice; R W Grundy;
R W Lindo; I F Mackay; R C Muse;
D M Old; K P Oliver; A F Vizoso;
S P Wydra; Flying Officers R A Keech;
C J Wilkins.

Engineer Branch

Flight Lieutenant P W Underhill.
Flying Officers D A Carus; R J Farman;
G Howson; J G Stevenson.

Secretarial Branch

Flying Officers D K Gardner; R A
McCulloch; M R Mackenzie.



*The Queen's Medal for 1975 presented to
Flying Officer R G A Westlake (14 GE) by
General Toufanian on 27th March 1975*

PRIZE WINNERS

**The Sword of Honour and R S May
Memorial Prize**
Flight Lieutenant I F Mackay
The Philip Sassoon Memorial Prize
Flight Lieutenant P W Underhill
**The R M Groves Memorial Prize and
Kinkead Trophy**
Flight Lieutenant P W Grice
The Hicks Memorial Trophy
Flight Lieutenant G H Edge
**The Dickson Trophy and Michael Hill
Memorial Prize**
Flight Lieutenant P W Grice
The Battle of Britain Trophy
Flight Lieutenant K P Oliver
The Chicksands Cup
Flight Lieutenant P W Underhill
The Prize for Secretarial Studies
Flying Officer M R Mackenzie

NUMBERS 17 & 18 GRADUATE ENTRIES

The Passing Out Ceremony of No 17 Graduate Entry (GD and Engineer Branches) and No 18 Graduate Entry (Supply Branch) took place on 27th March 1975. The Reviewing Officer was His Excellency General Hassan Toufanian, Vice Minister of War for The Imperial Iranian Government.



PRIZE WINNERS

**The Sword of Honour and R S May
Memorial Prize**
Flight Lieutenant R McLellan
The Philip Sassoon Memorial Prize
Flight Lieutenant D W McCready
**The R M Groves Memorial Prize and
Kinkead Trophy**
Flight Lieutenant R McLellan
The Hicks Memorial Trophy
Flight Lieutenant R McLellan
**The Dickson Trophy and Michael Hill
Memorial Prize**
Flight Lieutenant R McLellan
The Battle of Britain Trophy
Flight Lieutenant R McLellan.

LIST OF PASSING OUT OFFICERS

General Duties Branch (Pilots)

Flight Lieutenants M C Kenrick; P J
Lander; D W McCready; R McLellan;
I Pallister; P R West; K J Horlock;
A J Sumner.

Engineer Branch

Flying Officers J N Bennett; G A
Straughan.

Supply Branch

Flying Officer R G Williams.

1975 - Passing Out Ceremonies (1)

The address by His Excellency General Hassan Toufanian, Vice-Minister of War, Imperial Iranian Government.

I, as an old graduate pilot of Cranwell, am honoured and delighted to be your Reviewing Officer today.

Honoured because Her Britannic Majesty's Government has invited me and His Majesty's Government of Iran has accepted the invitation — and, by command of His Imperial Majesty the Shahanshah, my Supreme Commander, I flew more than two thousand miles to attend such an important event.

I am delighted because it has been 32 years since my first trip as a student to such an important College . . . I am here again but, this time, as one of the most senior officers of my Country and, yesterday, when I flew in the Tiger Moth, the first aircraft that I flew 40 years ago, I felt that I became young again.



15 GE Colour Party

I would like to point out to you as young officers and future military leaders, that hard study and work, and devotion to duty, will always be rewarding — and I want you to believe it.

Yesterday I received a short briefing on your new training system, and I must congratulate Nos 17 and 18 Graduate Entries on their achievement of the very high standards of the courses that they attended and from which they graduated.

I have also to congratulate and felicitate these young officers who have chosen such a heroic career — all of you pilots, engineers and administrative officers.

You all work for a common good and heroic and respectful aim to keep your aircraft in the air and this will help the continuation of that security and stability of your country's needs.

