



The Loss of USAF B29A #44-62276 on 17th January 1949 near Strachur, Scotland.

An investigation and compilation of all known material facts surrounding the death of 20 USAAF personnel who were returning to the USA from England after a 3 month detachment as part of support to the Berlin Airlift.

Introduction

This ‘investigation’ occurred by chance as a result of the e-mail shown at [Appendix A](#) from the niece of the Captain of the aircraft sent to Brian Canfer in his capacity as Chairman of the RAF’s Mountain Rescue Association, and was a happy co-incidence of spare time during convalescence following a heart by-pass operation in 2004 and the greatly improved communications of the Internet. Although this fatal accident occurred over 63 years ago and various accounts have appeared in the press, on websites and one in print,¹ all the available facts and any subsequent analysis have never all been brought together. This article aims to remedy that by placing all the known facts and many of the possible explanations and theories in one place. It has been a collaborative project and a full list of contributors and sources is acknowledged in the supporting Appendices. Even after all these years and the hundreds of hours I have personally devoted to this research many questions remain unanswered and will probably never be fully explained. With the advent of the Internet and e-mail, research has been much easier and quicker this time. The Freedom of Information Act and the passage of time meant that it was comparatively easy to get copies of all official documents about the accident and classified WW2 films and manuals about the B-29. *Italicized text* in this report indicates an exact copy of another document. I have gathered probably too much information in what is a large jigsaw and I have attempted to list it all in Appendixes. There is only one B-29 in the UK, in the Imperial War Museum at Duxford and the staff there allowed me unfettered access to the aircraft so I was able to get some idea of the conditions on board and it was a real eye opener!

Flying in 1949 was quite different in many respects to when I flew as a navigator in the RAF from 1965-95; there was no regulated airways structure in 1949 or Air Traffic Control as we now understand it and no radars covering the aircraft’s flight path. The B29’s navigation fit had not been changed to suit the navigation aids available in the UK so the aircraft’s radar would have been its prime navigation system in the UK backed up by radio beacons. However many of the navigation techniques were standard albeit a degree of specialist knowledge is required to understand them so I have gone to some lengths to try to explain what was involved. Meteorological forecasting was improving but knowledge of Jet Streams² was still in its infancy, the existence of Jet Streams having only been acknowledged some 7 years before. There were certainly many more aircraft accidents in these early days, the joint military civil figures for 1949³ record 200 accidents with 1263 fatalities, of which the RAF figures were 28/107 and the USAF 10/91 this might explain why the same resources were not put into examining every accident in minute details as happens in the western world today.

¹ Whensoever 50 years of the RAF Mountain Rescue Service 1943 – 1993 ISBN 0-948153-23-7

² The very strong winds that always occur with frontal systems, normally at high altitudes but sometimes lower.

³

The 'Compiler' - Brian Canfer

I joined the RAF in 1965 as a Direct Entry Navigator after 'A' Level studies, training was on Varsity and Valetta piston engined aircraft before moving onto the Dominie twin jet for advanced training, amongst this training was many hours spent learning about meteorology. I spent 2 tours (6 years) on Canberra bombers before completing a tour as an Air Traffic Controller and then returning to flying duties in the SAR helicopter role on Whirlwinds, Wessex and Sea Kings, I carried out an instructional tour at the RAF Sea King Training Unit and had the privilege to command the RAF Search & Rescue Training Unit at RAF Valley; my final tour was Inspector of Land Rescue responsible for the operational policy, training and equipment of the RAF's 6 Mountain Rescue Teams in UK; I spent many weekends working with this rare breed of men and I found them quite inspirational and the meritocracy of their teamwork was a wonder to behold. I had no special training in accident investigation and as you may find to your cost as you read through this long article, no forte in written work! Although familiar with many aspects of aviation including meteorology & navigation I have tried to at least double check all statements and whenever possible have sought second opinions. During my 4,500 flying hours I experienced a number of emergencies ranging from a mid-air collision, engine failures and lightning strikes to a ditching and severe icing at night in a helicopter so if nothing else I feel an affinity for anyone who finds themselves in trouble in the air. Suggestions on ways to improve either the content or the layout would be most welcome brican@talktalk.net . My intentions in compiling all this information are to answer the questions posed at Appendix A and to have as detailed as possible record of the crash for the RAF Mountain Rescue Association.

Background

The American B-29s aka the Super Fortress became operational in the Far East in June 1944 after being rushed into service and in the next 14 months conflicting reports put B-29 losses of between 414 to 512 Bombers, with 576 aircrew killed and 2400 missing in action. Training losses in the U.S.A. were reported to have claimed another 260 B-29s. Total B-29s losses were therefore between 674 and 772 or an average of 51 every month. The B-29 is possible best known as the aircraft which dropped the atomic bombs on Hiroshima and Nagasaki and as such forced the unconditional surrender of the Japanese and the end of World War 2.

The Russian blockade of Berlin on 24th June 1948 put a tremendous strain on the Allied Air Forces, all of which were simultaneously demobilizing. As the Russians became more verbally aggressive the recently formed USAF (it was the US Army Air Force -USAAF in WW2) gave the airlift teeth by deploying, inter alia, some 60 B-29's to 3 UK bases, Scampton, Waddington and Marham. The B-29

crews were on a 90 day roulement similar to the RAF's Falkland Island detachment except that crews flew over and back in their aircraft. One such aircraft and 'crew' was #44-62276, Captained by Sheldon Craigmyle born May 27, 1918 in Madison, Indiana.

Whatever else Sheldon did during his time in Europe he almost certainly purchased a quantity of gems, possibly diamonds, to take back to help him establish a new life as a jeweler, this fact has been offered by his family⁴ however, once Sheldon's letters to his wife were made available in 2008 it was not possible to confirm this although the purchase of gemstones and or diamonds in the UK remains a very strong possibility – more of this later! There were already B-29's at Wiesbaden in W Germany and in his book "Force for Freedom. The USAF in the UK since 1948"⁵ Michael Bowyer comments on page 33 " *General Norstad next outlined the US's desire to maintain permanently one B-29 bomb wing and a bomber escort/support fighter wing in the UK, irrespective of any emergency and thereby expanding the initial deployment plan. The two extra bomb wings currently (September 1948) in the UK were, he pointed out, here only on a 'temporary' basis. This new scheme allowed one bomb wing to be deployed for 90 days, during which time it would detach for training in Germany before the rotational replacement arrived.*" So there was the opportunity to deploy from UK to Europe and doubtless as many crews as possible took the opportunity to do so and it can not have been that difficult to arrange a car to visit e.g. Amsterdam during such detachments, the US\$ was a powerful currency and would have opened many doors. There was at least one debate in The House of Commons during this period when concern was expressed about what was tantamount to smuggling by Allied aircrews.

The RAF Mountain Rescue Service (MRS) had been formed during WW2 to assist British and Allied aircrews who had crashed or been forced down in mountainous terrain. In 1949 the RAF MRS had two Mountain Rescue Teams (MRTs) in Scotland, one at RAF Montrose on the East Coast and a 2nd at RAF Kinloss near Inverness. Both were on H24 standby and were normally tasked by the Rescue Co-ordination Centre (RCC) at Pitrievie near Rosyth Naval dockyard. As part of the MRS's 50th anniversary celebrations a book of its history thus far was published, 'Whensoever', which contained an account of this particular accident based on the eye witness record of a member of the RAF Kinloss MRT. To date this has been the only formally published account of the accident. The RAF MRS had attended a similar accident on 8th June 1945 when a B-17G Flying Fortress 44-8639 crashed on Criag Cwm Llwyd near Cadair Idris, again killing all 20 on board a return ferry trip to USA.⁶

The Route Home

⁴ e-mail from his niece Tammy Caine to Brian Canfer 7/7/2005

⁵ ISBN 1-85260-415-8 published by Patrick Stephens Ltd £19.99. I got my copy from Amazon after it was recommended by AFHSO Research [afhso.research@pentagon.af.mil]

⁶ "All In A Day's Work" page 100 the diaries of Campy Burrows RAF Llandwrog MRT

Two B-29s were planned to return to the USA on Monday 17th January 1949. The aircraft were to fly independently (regardless of any other considerations the weather was too poor for formation flying). The route across the UK was almost a straight line, Scampton, Prestwick, Barra Head (the most southerly of the Bishop's Isles at the southern extremity of Outer Hebrides 57° N 007° W, see the maps at [Appendix B](#) and then direct to Keflavik to refuel. Depending on the map projection used the entire route is almost a straight line so navigation error in respect of missing a turning point can be ruled out. The 5th page of the USAF Official Accident Report (OAR) states as follows:-

“On 17 January 1949, two (2) B-29 Aircraft were briefed at Scampton, England, and departed on a flight to Keflavik, Iceland, by way of Prestwick and Barra Head Scotland. The Flight path would carry the two aircraft through a cold front and a low pressure area off the East⁷ coast of Scotland. The pilots were briefed to the effect that there would be heavy icing in all clouds that might be encountered. B-29 #034 departed Scampton at 0800 hours, passed through the frontal area at 5500 feet with no difficulty, and when approximately 400 miles from Iceland, was notified that the weather was below minimums and was instructed to return to Prestwick, his alternate. Upon arrival at Prestwick, the pilot was advised that it was closed, so he returned to Scampton, successfully completing the flight.