I need hardly draw your attention to the fact that you have graduated from a College that is the best of its kind in the world. In this College they give you many lectures: they have told you how to handle the men and people, how to utilise the time, how to look after the very expensive material that is in your hands, how wisely to utilise the country's money or, in other words, how best to utilise the country's resources with a sense of responsibility or, in short, they have shown you the correct way of management and leadership. But I want to tell you, as future leaders of your country that, from now on, all depends on yourselves. Your future is in your head — your heart — and your hands. You have to develop the sense of devotion to duty and responsibility in yourselves, a sense of confidence in your subordinates, and loyalty to your senior officers and — if you are always clean and correct — your future will be assured.

I pray to God to help you in fulfilling your duty towards your Queen and your Country and hope you have long life and success in your career.

INDOOR CEREMONIES

With the proliferation of initial and professional courses at Cranwell, the College has reverted to the previous tradition of holding prize-giving, End of Course and Wings ceremonies indoors. The following ceremonies were held during the past year.

No 1 Secretarial Officers' Course — 16 April 1975

Reviewing Officer:

Air Vice Marshal G J Kemp RAF.

Prize Winner:

Flying Officer A G Cure.

Course Members:

Flying Officers J W Edwards, M B Gould, A R N Gray, P A Harrop, S J Morris, G F Rogers, P D J Turner. Pilot Officers M R Coward, P S De-Camps, D J Pocock, N J Timms, C N Innes WRAF, A M Kelly WRAF. Captains J Dubu-Agyemang, P Sogboajor.

No 308 Initial Supply Course — 6 June 1975

Reviewing Officer:

Air Commodore H F Glover, C Eng, MRAes, RAF.

Prize Winner:

Flying Officer J E Corrin.

Course Members:

Flight Lieutenants D B Pace, J V Morgan. Flying Officers D G Halliday, R J Tripp, M G Wooldridge, R MacLeman. Pilot Officer J C Knights. Captains Naser Abdullah Al-Saif, Hamid Ali Al-Keraidis. Lieutenants Ahmed Ismail Bahkali, Mahir Jamil Hindi.

No 2 Secretarial Officers' Course — 20 June 1975

Reviewing Officer:

Group Captain G Taplin, BSc, DVS, C Eng, FIERE, RAF.

Prize Winner:

Flying Officer H M Storey WRAF.

Course Members:

Flight Lieutenants R F Craig, G F Mitchell, Flying Officers D B Dunsmuir, R I Relve, B W Squires. Pilot Officers R F Foster WRAF, J P Kendall WRAF, A P Knill, S E Slater WRAF, G Ware, C J C Westwood WRAF, B Withington, K S Kayombu, B Kundu.

No 18 Graduate Entry; Presentation of Wings 4 July 1975

Reviewing Officer:

Air Vice-Marshal R D Austen-Smith CB DFC RAF.



The Hicks Memorial Trophy:

Flying Officer P G Pynegar.

Officers Receiving Wings:

Flight Lieutenants S J E Legg, A D White. Flying Officers D R Causer, D J Harkin, M J Holland, W J Kirkpatrick, M Malone, J R Mann, J R Pope, P G Pynegar, J P Squelch, A D Sweetman, I B Walker, S Walker, P J Warren.

No 3 Secretarial Officers' Course — 4 July 1975

Reviewing Officer:

Air Commodore H F Glover, C Eng, MRAes, RAF.

Prize Winner:

Flying Officer A J White.

Course Members:

Flying Officer V Harbison. Pilot Officers R Elliott, R A M MacTaggart, J M Read WRAF, A P Rogers WRAF, A Spearpoint, S R Strannix, S C Wood. Lieutenant J E Y Ebiye, N M Odung.

1975 - Passing Out Ceremonies (2)



**No 18 Initial Engineering Course —
11 July 1975**

Reviewing Officer:

Air Vice-Marshal G E Thirlwall B Eng
MSc C Eng FRAeS MBIM RAF.

The Beckwith Trophy:

Flying Officer S D Ottridge.

Course Members:

Electrical Specialisation :
Flight Lieutenant A F P
Newns. Flying Officers I D
Sweet, N F Plank, T P De
Souza, K A Clarke, I R F
Sloane, S D Ottridge, A E
Gowers, D R Rennison,
V R Driver.

Mechanical Specialisation :
Flight Lieutenant S B
Schofield. Flying Officers
N Bennett, S J Burry, S R
Daniels, A R Pritchard,
D J H Manderson, T R
Bonella.

*19 GE after the Commandant's
first Wings Ceremony*



*Air Commodore Robinson with Flying Officer
Barnwell, prize winner on 4 SOC*

**No 4 Secretarial Officers' Course —
15 August 1975**

Reviewing Officer:

Air Commodore M M J Robinson, RAF.

Prize Winner:

Flying Officer L M L Barnwell.

Course Members:

Pilot Officers C Allen, D A Mathias,
W M Pike, H K Robinson WRAF,
M A Sidebottom WRAF, S M Wilmshurst-
Smith. Captains B B S Ogotu. Lieutenant
J N Irungu.

**No 19 Graduate Entry: Presentation of Wings
22 August 1975**

Reviewing Officer:

Air Vice-Marshal W E Colahan CBE DFC
RAF.

The Hicks Memorial Trophy:

Flying Officer S Gunner.

Officers Receiving Wings:

Flight Lieutenant D A G Quick. Flying
Officers J G Baynton, R J L Carey, J D E
Dean, S Gunner, P L R Martin, P Roberts,
R A H Rogers, N P Storah, S J Wood.



1975 - Royal Visit (1)



1975 - Royal Visit (2)

VISIT OF HER MAJESTY THE QUEEN

The College was honoured when Her Majesty The Queen on Friday 30th May 1975 visited Cranwell to present the New Queen's Colour to the Royal Air Force College. Her Majesty presented her original Colour in 1960 and this has now been laid up in the College Church of St Michael and All Angels.

An Andover of The Queen's Flight brought Her Majesty to Cranwell, where she was welcomed by the Earl of Ancaster, Her Majesty's Lord Lieutenant for the County of Lincolnshire, Air Marshal Sir Neville Stack, Air Officer Commanding-in-Chief Training Command, Air Chief Marshal Sir Andrew Humphrey, Chief of the Air Staff, Air Marshal Sir Neil Cameron, Air Member for Personnel and Air Vice-Marshal R D Austen-Smith, the Air Officer Commanding and Commandant of the Royal Air Force College.

On arrival at the parade ground Her Majesty was greeted by a Royal Fanfare and a flypast of 16 Jet Provosts in a diamond formation. The parade, which consisted of Graduate Entry Officers forming the Colour

Escort and three supporting squadrons with one supporting squadron of Direct Entry Officers, was commanded by Flying Officer D J H Manderson of No 18 Graduate Entry. After the inspection, the Old Queen's Colour carried by Flight Lieutenant M R Howard was marched off, and the New Colour Party then marched out of College Hall. Following the Consecration of the New Colour, Her Majesty presented the Colour to Flying Officer A A Young. Her Majesty then made a short address to which the Commandant replied. The Parade marched past in review and finally advanced in review order for a Royal Salute before the Parade Commander ordered Three Cheers for Her Majesty. With the conclusion of the Parade, Her Majesty was escorted from the dais by the Commandant, and drove to a Reception in the Sergeants' Mess.

Having been welcomed by the Officer in charge of the Sergeants' Mess and the Chairman of the Mess Committee a number of Mess Members and their ladies were presented. There then followed a Reception in College



The Queen inspects the Parade



1975 - Royal Visit (3)



The "Walkabout" was a very popular event

Hall Officers' Mess, when Her Majesty met officers from the three Departments and the Station and their ladies. After luncheon, the Mess Manager, the Head Steward and the Head Chef were presented, and Her Majesty signed the Visitors Book.

The Afternoon Programme

With the formalities of the morning over, Her Majesty planted a lime tree in Queen's Avenue and watched a flying display by the Royal Air Force College aerobatic team The Poachers. The Queen then delighted the crowd by making one of her informal walkabouts, chatting to servicemen, civilians and their families. The Queen was invited to view a static aircraft display which traced the flying training of the Graduate Entry Officer by exhibiting the aircraft used by the University Air Squadrons and the front line squadrons of the Royal Air Force. Crews and engineering officers of recent Entries stood in support of their aircraft, and were presented to The Queen.