B-29A #44-62276 departed Scampton at 0805, cruising at 10,500 feet. Approximately 1 hour and 15 minutes after takeoff, the pilot contacted Air Traffic Control at Prestwick and requested a change of altitude from 8500 to 14,500 feet. No indication of any difficulty was given and the new altitude of 14,500 feet was authorised. At approximately 0950, the aircraft crashed on a plateau, elevation 1200 or 1300 feet. The location of the accident is 47 miles NNW of Prestwick, Scotland and 2 ½ miles NNW of Lochgoilhead, Scotland. It was established that, at the time change of altitude was requested, 2276 was encountering heavy icing conditions as evidenced by the statement of the pilot of #034, who was in radio contact with him.

⁷ Another small error, the front was to the West of Scotland as evidenced by Captain Rigg's statement and copies of the Met charts for the day.

It was determined by the statement of witnesses, (full copies of their statements are at [Appendix C](#)) who heard the aircraft approaching and also the sound of the impact, that the flight path of the aircraft immediately before the crash, paralleled the correct heading from Scampton to Barra Head. Most of the wreckage was found in a 70ft. long trench, approximately 20 feet wide and 3 to 6 feet deep, with both main gears and nose gear on one edge and one horizontal stabilizer (only one could be found) on the other edge. A freshly disturbed area on top of a 2000 foot hill in the flight path and the position of the wreckage, plus the fact that an airspeed indicator, indicating 250, was found, led the Accident Board to believe that the heavily iced aircraft scraped a wing on top of the hill, became inverted, and crashed into the plateau some 700 feet below.

From the position of the wreckage, it was determined that the aircraft struck the ground at a very high angle of dive and was almost completely buried in the soft, spongy ground. The aircraft was completely destroyed and burned for nearly 24 hours.

It is believed that the emergency condition was known to the crew and passengers, in that each of the remains had either the parachute attached or in the vicinity .*

Since there were no survivors, it is impossible to determine the exact cause of the accident; however, from the facts, it is the opinion of the Board that the primary cause factor was heavy icing.

The Board made no recommendations and no further action is contemplated. ”

<i>STATION. EACH MEMBER MUST SIGN</i>					
<i>NAME – PRESIDENT</i> <i>JOSEPH W. JORDA</i>		<i>NAME – MEMBER</i> <i>CLARENCE T. JOHNSON</i>		<i>NAME – INTELLIGENCE OFFICER</i> <i>JAMES W. WITTY</i>	
<i>GRADE</i> <i>MAJOR</i>	<i>ORGANISATION</i> <i>59TH AIR DEPOT</i> <i>WING</i>	<i>GRADE</i> <i>MAJOR</i>	<i>ORGANISATION</i> <i>59TH AIR DEPOT</i> <i>WING</i>	<i>GRADE</i> <i>1ST LT</i>	<i>ORGANISATION</i> <i>59TH AIR DEPOT</i> <i>WING</i>
<i>NAME – MEMBER</i> <i>THOMAS E. HALLIFA</i>		<i>NAME – MEDICAL OFFICER</i> <i>EUGENE H. BETLACH</i>		<i>NAME – RECORDER</i> <i>WILLIAM R. HARMON JR.</i>	
<i>GRADE</i> <i>MAJOR</i>	<i>ORGANISATION</i> <i>59TH AIR DEPOT</i> <i>WING</i>	<i>GRADE</i> <i>CAPTAIN</i>	<i>ORGANISATION</i> <i>59TH AIR DEPOT</i> <i>WING</i>	<i>GRADE</i> <i>1ST LT</i>	<i>ORGANISATION</i> <i>59TH AIR DEPOT</i> <i>WING</i>

*NB The comment and deduction about parachutes was refuted Lt Col William C. Garland, Commanding Officer 32nd Bombardment Squadron, 301st Bombardment Group, Smoky Hill AFB in his letter of 27th May 1949. A full copy of his letter was included with the OAR and is partially reproduced in this record as it contains pertinent details of Craigmyle's, the captain's Instrument Flying ability and the aircraft's fit, see [Appendix D](#)

The captain of the 1st aircraft, Captain Donald Riggs, made the following statement on 21st January 1949 to 1st Lt Harmon, the AOB recorder.

“I, Captain Donald E, Riggs, A0-668502, 32d Bomb Squadron, 301st Group, certify that on the morning of the 17th of January 1949, myself and Lt Craigmyle were briefed at Scampton, England, on weather pertaining to our flight to Iceland, the weather we received at the briefing was not very good at Iceland, enroute or our alternates. Off the coast of Scotland was supposed to be a low pressure cold front which we would encounter enroute and were also notified to that effect. We were told that Goose Bay would be closed with a front over that area. If we were not able to get into Iceland, we were instructed to radio Iceland⁸ and obtain the weather at Iceland and see whether we could land there or had to continue on to Goose Bay. We were also briefed there would be heavy icing in all clouds we might have to go through.

⁸ This sentence does not make sense and I wondered if it should have referred to radioing Greenland?

034 which was piloted by myself took off at 0800 hours from Scampton. Ship No. 2276 pilot by Lt Craigmyle departed Scampton at 0805 hours. Approximately one hour and fifteen to thirty minutes after take-off, I was in contact with 2276 and he gave me his position as approximately 25 miles southwest of Prestwick, cruising at his altitude at 8500 feet. At that time he told me he was picking up heavy ice and was going to call Prestwick and obtain a new altitude, which I heard him do over the radio. He asked for a new altitude of 14,000 feet and was given 14,000 feet by the Prestwick Radio.

I continued on a southwesterly course which I told him I was going to follow that morning and went through the front at 5500 feet, picking up no ice nor running into any other weather after passing through the front which was very weak at my position. I took a northwest heading heading for Iceland.

Approximately 400 miles from Iceland, we contacted Meeks Field on the radio and they instructed us to return to Prestwick. During this time I tried at intervals to contact 2276 and was unable to do so. Also on the return trip to Prestwick, I tried to contact him and could not raise him. When we arrived at Prestwick they instructed us that Prestwick was closed which was our alternate for Iceland and instructed us to return to Scampton, which we did. 2276 's position was approximately 55° North and 02° West at the time I had radio contact with him.”

Original signed and certified as a true copy by 1st Lt Harmon.

The Crew

⁹ This position of 55N 2W bears no relationship to the previously reported position of 25 miles SW of Prestwick as 55N 2W is some 93 nm SE of Prestwick!

Depending on its mission a B-29 normally carried a crew of between 9 and 13. The OAR lists all 20 personnel on board (see [Appendix E](#)) and only designates 4 of these as crew, one of whom, the Bombadier, would have had no apparent role and there was no mention of a wireless operator/signaller or a radar operator. This may have simply been an omission and I have not been able to determine if either of these 2 crew positions was manned. I was able to track down one living B-29 navigator and his comments in an e-mail are as follows *“First about the nav. equipment , clock ,compass radio compass, LORAN and radar , To my knowledge the radar operator was a must no matter how many people were aboard... Back to the radar operator , it was standard procedure for him to give all concerned a fix at lands end as a double check for the navigator. So I am sure he should have been aboard.”*¹⁰

The Aircraft

Most of the B-29s operational flying was done in the Far East and crews did not fly with a full anti icing equipment. However we know from Lt Col Garland’s letter, extract at Appendix D, that both the captain and the aircraft were fully trained and equipped for flight in bad weather including icing. That said, airframe and engine icing can take many forms and the best advice has always been, and still is, to avoid it. The other B-29 that departed 5 minutes ahead of 62276 flew at a lower altitude (5500’) and flew a more circuitous route including a dog-leg onto a south westerly heading to avoid the bad weather; the 2 pilots were in radio contact with each other but we will never know why Sheldon initially chose a higher cruising level nor why, when he encountered the forecast icing, he chose to climb to 14,500’¹¹ rather than descend to the warmer air below or avoid it. Neither do we know how effective the de-icing boots were; the smoothness of the wings are an essential ingredient to safe flight as the cross section creates the lift, it has been suggested¹² that

Brian,

Sorry, I'm not quite old enough to know at first-hand what B-29's used. He would not have got into Loran cover until north of Scotland so I imagine he would have been navigating on radio-ranges and/or MF beacons. I don't know whether USAF navigators had instructions to run airplots and I don't know whether they had API's. RAF practice was certainly to run the API at all times, if you had one. An RAF aircraft would have been using GEE but I'm pretty sure the USAF didn't fit it.

My personal opinion is that this was a simple case of icing-up and had nothing to do with navigation errors. Some B-29's did not have anti-icing boots - see pix in Aeroplane article. Maybe this was one.

Regards,

¹⁰ e-mail from George Lane B-29 navigator WW2 31 Aug 2005

¹¹ There is a small discrepancy here between the height quoted by Captain Riggs and that stated in the Board write up but the 500’ is unlikely to have been significant.

¹² e-mail correspondence with the Royal Guild of Navigation, one member of which had personal experience of the ‘Goodrich’ boot system and its limitations See Appendix F for the full e-mail.

Walter Blanchard.

“The magazine "Aeroplane" (September 2005) contains a special supplement on the B-29 in which it is stated Loran-A was a standard navigational aid fit, at first the APN-4, later the APN-9. This would check with the B-29's intended major sphere of operations in the Pacific which was littered with Loran-A. It also says:

"The B-29's bombing and navigation system was the Bell Telephone/MIT AN/APQ-13 which used a 30 inch radar dish installed in a hemispherical radome between the bomb bays. The same organisations were responsible for the AN/APQ-17 Eagle radar system which appeared in an aerofoil-shaped housing slung under the belly of many B-29's"

Further, the e-mail at [Appendix F](#) says *"it had leading-edge de-icing boots, presumably the same pneumatic system as many US aircraft including the Dakota which I navigated extensively in the Far East 1950-53. This system was notorious in being unable to cope with severe icing. It worked by pulsing a rubber boot which was OK for light icing but in heavy icing the ice eventually built up outside its radius of action so the boot merrily pulsated in a nice little cavity behind the ice which went on building up. For that reason we were instructed not to use de-icing continuously but wait until there was a fair build-up, use the boots to break it off, then switch it off and wait for another build-up. I wonder how many crews had the patience to wait, or noticed it in time."*

The Flight Plan submitted listed the navigation aids to be used during the flight, one of which was the Long Range Navigation (LORAN) system however, this was not operational over England nor the majority of Scotland at that time¹³.

Flight Planning Details

Leg	Distance nm	Planned Time Hrs & Mins	Planned Ground speed	Actual ground	apparent track error
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¹³ e-mail correspondence with USCG LORAN historians and others

			kts	speed	in degrees
Scampton to Prestwick	192	1.03	190	131	6 degrees starboard
Prestwick – Barra head	127	0.42	190	131	6 degrees

From these details we can compare his actual position and his intended position at the time of the crash. His intended position at 0950Z was at Barra Head island (highest point on this Island is 634 feet amsl) and thus well clear of any really high land making a descent to 1000 feet a relatively safe manoeuvre. What we do not know is why he had lost so much time/speed. They crashed 95 nm from where they should have been. Why was this not commented on by the crash investigators? possibly the presence of either a much lower Jet Stream. This discrepancy in position was also commented on by the Guild of Air Navigators at [Appendix F](#), the expected position, passing Barra Head, is shown on the map at [Appendix B](#).

The Weather

“The Flight path would carry the two aircraft through a cold front and a low pressure area off the East coast of Scotland. The pilots were briefed to the effect that there would be heavy icing in all clouds that might be encountered.” Except for the small error in east and west it would appear that the forecast was essentially correct. We have the actual weather observations for the nearest weather stations contained in the OAR and now copies of the synoptic charts for the entire day. From these we can apply the wet adiabatic lapse rate of 3°F per 1000 feet to determine that the 0° isotherm was at about 4500ft above mean sea level. Similarly the temperature at Sheldon’s final cruising altitude 14,500 feet would have been in the region of -28°F.

We know from Capt Rigg’s statement that he was able to avoid the worst of the weather and all associated icing by a combination of both flying at a lower altitude and by diverting around the end of the front; both a/c had 18 hours fuel so they were more than capable of such diversions. The same statement confirms that 62776 was experiencing icing but still chose to climb higher, why should he do this when he knew that there was little or no ice at lower levels? The aircraft would probably have been affected by one or more of 3 types of icing, firstly airframe i.e. wings and flying surfaces, secondly the propellers and finally the engine – most likely carburettor. See [Appendix G](#) for details of icing. For anyone who would like to read a first-hand account of flying in icing conditions I would strongly recommend a book written by an American airline pilot Ernest K. Gann called “Fate is the Hunter”, especially pages 78-107 which vividly describe the insidious effects of icing. Ernest is dead and the book is out of print but copies are available from Amazon.com .

Flight Path

Using the details supplied in the RAF F2919 (contained in the OAR) the planned course was plotted i.e. Scampton to overhead Prestwick and then on to Barra Head. From the flight plan the intended Ground Speed can be calculated and it was 190 knots (nautical miles per hour). At the time of the impact the aircraft was approximately 24 nm starboard or right of track and was flying over higher ground than had been planned. The highest ground along the planned track was 1500' above mean sea level (amsl). It is therefore possible that having failed to shed icing by climbing Sheldon was forced to descend to burn off the icing. The zero degree isotherm was at c 4500' amsl and he would have been obliged to descend below this but it is extremely unlikely that he would have shed all icing as soon as he descended below 4000' due in part to the cooling caused by the expanding airflow over the wings and also the sheer mass of ice accumulated, this is graphically described in the book mentioned in the preceding paragraph.

The Recovery and RAF MRT Involvement

As soon as the accident was reported to the police and thus the RAF Rescue Co-ordination Centre (RCC), the RAF Kinloss (near Inverness on the Moray Firth, Scotland) MRT was called out. Air Transport was arranged to Prestwick and then Royal Naval road & ferry transport to Strachur however, just before boarding the aircraft the MRT was stood down on the basis that the USAF was handling the incident. A team of 6 USAF accident investigators were dispatched from Burtonwood 2 miles north-west of Warrington, Lancashire, on Monday 17th, the day of the accident. They were accommodated in a Hotel at Strachur and by 1945 hours that same day they submitted their preliminary aircraft accident report listing all 20 on board, copy at [Appendix H](#). In another signal sent on Wednesday 19th January at 1524 the Board reported that six bodies had been recovered but that none had been identified, this ties in with the various witness reports which report that a number of bodies had been thrown clear of the wreckage and subsequent fire. On Thursday 20th January 1949 the RAF Kinloss MRT were once again requested to attend the accident and were erroneously briefed that “nobody’s been there, nobody’s visited the site” (since the aircraft had crashed). In the 6 years of the RAF MRS’s existence a callout to an a/c accident 3 days later had never occurred and as life saving was clearly not an option the team deployed by road arriving in the early hours of Friday 21st January 1949. The MRT were assisted by a large working party of naval hands from Prestwick and the task of recovering the bodies down steeply sloping ground was made easier by the use of the farmer’s horses. The farm is still being run by the son of the farmer who assisted the RAF MRT and the farmer had clear memories of the accident when I spoke to him during a visit to the crash site in 2005.

So Why Did They Crash?