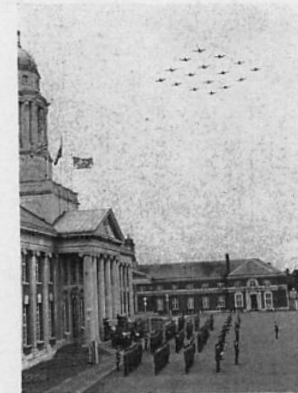
The final event of the day was a visit to a Recreational and Social Activities Display which portrayed the diverse leisure activities at the College ranging from sports, including sailing, horse-riding and go-karting, to Brownies, amateur dramatics, pottery and upholstery. The Queen met a representative gathering of all ranks and their families who participate in the College's recreational and social activities.

The visit ended with a final wave to the crowd by Her Majesty The Queen from the aircraft steps. Later that evening the Commandant received a telegram from Buckingham Palace which read as follows:

"Please congratulate all those who took part in the parade this morning. Their drill and appearance were both first class and I am sure that the new Colour will be in good hands. Please thank too those responsible for the most enjoyable programme this afternoon both in the air and on the ground. I was much impressed by what I saw today. Elizabeth R."



THE VISIT OF HER MAJESTY THE QUEEN 30 MAY 1975



*The Queen
speaks to the Brownies*

At the Flightline

The Parade and Flypast

*At the Management Flight
Exhibition*

The Equitation Society



1975 - Royal Visit (4)



1975 - Royal Visit (5)

SPEECH BY HER MAJESTY THE QUEEN AT THE CEREMONY FOR THE PRESENTATION OF THE THIRD COLOUR TO THE ROYAL AIR FORCE COLLEGE — 30 MAY 1975



The Queen presents Her New Colour

Student Officers of the Royal Air Force:

I am very pleased to be here at the Royal Air Force College today in order to present a new Queen's Colour. Although 15 years have passed since my last visit for this purpose, my recollection of that occasion is still fresh in my mind. Since then of course the family links which have so happily existed with the College have been strengthened by the attendance here of my son, culminating in the award of his Wings. It was a period of his life which I know he will remember as a happy one, and one which gave particular satisfaction to me as his mother and as your Commandant-in-Chief.

Cranwell has always held a special place among the military colleges of the world because it was the first of its kind. It now

becomes the first Royal Air Force unit to be presented with a third colour.

The Colour is given in recognition of great achievements compressed into a short space of time. Historically the Colour was a rallying point for those who fought under it, as well as a mark of distinction. Today it is an acknowledgement of devoted service and a symbol for those who serve their Country. It is a symbol for the future and a call for the highest standards of loyalty and steadfastness of skill and spirit. These are qualities which have already made the Royal Air Force famous and of which this country will always stand in need. I am confident that the trust I show by presenting this Colour will be upheld with the devotion, valour and skill which illuminate the whole history of your Service.

1975 - Lead Article (1)

THE DEPARTMENT OF SPECIALIST GROUND TRAINING The Era of Higher National Engineering Training in the Royal Air Force

The passing out of No 11 Standard Engineering Diploma Course on 22nd March 1973 marks the end of an era of 23 years of Higher National Diploma Training in the Royal Air Force.

Courses for the Higher National Diploma began in 1952 when the first entry of Technical Cadets began their training at the Royal Air Force College, Henlow. Until 1962 all Technical Cadets studied for the HND in parallel with their engineering studies. After this date, when the Diploma in Technology Courses subsequently to be superseded by CNAAC Degree Courses were introduced, the HND training still continued for Technical Cadets as an alternative qualification until 1971.

The first Standard Engineering course was introduced in 1962, to attract the more mature student who was too old for cadet training. This course has continued very successfully for the last thirteen years. However, since nowadays more degrees are being awarded, and rationalization is taking place in civilian education which will eventually lead to the discontinuation of the Higher National Diploma Examinations, the Royal Air Force Course has now been discontinued.

Since 1955, when the first Higher National Diploma Engineers trained by the Royal Air Force completed training, 196 Mechanical and 226 Electrical Diplomas have been awarded. The recipients of these diplomas, taken together with diploma-holders directly recruited, form approximately 20% of the full career cadre of the Engineer Branch.