This paragraph is mainly supposition as there is no record of any calls to Prestwick ATC or any other agency declaring a Mayday¹⁴; the accumulation of ice would probably have been insipid and at some stage Sheldon either realised the aircraft was not climbing, or he experienced difficulty controlling it or one or more engines stopped due to carburettor icing. From their air plot they could have expected to be approaching the west coast of Scotland and the open sea, it is just possible that he realised that he would have to descend or the icing may have forced this upon them, either way he did not or was unable to contact either ATC or the other aircraft and his signaller did not make any recorded calls. If they had thought they were over the sea they could have planned to descend to say 1500 or 1000 feet above the sea and wait for the ice to burn off, in reality they made the complete descent in cloud and the first warning that their position was still overland would have occurred when the wing struck the high ground and the aircraft rolled onto its back and dived into the sloping ground beyond. From letters read between Sheldon and his wife it is clear that Sheldon was very keen to get home and be reunited with his wife, he had not enjoyed the food or the accommodation in an England that was suffering all sorts of privations immediately after the war and food rationing was still widespread, central heating in Messes was unheard of and the winter had been cold! [N.B. Please see the Post-report Note dated 24th August 2014 on page 17.](#)

Those Diamonds! And Other Mysteries.

The popular press in the UK has always sought some ‘sensational angle’ and in this case they somehow heard that there had been diamonds on board the aircraft; in press articles in the 1980’s and 1990’s the aircraft was described as “The Diamond Bomber”. How widely this was known back at Scampton is open to speculation but presumably someone knew of Sheldon’s plans to become a jeweller and may have been privy to his purchases, if the USAAF authorities had been informed that might explain the long delay between the arrival of the investigating team and the second call to Kinloss MRT to recover the bodies? The story goes that Sheldon had ‘invested’ in some diamonds and these were transported in a glass Alka Saltzer bottle, in those days Alka Saltzer was a common remedy for indigestion and the bottle would easily have fitted in the lower leg pocket of a flying suit.

¹⁴ The same icing which probably caused the aircraft to descend would almost certainly have accumulated on the High Frequency radio aerial thus preventing the Radio Operator from making a transmittable Mayday, we do know that the 2 pilots were in radio communication before Sheldon obtained clearance to a higher level, perhaps the VHF aerial suffered from similar icing see

Documentary evidence was supplied by Sheldon's niece Tammy which confirmed that he had studied for and passed his examinations to be a licenced dealer, letters were also seen between Sheldon and 'customers' in the USA who both requested and then thanked him for jewellery supplied whilst he was based at Scampton. Other letters between Sheldon and his wife described trips to London and I can only assume that given the fact that many refugees fled from Nazi Germany and the occupation and there are many stories of money and or jewels being sewn into the linings and hems of clothing, that it would have been relatively easy to purchase these on the 'unregulated' market.

Personal discussions with William Patrick, who at 19 years old was one of the youngest members of Kinloss MRT and who assisted in the recovery of the 20 bodies from the crash site, confirmed that whilst they were recovering the bodies they also collected a number of high denomination notes including \$500 and \$1000 bills. During the recovery operation they were joined by a stranger who when challenged by the RAF Team Leader, identified himself as a Padre, a Major in the USAAF but questions were rebutted – the RAF MRT handed the Padre the money and other personal possessions that had been recovered and to their amazement the Padre lit a small fire & burnt them! There were apparently some small arms recovered and what appeared to be gold 'wings', in reality the latter were standard USAAF issue to the pilots but doubtless they looked 'expensive' when compared to the RAF's embroidered wings.

Miscellaneous

In 1981 Mr Ronnie Waugh, who helped to run the Dumfries Aviation Museum, discovered a forgotten file which contained some of the personal possessions of one of the passengers on board 44-62276, Tech Sgt John Lapicca. The oil stained papers & photographs had lain undetected in a case under a wing section until discovered by the aviation group and filed away. Ronnie was able to trace John Lapicca's sisters through an American aviation magazine.

In a separate incident a ring was found inscribed with the name of one of the passengers on board 44-62276, efforts to trace his next of kin failed and when the ring was sent to the Pentagon it was returned with a very cursory note.

Between 1987 and 2003 the Dunoon Air Training Corps researched this crash and, in conjunction with the Dumfries & Galloway Aircraft Museum erected a permanent memorial Cairn to the 20 crew at UK Ordnance Survey Grid Reference NN 16094 02160, as shown in the following photographs. The stones were moved a considerable distance by the Air Cadets up very steep ground over the course of several

days. The names of the 20 airmen are engraved onto a brass plaque so their memory will live on in perpetuity.



The dedication service attended by Officers and Cadets from 2296 (Dunoon) Squadron, Air Training Corps and USAFE personnel.



Brian Canfer, this reports compiler, visiting the site in 2005. Photo taken by Alister Haveron.

Brian Canfer
Squadron Leader Retired, RAF

27th February 2013

Post-report Note dated 24th August 2014

This week BBC Radio 4 had a documentary on the Berlin Airlift which included a comment on aircraft crashes which contradicted something that I had quoted in this report, when I went to the website that I had used I found it had been removed so I had to assume that the fact was wrong and it has now been removed; this is a rather long winded way of explaining that I gave the report further thought. Sheldon's widow Allene died on 28th Feb 2012 having been married and widowed three times¹⁵. This I feel allows me more freedom to comment, whilst I cannot disagree with the Board of Inquiry's findings that the accident primary cause factor was heavy icing I was surprised that not only did they not go on to make recommendations about avoiding icing –perhaps they thought it too obvious- but there was no attempt to apportion blame. To my mind, given that there no need to climb e.g. a barrier of mountains, and the other aircraft 10 minutes ahead had reported himself clear of icing at a lower altitude, Lt. Craigmyle must have borne most, if not all, responsibility for the aircraft ending up entombed in ice. It might simply be that the allocation of blame was outside the Board's Terms of Reference or there might have been financial or morale considerations that prevented them doing so, I will attempt to find out what restrictions, if any applied. If on reading this report you feel differently or have a counter argument please do feel free to contact me to air your views. brican@talktalk.net will reach me.

¹⁵ E-mail from her niece Tammy dated 22nd June 2012

Appendices:

- A. The original e-mail from Tammy Caine dated 6th July 2005. NB All questions have been answered in separate e-mails.
- B. Map of the planned route home.
- C. Witness statements
- D. Letter from Sheldon Craigmyle's CO.
- E. Crew list.
- F. Expert comment on B 29 Navigation Aids and Goodrich de-icing boots.
- G. Articles explaining how icing occurs on aircraft.
- H. Signals from the USAAF Investigation Board.

The following Appendices are included purely for interest

- I. B-29A Technical Data
- J 1 B-29 CREW RESPONSIBILITIES
- J2 NAVIGATION EQUIPMENT.
- K. SMOKY HILL AFB –Sheldon's Home Base
- L. The History of Air Traffic Control History in the UK_

- M. B-29 Operations in WW2
- N. Expert Comment on the Effect of Icing on Aircraft Aerials
- O. List of people and websites contacted during research into this report.

APPENDIX A

Initial E-mail from Tammy Tinney Caine Sent : Wed 06/07/2005 18:20

Dear Brian, it is a pleasure to meet you.

I am the niece of Allene Tinney Craigmyle Richter. She lives in San Angelo, Texas and will be 83 this August. She's not in the best of health these days but she's doing fairly well. I have the responsibility of caring for her. I am partial to this aunt because even though she had no children of her own, she was brave enough to take us kids and raise us the best she could. She is more of a mother than aunt. :):)

It would warm my heart to be able to have her visit the memorial in Scotland. She was not notified when the memorial was placed. I have talked with the museum and they said they tried to contact the families of the airmen that died that day but I don't think they looked hard enough. They put an article in a military magazine but nothing else. Being remarried at the time of their search, it is not likely my aunt would have picked up a magazine like that. I was told that the museum had contacted the USAF in an effort to have them help in the search for family but they were not cooperative. If they had helped, they would have found my aunt and she would have been able to attend the ceremony.

Up until recently, our family has not been too curious as to Sheldon's crash. I was contacted by Eric Grant and he sent me some items of interest and also a piece of the plane. He had it mounted on a plaque. I was grateful to him for his interest. Included in his package was a article done by "The Daily Mail" which made me absolutely furious. It accused Sheldon of being the king pin of the black market trade in Germany. I contacted my aunt and asked her about this. She didn't feel the article was right but said Sheldon made several comments on his last trip that were suspicious. Before he went on his last flight over seas, Sheldon told my aunt that he changed his military insurance papers to show he was married and removed his mothers name. He said he would not leave her at the mercy of his mother. I guess his mother was ruthless from what I hear.

Sheldon called my aunt just before take off on his return from Germany and told her he had money and diamonds. He had taken all their money when he left and my aunt had to live on credit while he was gone. If you read the Daily Mail article, it says that Sheldon was a rich man. Ha! Ha!...Sheldon said he knew she had bills to pay when he got home. The diamonds were to help the start a jewelry business with the Johnson's in Indiana. The equipment had already been bought.

My aunt also said Sheldon was very secretive but would say things to spark her curiosity.

Sheldon had brought home trinkets and things on several of his trips. The article says that an investigation was sought in an effort to stop the trading between the Germans and the Americans. If Lisenhower really wanted to stop trading he would have but he tabled it. It was good business and both the Germans and the Americans were benefiting. I'm sure that Hitler didn't want anyone getting out of Germany so he did whatever he could to stop it but the Americans kept helping in one way or another. sheldon was also part of the Berlin Airlift.

Anyway, I believe Sheldon was doing things for others, namely higher ranking officers.

Sheldon asked to raise his altitude but apparently was either denied or the navigator mis read his instruments. Sheldon apparently knew he was flying low and had ordered his other planes to raise theirs.

My aunt says that one pilot had a nervous break down because he didn't want to make the trip. I don't know which one that was. I know that one plane turned back.

Back to the diamonds....the Daily Mail gives readers the idea that those diamonds are still on that mountain. I say they are not!! I say that who ever Sheldon was also bringing things back for, is the person that got to the crash site first. This person is clearly brass but unknown who it might be. The Padre was a decoy so that people would think that valuable information was being destroyed when in fact the money and jewels had already being taken from the site. Whatever was in that plane was gone by the time the RAF & MRT got there. Whoever this brass was, used the Padre to make it seem that something big was going on to take minds off the diamonds and/or other items that were on that plane. In my mind, the papers that were being burned were blank or of no value. If you think about it, everything burned in that crash except what was not flammable. The plane was fully fueled before takeoff. So if there were papers, they were put there on purpose after the crash. That's why when the MRT asked "What are you doing?", they responded with "it's none of your business".

The brass knew exactly what they were doing. They succeeded in making people think that they had not been up there prior to the MRT cleaning out the valuables. One thing for sure, if I find out who that person is, I'm going after him with all my heart.

I emailed the Daily Mail and it's editor, but naturally I have had no response. The Museum also is in pursuit of the Daily Mail because they were misquoted. I have also email our president, and the American Embassy in Scotland, but again nothing. I told them all, I'm going to scream until someone hears me. I feel Sheldon's name has been unjustly wronged and I want to get to the bottom of this. I also feel that Sheldon took the blame for the crash. Why would they not let him raise his altitude but let the others turn back or raise theirs? Why can we not find his military files? Was Sheldon to meet with someone in Alaska or Kansas to deliver something? Who and what was the item? What was Sheldon carrying that was so important the he would risk his life? These are just a few of my questions....

And for your question about his log book....where is it? Did it burn up in the crash? I don't think we have it but I will look. My aunt has a green cedar chest she kept all his things in. She would not let us look into it until recently. I have gotten about half way down and found so many things that now I know may be of some help. She has lots of letters from him but I didn't read any of them. I felt they were personal so I left them alone but now I will get them out.

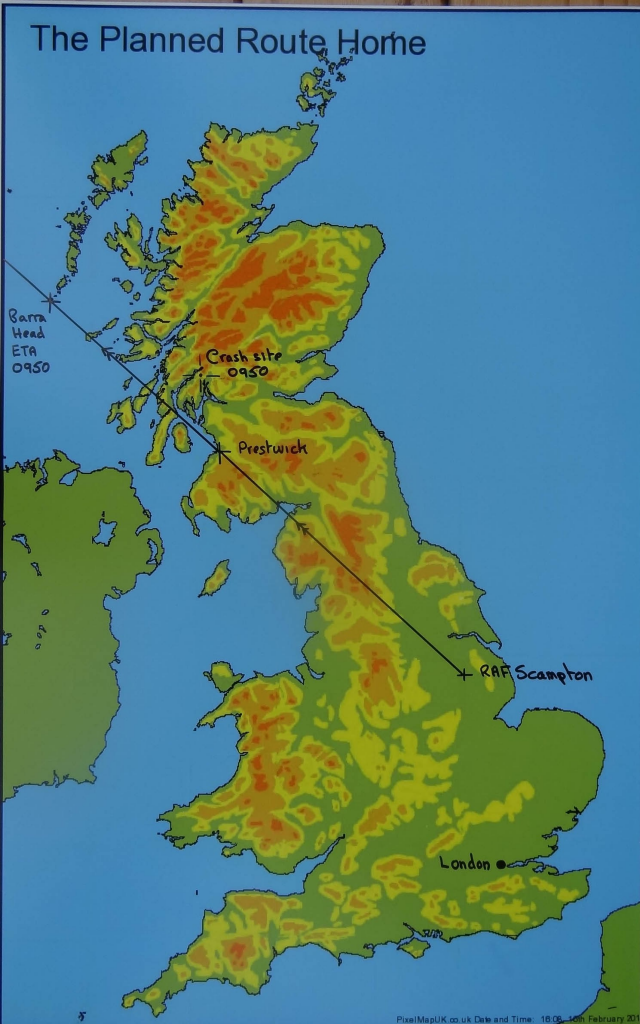
I live in Calif. and will be in Texas by the end of next week. I will see what I can find.

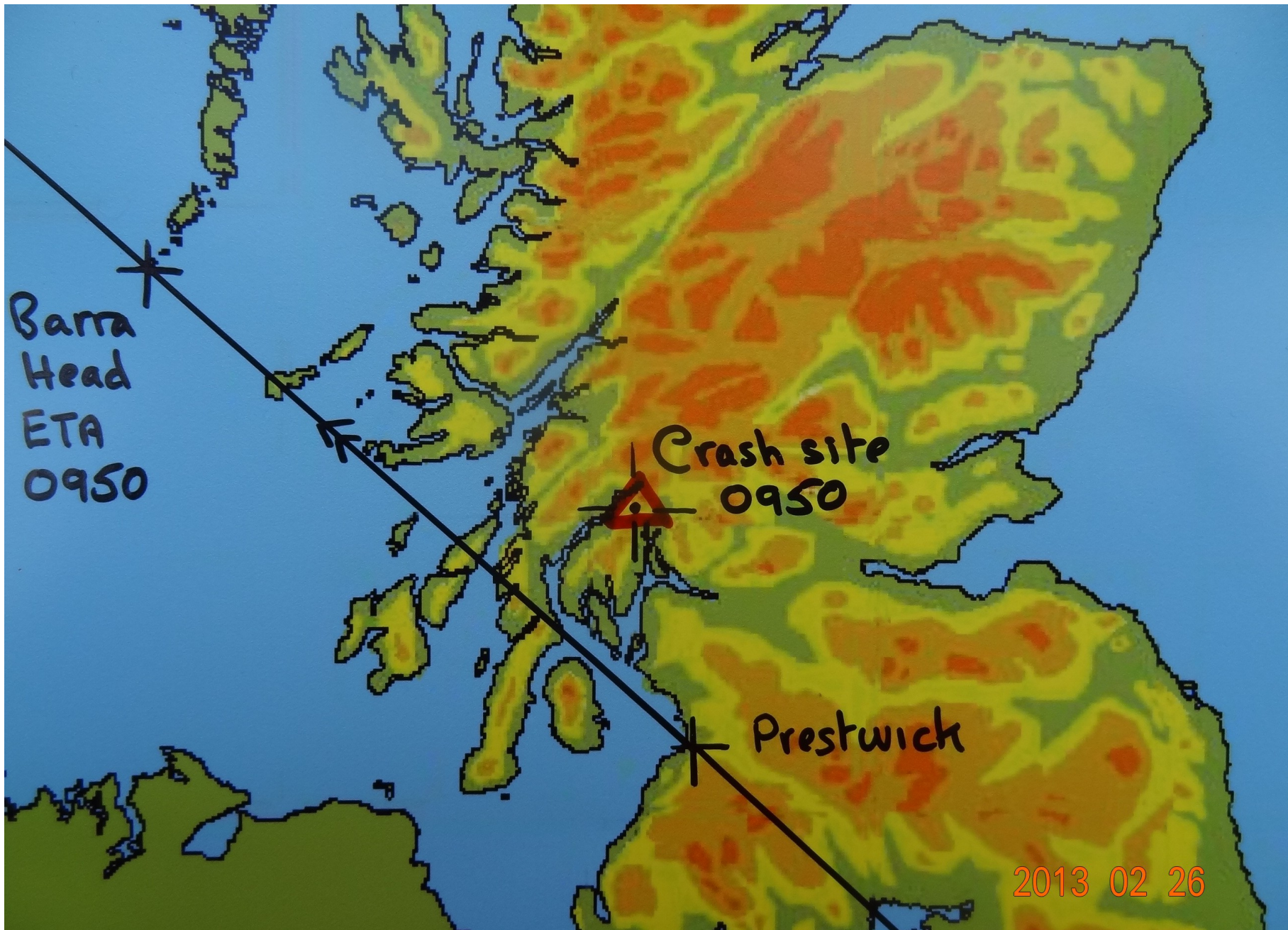
Please keep in touch and if you have any questions, please let me know. I will answer yours the best I can from what I know.