No 11 Standard Engineering Diploma Course, the last course, completed training on 21 March 1975. Although small in number its efforts both academically and socially whilst at the college have been commendable. Flying Officer P D Rawson who obtained no less than 4 distinctions in his final diploma examinations was awarded, in competition

with candidates in the whole of England and Wales, the HND prize in Mechanical Engineering of the Institution of Mechanical Engineers.

In his address after presenting the prizes the Commandant congratulated the diploma holders, pointing out that future career success depended on both individual and team effort as engineers and managers in post. Modern hardware including operational squadrons of Phantoms, Jaguars, Harriers, Pumas, Gazelle, and Nimrods already in being, and further aircraft in the pipeline, set both opportunity and challenge for the engineer. The efficiency of any fighting service is heavily reliant on the way it utilizes its resources, the aircrew on how they operate the aircraft, and the engineers for the way in which they generate the aircraft for the aircrew to fly. The Commandant closed wishing No 11 Course on behalf of the Royal Air Force College good fortune and happiness in the future.

On the passing of the Higher National Diploma era the *Journal* adds its best wishes to members of No 11 Course and all other engineer officers who gained their HND qualifications within the Royal Air Force during the last 23 years.



Flight Lieutenant P T Coleman
receiving his diploma

THE HIGHER NATIONAL DIPLOMA No 11 STANDARD ENGINEERING DIPLOMA COURSE

ELECTRICAL
Flight Lieutenant P T COLEMAN
Flight Lieutenant R T DIXON

MECHANICAL
Flight Lieutenant J C HAY

MECHANICAL
Flying Officer J S ALTON
Flying Officer C C CLARKE
Flying Officer P M CLARKE

MECHANICAL
Flying Officer S T DEANE
Flying Officer P D RAWSON
Flying Officer D J ROBINSON
Flying Officer ABU BAKAR SUHAD

PRIZES

The Higher National Diploma Prize in Mechanical Engineering — 1974 : Flying Officer P D RAWSON.

The Mechanical Engineering Studies Prize : Flying Officer P D RAWSON.

The Electrical Engineering Studies Prize : Flight Lieutenant P T COLEMAN.

The Mathematics Prize : Flight Lieutenant P T COLEMAN.

The General Studies Prize : Flight Lieutenant P T COLEMAN.

The Minerva Prize : Flying Officer P D RAWSON.

The Nightscale Award : Flying Officer D J ROBINSON.



Flying Officer P D Rawson receiving his Diploma from the Commandant

1975 - Lead Article (2)

MAINTENANCE ENGINEERING COURSE PRESENTATIONS

No 11 Maintenance Engineering Course, of one years duration, completed training in July 1975. At the prize-giving, all 4 awards were gained by 2 of the students. Monetary prizes were also awarded to the winner and runner up of the Halahan Trophy, under arrangements made by Miss Halahan.

Halahan Trophy (Winner): Fg Off F M DENTON-POWELL.

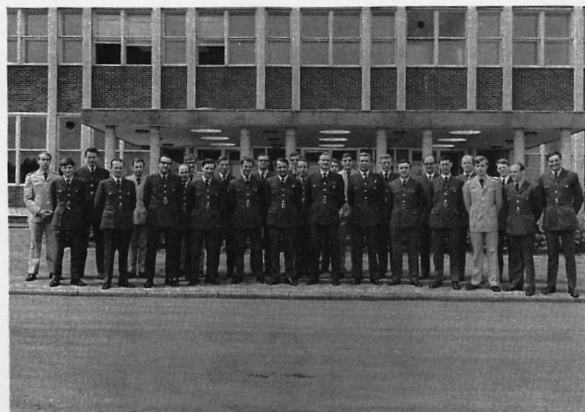
Halahan Trophy (Runner-up): Fg Off D C J DIMES.

Royal New Zealand Air Force Prize (Electrical): Fg Off D C J DIMES.

Royal New Zealand Air Force Prize (Mechanical): Fg Off F M DENTON-POWELL.