Always,

Tammy Tinney Caine

MAP OF THE PLANNED FLIGHTPATH FROM RAF SCAMPTON.





APPENDIX C

STATEMENTS TOUCHING THE CRASH OF A UNITED STATES OF AMERICA AIR FORCE SUPER FORTRESS WITH THE LOSS OF 20 U.S.A.F. OFFICERS AND MEN ON A SLOPE OF BEINN THARSUINN – A HILL ABOUT 2000 FEET – IN THE PARISH OF STRACHUR AND COUNTY OF ARGYLL, AT 09.48 HOURS ON MONDAY 17TH JANUARY. 1949.

DAVID MACLACHLAN, aged 40 years, estate joiner, Ivybank, Lochgoilhead, Argyllshire. STATES:

On Monday forenoon, 17th January, 1949, I was on the shore of the pier, Lochgoilhead, when I heard a plane coming over from Beach (a hill on the east side of Lochgoil) direction. Its course was towards Ben Lochan, but as a thick mist was down to about 500 ft. I could not see the plane. It seemed to me from the roar of the engines that the pilot was flying too low for the hills. Within 2 or 3 minutes of first hearing the plane, I heard a crash which was preceded by what appeared to be a sudden acceleration of the engines. I thought the crash was either on Ben Lochan or Beinn Tharsuinn. I looked at my watch. The time was 9.49 a.m. Hugh Sleeth and Duncan Campbell (witnesses) came along the road in a car at the time and stopped to speak to me. We discussed the plane. Hugh Sleeth said he would go to the Police Station and get the doctor out. I set out for the hill along with John MacKenzie (witness). We went up Corrow Hill. On the ridge thereof we met the said Hugh Sleeth and the said Duncan Campbell. They were “**A**” accompanied by Alexander Douglas witness. We split into two parties and took different sides of the hill. Alexander Douglas came with me. About midday or very soon thereafter, we were attracted to the crashed plane on Beinn Tharsuinn by the smell of burning. We could not approach close to the main part of the plane for flames and heat. Wreckage was strewn over a considerable area. We made a hurried search of the area. There were no signs of life. I counted at least six trunks of the dead. Alexander Douglas remained with the intention of standing

“**B**” by until the police would arrive. I hurried back to contact the police. On my way down the hill I met Constable A. MacDougall, Strachur, informed him of the circumstances and advised that he get assistance and approach the scene from the Strachur side.

“A TRUE COPY”

WILLIAM R. HARMON JR.
1st Lt., USAFG
Stn. Accident Officer

APPENDIX C continued

JOHN MACKENZIE aged 18 years, plumber, c/o Macleod, Dunvegan, Lochgoilhead, Argyllshire, STATES;

Shortly before 10a.m. on Monday 17th January 1949, I was at my work in Lochgoilhead. I heard an aircraft pass over, but could not see it for a thick mist. I thought from the noise of the engines that it was too low for the hills. I then heard the engines roar faster. This was immediately followed by a dull thud.

I corroborate the statement of High Sleeth from C. to D.

DAVIS MACCALLUM, aged 45 years, builder, Benloch Place, Lochgoilhead, Argyllshire, STATES;

On Monday forenoon, 17th January 1949, I heard an aircraft pass over. I looked at my watch and it was 9.48 a.m. I reckon that when my attention was first attracted, the plane was flying low between Corrow Ridge and Ben Lochan. I thought the engine was faltering. In a matter of seconds after that I heard a crash and perhaps an explosion. I telephoned the local Police Station.

I went to a hill along with a man Angus Montgomery. We went up Corrow Ridge. On the back of Corrow Hill I saw a fresh mark as if a wing tip of the plane had struck it. It was not a large mark and not noticeable from any distance. I remarked about it to Montgomery who was a short distance behind me. I doubt if he heard me or even saw the mark. We carried on and reached the wrecked plane. There was no sign of life. I think I counted about 11 dead bodies.

Note:- The foregoing statements by Maclachlan, Douglas, Sleeth, MacKenzie, Campbell and MacCallum were taken on 19th January, in the presence of Sergeant Marshall and Constable A. MacDougall, both of Argyllshire Police, and a Major Joseph W. Jorda, U.S.A.F., and another U.S.A.F Officer, both presently based at R.A.F. Station, Burtonwood, Nr. Warrington, Lancs., by me.

s/ Alex. Reid
Inspector

Police Station
Dunoon 25.1.49

“A TRUE COPY”

William R. HARMON JR.
1st Lt., USAF
Station Accident Officer

THE AIRCRAFT'S CAPTAIN, SHELDON CRAIGMYLE, WAS UNUSUALLY WELL QUALIFIED FOR INSTRUMENT FLYING AS EVIDENCED BY HIS CO'S LETTER ATTACHED TO THE OAR WHICH STATED, INTER ALIA,

“2. Lt Craigmyle was a pilot of considerable flying experience, having approximately 3500 hours total flying time, of which 1500 hours was B-29 time. He was also one of the most experienced weather instrument pilots in the 301st Bomb Group, having flown much weather instrument time while on TDY in Alaska with the 97th Bomb Group during the winter of 1947-48. Lt Craigmyle was a graduate of the Bryan Instrument Instructors School, and held a current Green Instrument Card. He was appointed Squadron Instrument Instructor and check pilot in September 1946.

3. The aircraft involved, USAF #44-62276, had received a complete 100-hour inspection and a satisfactory test flight before take-off from Scampton, England, on 17 January 1949. The aircraft was also equipped for winter and weather flying.”

Whilst there is no identical expressions in the RAF to ‘weather and winter flying’ it can reasonably be assumed that these refer to flying with sole reference to instruments as there was no visible horizon, what is now called in the UK ‘Instrument Meteorological Conditions’, (IMC). Without a radar operator navigation over the UK would have been a combination of Dead Reckoning, i.e. relying on the forecast winds and the pilot’s instrument flying ability supplemented by radio beacon ‘overheads’ and there was only one of these, at Prestwick, on the flight path between Scampton and the crash site, and, if the position of 25 miles SW of Prestwick reported by Captain Riggs is correct (but see footnote 8) they may have been relying on an air-plot running fix, never a very accurate navigation system but then they did not require accuracy for the ferry flight over UK.

APPENDIX E

Crew and Passengers on board

Name	Rank	Service no	Position in crew
Sheldon C. Craigmyle	1st Lieutenant	AO674474	Pilot and Captain
Myrton P. Barry	1st Lieutenant	AO928749	Co-pilot
Richard David Klingenberg	1st Lieutenant	AO38398	Navigator
Robert A. Fritsche	1st Lieutenant	AO698967	Bombardier
Delbert E. Cole	Technical Sergeant	AF37472130	Passenger
Wayne N. Baker	Master Sergeant	AF6805865	Passenger
John B. Lapicca	Sergeant	AF32986735	Passenger
Malcolm W. Bovard Anthony V. Chrisides	Staff Sergeant Sergeant	AF14031043 AF37551708	Passenger Passenger
Rufus W. Mangum	Sergeant	AF14214466	Passenger
Jack L. Heacock	Private 1st Class	AF1931892	Passenger
Henry P. Prestoch	Master Sergeant	AF6945007	Passenger
Frank M. Dobbs Jnr	Technical Sergeant	AF37102187	Passenger

Cecil G. Jones	Sergeant	AF44127969	Passenger
Charles W. Ross	Sergeant	AF13107559	Passenger
Robert J. Brown	Private 1st Class	AF14268717	Passenger
Rufus G. Taylor	Technical Sergeant	AF34343029	Passenger
Paul W. Knight	Sergeant	AF31519150	Passenger
Frederick N. Cook	Private 1st Class	AF14061495	Passenger
Bruce J. Krumhols	Private 1st Class	AF16277502	

BRITISH GUILD OF AIR NAVIGATORS - COMMENTS ON NAVIGATION AIDS AND 'GOODRICH'**DE-ICING BOOTS**

----- Original Message -----

From: [Walter Blanchard](#)

To: [Neill Leary](#) ; [Air Cdre D F H Grocott](#)

Sent: Sunday, July 31, 2005 3:19 PM

Subject: Re: Research into Nav Aids c 1948/9

All,

It would need a quick look at PRO records to confirm it but I don't think there was any operating Loran in the UK in 1949. In 1945 there was a station for the skywave synchronised system (SS Loran) near Aberdeen but it was dismantled in 1946 since it wasn't very successful. Later (not sure when), two NATO Loran-A chains were set up down the West Coast, which were certainly only transmitting for "test" purposes when I was navigating in 1954 but were later switched on permanently (about 1965?) to assist civil transatlantic navigation. I remember using it quite frequently during my spell as a civil flight navigator 1968-1972 - it had quite a good range: out to about 10W. I expect they were shut down shortly afterwards when INS came in. One of the stations was at Angle in Pembrokeshire and I was very surprised to find when I was in the area a few years ago that the aerial and most of the equipment was still there. MOD did not accept my offer to buy the transmitters at scrap metal values!

The current issue of "Aeroplane" contains a special supplement on the B-29 in which it is stated Loran-A was a standard navaid fit, at first the APN-4, later the APN-9. This would check with the B-29's intended major sphere of operations in the Pacific which was littered with Loran-A. It also says:

"The B-29's bombing and navigation system was the Bell Telephone/MIT AN/APQ-13 which used a 30 inch radar dish installed in a hemispherical radome between the bomb bays. The same organisations were responsible for the AN/APQ-17 Eagle radar system which appeared in an aerofoil-shaped housing slung under the belly of many B-29's"

Further, this article says it had leading-edge de-icing boots, presumably the same pneumatic system as many US aircraft including the Dakota which I navigated extensively in the Far East 1950-53. This system was notorious in being unable to cope with severe icing. It worked

by pulsing a rubber boot which was OK for light icing but in heavy icing the ice eventually built up outside its radius of action so the boot merrily pulsed in a nice little cavity behind the ice which went on building up. For that reason we were instructed not to use de-icing continuously but wait until there was a fair build-up, use the boots to break it off, then switch it off and wait for another build-up. I wonder how many crews had the patience to wait, or noticed it in time.

Interestingly, further on in the article there's a piece about a B-29 that got into a spin, quote:

"It was in May or June 1944. About 3hr out from our base in India we developed ice on the leading edge of the wings at 27,000 ft. The ice spoiled the aerofoil. We had no de-icing equipment" Abruptly Bremner (the pilot) found his B-29 heading down, turning, and trying to run out of control." He recovered it from the subsequent spin, apparently the only recorded recovery of a B-29 from a spin.

According to this same article the B-29 cruised at about 200 kts TAS so assuming a climb speed of 175 kts to 8500 ft at 500 fpm and then a 200 kt cruise would have put him 343 n.m. along track at the crash time in still air. The crash site is only 229 nm from Scampton so he had lost 113 n.m. in 1h 45m indicating a headwind of 70 kts or so. This checks with the evidence. It was January and so there must have been a strong N or NW'ly airflow which can be very cold and wet in winter. If it had no anti-icing boots that might explain everything. No doubt the Met. could be checked in the MO records.

Walter.

ICING AND FLYING

Module content <http://www.auf.asn.au/meteorology/section10.html>

- 10.1 [Airframe icing](#)
- 10.2 [Effect of airframe ice](#)
- 10.3 [Ice jamming control surfaces and cables](#)
- 10.4 [Hoar frost obscuring vision on take-off](#)
- 10.5 [Carburettor icing](#)

10.1 Airframe icing <http://www.auf.asn.au/meteorology/section10.html>

High humidity and low winter freezing levels in south-east Australia provide likely conditions for icing at low levels. Hopefully it is unlikely that an ultralight or VFR GA pilot would venture into possible icing conditions but an enclosed cockpit ultralight may be tempted to fly through freezing rain or drizzle. Aircraft cruising in VMC above the freezing level and then descending through a cloud layer may pick up ice.

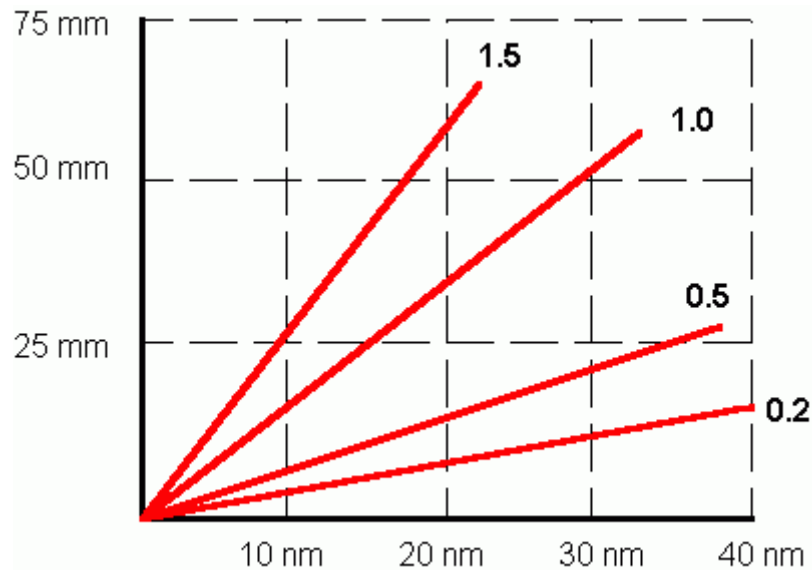
The prerequisites for airframe icing are:

- The aircraft must be flying through visible supercooled liquid, i.e. cloud, rain or drizzle
- The airframe temperature, at the point where the liquid strikes the surface, must be sub-zero.

The severity of icing is dependent on the supercooled water content, the temperature and the size of the cloud droplets or raindrops. The terms used in the Australian Bureau of Meteorology icing forecasts are:

- **Light:** less than 0.5 grams per cubic metre of supercooled water in the cloud – no change of course or altitude is considered necessary for an aircraft equipped to handle icing. Of course no ultralight and very few light aircraft are equipped to handle any form of airframe ice.
- **Moderate:** between 0.5 and 1.0 g/m³ – a diversion is desirable but the ice accretion is insufficient to affect safety if anti-icing / de-icing used, unless flight continued for an extended period.
- **Severe:** more than 1.0 g/m³ – a diversion is essential. The ice accretion is continuous and such that de-icing / anti-icing equipment will not control it and the condition is hazardous.

The diagram below shows the ice accretion in mm on a small probe for the air miles flown, in clouds with liquid water content varying from 0.2 g/m³ to 1.5 g/m³.



The small, supercooled droplets in stratiform cloud tend to instantaneous freezing when disturbed and form **rime ice** – rough white ice, opaque with entrapped air. In the stable conditions usually associated with stratiform cloud, icing will form where the outside air temperature [OAT] is in the range 0 °C to –10 °C . The continuous icing layer is usually 3000 to 4000 feet thick.

The larger supercooled droplets in convective cloud tend to freeze more slowly when disturbed by the aircraft; spreading over the surface and forming glossy **clear** or **glaze ice** . In unstable air moderate to severe icing may form where the OAT is in the range –4 °C to –20 °C . Where temperature is between –20 °C and –40 °C the chances of moderate or severe icing are small except in CB CAL i.e newly developed cells. Icing is normally most severe between –4 °C and –7 °C where the concentration of free supercooled droplets is usually at maximum, i.e. the minimum number have turned to ice crystals. Refer [3.1 Cloud formation](#). Mixed rime and clear ice can build into a heavy, rough conglomerate.

Flying through snow crystals or snowflakes will not form ice but may form a line of heavy frosting on the wing leading edge at the point of stagnation, which could increase stalling speed on landing. Flying through wet mushy snow, which is a mixture of snow crystals and supercooled raindrops, will form **pack snow** on the aircraft.

The degree and type of ice formation in cloud genera are:

- Ci, Cs and Cc; icing is rare but will be light should it occur
- Ac, As and St; usually light to moderate rime
- Sc; moderate rime
- Ns; moderate to severe rime, clear ice or mixed ice. As the vertical extent of Ns plus As may be 15 000 or 20 000 feet the tops of the cloud may still contain supercooled droplets at temperatures as low as -25°C
- TCu and Cb; rime, clear or mixed ice, possibly severe.