*The Halahan Trophy Winner,
Flying Officer F M Denton-Powell*



Members of No 11 Maintenance Engineering Course



No 8 Aerosystems Engineering Course

1975 - Second Article (1)

THE DEPARTMENT OF AIR WARFARE GD Aero Systems Course—Exercise Far North

During 1974 the Department of Air Warfare successfully staged Exercise Far North for the 13th consecutive year. The exercise, which is an annual event in the GD Aero Systems Course calendar, is designed to give the students practical experience of modern navigation equipment operating in high latitudes. A specially fitted Britannia aircraft is employed and 2 training flights into the north polar regions are staged. These flights route initially from Brize Norton to Stornoway and then across the North Atlantic and the Greenland ice-cap to Thule; the most northerly link in the Ballistic Missile Early Warning System (BMEWS). After a night stop at Thule, the aircraft heads north to the Pole before returning to Brize Norton; the complete exercise is then repeated with an entirely different crew complement. Exercise Far North involves months of planning and close liaison with the avionics industry and R & D establishments whose representatives accompany their equipment on the flights. To give an appreciation of what is achieved this article describes the 1974 exercise.

Three Ferranti Digital Inertial Navigation Systems (INS) were fitted. These systems, derivatives of which will be installed in MRCA, are developments of those fitted in the Phantom and Harrier. They included a prototype model, an A model loaned by RAE Farnborough, and a B model loaned by the Ferranti Company. The B Model INS was used as the primary datum equipment for position and heading.

The azimuth outputs from several gyros were available for comparison against the datum; these included 2 Sperry twin-gyro platforms together with a CL11, C12, and a CL22 gyro. Hence the directional gyros used in the Lightning, Buccaneer, Vulcan, Dominic, Hercules and several other aircraft compass systems were represented. The Smith's Flight System and P12 compass fitted in the Britannia were also included in flight evaluations.

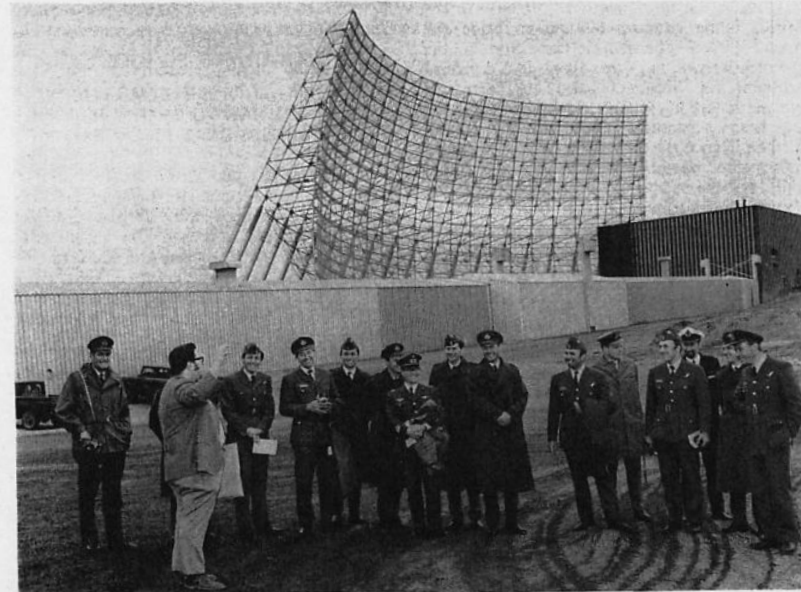
Omega and Loran long range navigation aids were also carried. The Loran receivers were Decca ADL21 semi-automatic equipments, and a Decca ADL81 fully automatic unit loaned by the Company. Marconi-Elliott loaned an AD1800 Omega receiver which, in addition to signal readouts, continuously computed and displayed aircraft position as either latitude and longitude, or as steering information to any desired position.

Other on-board equipment included a variety of Hewlett-Packard pocket calculators HP 9100A and HP 9810A programmable calculators and a crystal clock. The calculators, loaned by the company, were used to determine apparent gyro drift and to convert Loran readings into latitude and longitude.



One of the inertial navigation system evaluation positions

Installation of equipment in the Britannia started 4 days before the flight when the aircraft was taken off line for pre-flight preparation. The seats were removed and, to meet the various power requirements, extra inverters were fitted at the rear of the aircraft; from these supply cables were strung along both sides of the passenger compartment. The equipment was mounted on tables fitted both sides of a central walkway. Four of these



"Mitch" Mitchell, a senior engineer at Thule, escorted the party through BMEWS. In the background is one of the 165ft by 400ft aerials.

tables had been specially constructed to accept palletized gyros, Loran receivers, and IN systems. Two days before the flight the manufacturers' representatives arrived and installed their equipment at the stations provided. The final stage in the preparation was then completed by running all the systems on aircraft power.

The aircraft was airborne on schedule and the staff and students settled down to their tasks. At regular intervals during the flight they changed positions around the equipment stations so that everyone had an opportunity to use each item. At every station specially prepared data sheets were used to manually record the readings from the equipment. It was essential that all readings were taken simultaneously, so every 15 minutes a coordinator would count down to the recording time using the crystal clock. Inertial and gyro readings were compared with the datum to

detect Schuler oscillations of the inertial platforms and to determine the real drift of the gyros. An in-flight record of the real drift of all gyros was plotted on a large, colour-coded graph. It provided an interesting and continuous comparison of their relative performance. The Omega and Loran positions were recorded and compared with the datum position.

During their time at each of the stations the students were shown how to operate the various systems by the manufacturers' representatives. The ensuing discussion was a valuable training aspect of the flight. Naturally enough there was a friendly rivalry between the representatives as to whose equipment was most accurate when the various systems gave different versions of the calculated aircraft position. However, the average error rate of the datum INS over the flights was less than 0.8 nm/hr.

1975 - Second Article (2)

Thule is the most northern air base in the world, being situated 690 miles inside the Arctic Circle. The frozen condition of the ground, known as perma-frost, is a constant problem for architects and engineers. If the perma-frost melts it no longer supports any heavy structures placed directly on the surface. Hence the runway is painted white to reflect the warmth of the sun and most buildings are supported on piles several feet above the surface. Large buildings like hangars, which must be built on the surface, have ventilating chambers below the flooring in which cold air is circulated thereby preventing melting of the perma-frost.

A conducted tour of the BMEWS was included in the visit. The radar installation is of impressive proportions; for example, the 4 fixed aerials are each as big as a football pitch and are built to withstand winds in excess of 200 knots. From the BMEWS site one has a panoramic view of coastal icebergs and snow-covered peaks and the meeting of 3 glaciers in the nearby fiord provides a unique geographical feature.

The tour of BMEWS provided a useful consolidation of many hours spent in the classroom. The system incorporates aerials, waveguides, electronic devices, computers and displays on a majestic scale. A demonstration of an alert situation was very impressive.

After the tour came time for relaxation. At that time of year night did not come to Thule and it was a startling experience to leave the 'Top of the World' Club in the late hours to be greeted by bright sunshine.

The next day the Britannia was airborne again heading north, and the recording cycles were recommenced. It was interesting to note the error -45° in the Britannia's P12 compass as the flight neared the magnetic pole. The INS faithfully logged the increasing latitude as the aircraft passed overhead Alert at $82^\circ 31'$ North and eventually $90^\circ 00'$ North, $000^\circ 00'$ East/West; the North Pole had been reached. From the Pole the Britannia turned South — it couldn't go in any other direction — along the 6° West meridian towards Brize Norton and home.

Exercise Far North is a very important part of the GD Aero Systems Course syllabus. It

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provides a unique opportunity for students to gain experience in using modern aero-systems, many of which are in an early stage of development, and to discuss system details with manufacturers' representatives. The flights are also held in high regard by the manufacturers who are able to evaluate their equipment under most testing conditions. This point is underlined by their continuing enthusiasm and readiness to provide equipment and manpower in support of the exercise. The systems evaluation techniques employed serve to augment the flight trials training given to students on the course and, furthermore, a large amount of useful data is collected. This data is collated and analysed after the flights and a comprehensive report is prepared and distributed to the manufacturers who provide the equipment and to interested units within the Service and the R & D establishments.

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