[Freezing rain](#) creates the worst icing conditions, occurring when the aircraft flies through supercooled rain or drizzle above the freezing level in Cu or Cb. The rain striking an airframe, at sub-zero temperature, freezes and glaze ice accumulates rapidly, as much as one cm per four miles.

Freezing rain or drizzle occurring in clear air below the cloud base is the most likely airframe icing condition to be encountered by the VFR or ultralight pilot and, as it is unlikely to occur much above 5000 feet amsl, descent choices are possibly limited.

10.2 Effect of airframe ice

Ice accretion on the wing leading edge is a major concern for aircraft not equipped with anti-icing or de-icing. Airflow disruption will reduce the maximum lift coefficient attainable by as much as 30% – 50%, thus raising the stalling speed considerably. and, because the aircraft has to fly at a greater angle of attack to maintain lift, the induced drag also increases and the aircraft continues to lose airspeed, making it impossible to sustain altitude if the stall is to be avoided. Fuel consumption will also increase considerably.

- The weight of 25 mm of ice on a small GA aircraft would be about 30 to 40 kg but the increased weight is usually a lesser problem than the change in weight distribution. Also accretion is often not symmetrical, which adds to increasing uncontrollability.
- Forward visibility may be lost as ice forms on the windshield.
- Icing of the propeller blades reduces thrust and may cause dangerous imbalance.
- Ice may jam or restrict control and trim surface movement or may unbalance the control surface and possibly lead to the development of [flutter](#).
- Communication antennae may be rendered ineffective or even snapped off.
- Extension of flap may result in rudder ineffectiveness or even increase the stalling speed.
- Aircraft operating from high altitude airfields in freezing conditions may be affected by picking up runway snow or slush which subsequently forms ice possibly causing engine induction icing, frozen brakes etc.

Engine air intake icing

Impact icing may occur at the engine air intake filter. If '**alternate air**' (which draws air from within the engine cowling) is not selected, or is ineffective, power loss will ensue. When air is near freezing movement of water molecules over an object such as the air filter may sometimes cause instantaneous freezing. Ice may also form on the cowling intakes and cause engine overheating.

Pitot or static vent icing

Pitot or static vent blockage will seriously effect the ASI, VSI and altimeter, as shown in the table below, but be aware that blockage of the static vent tubing from causes other than icing, water for example, will render the ASI, VSI and altimeter useless, unless the aircraft is fitted with an alternative static source.

If the static vent is totally blocked by ice –

Flight stage	Altimeter reading	VSI reading	ASI reading
During climb	constant	zero	under
During descent	constant	zero	over
During cruise	+constant	zero	OK
On take-off	constant	zero	under

If the pitot tube is totally blocked –

Flight stage	Altimeter reading	VSI reading	ASI reading
During climb	no effect	no effect	over*
During descent	no effect	no effect	under*
During cruise	no effect	no effect	constant*
On take-off	no effect	no effect	zero*

If the pitot tube is partially blocked –

Flight stage	Altimeter reading	VSI reading	ASI reading
During climb	constant	zero	under*
During descent	constant	zero	under*
During cruise	+constant	zero	under*

On take-off constant zero under*

* and/or fluctuating

10.3 Ice jamming control surfaces and cables

Many aircraft are prone to accumulation of water from dew or rain in areas that will inhibit control movement should that water freeze during flight and affect hinge, cable or torque tube movement. This particularly applies to ailerons and elevators if the gap between the control surface and main structure contains some form of flexible seal [to improve aerodynamic efficiency] which allows accumulation of water. Engine controls may also be affected should exposed cables or cable runs be wet and subsequently ice up.

If water has accumulated within a control surface and frozen before it has the opportunity to drain then the mass balance of the surface will be degraded and there is a possibility of [flutter](#) development.

Water should be removed from areas which may affect controls before flight and subsequently care taken not to fly into freezing conditions after flying through rain.

10.5 Carburettor icing

Ice is formed in venturi type and slide type carburettors in ambient air temperatures ranging from about $-10\text{ }^{\circ}\text{C}$ to $30\text{ }^{\circ}\text{C}$ if refrigeration and adiabatic cooling within the airways are sufficient to lower the air/fuel mixture temperature, and consequently the metal of the carburettor, below the freezing point. There also must be sufficient moisture in the air, but this need not be visible moisture. Ice may form at the fuel inlet, around the valve or slide, in the venturi and in curved passages, choking off the engine's air supply and, if icing continues, will cause the engine to stop.

Temperature reduction within the carburettor

Adiabatic cooling – in the induction system the constrictions at the throttle valve and choke venturi cause a local increase in air velocity, with consequent increase in dynamic pressure and decrease in static pressure. Density remains constant so the temperature instantly decreases in line with the decrease in static pressure, refer [1.2 equation of state](#). This adiabatic cooling is more noticeable when the throttle is closed, or partly closed, for

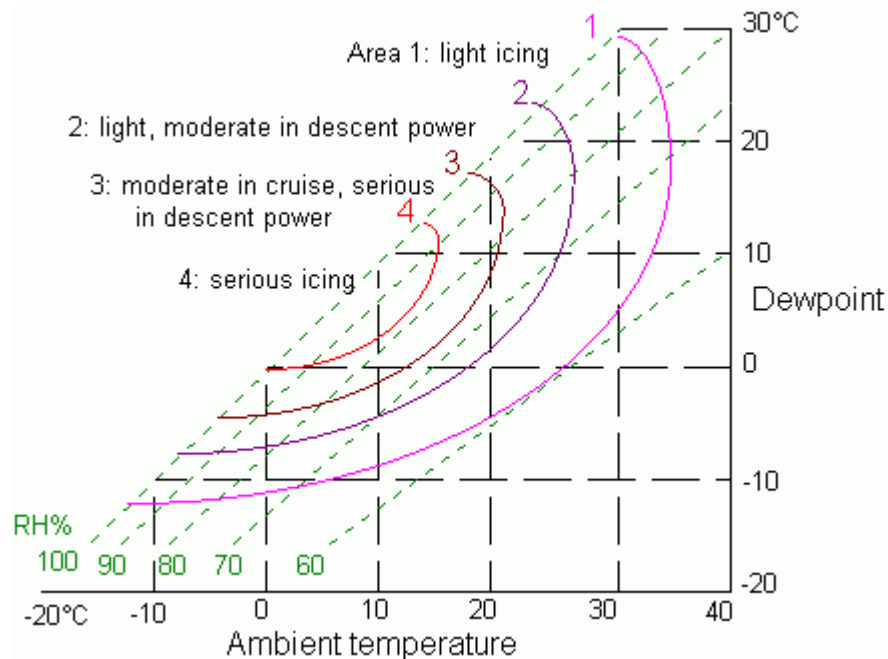
extended periods, but it is unlikely to be more than a 5 °C drop at the coldest part, probably much less, say 2 – 3 °C .

Refrigeration cooling – when fuel is injected into the airstream a certain amount evaporates. The latent heat for fuel evaporation is taken from the surrounding air and metal, which is already being cooled adiabatically. The temperature drop caused by refrigeration may be as much as 15 °C , giving a total drop within the carburettor as high as 20 °C . If the metal of the carburettor is thus reduced to a temperature at or below freezing cooled, or supercooled, water droplets will freeze on contact – as in airframe icing.

Sublimation of water vapour

However even if there is no visible water in the air the temperature reduction may cause ice to be deposited on the freezing metal by sublimation of the water vapour in contact with it, refer [1.5 atmospheric moisture](#) and [1.6 evaporation and latent heat](#). The amount forming depends on the absolute humidity of the atmosphere. Normally the higher the temperature the greater the absolute humidity can be thus it is possible that when flying in outside air temperatures as high as 20 °C , even 25 °C , carburettor ice can form. Air having a relative humidity of 25% at 20 °C , or 50% at 10 °C , will reach saturation at 0 °C .

However an OAT range of 0 °C to 25 °C , peaking at around 10 °C to 15 °C, with relative humidity exceeding 60%, are the most significant conditions for moderate to severe clear air icing – particularly at low throttle openings – as shown in the probability diagram below. Note that the region to the left of the 100% relative humidity line would be visible moisture – mist, fog and cloud.



Locally high absolute humidity may also occur in the following conditions:

- poor atmospheric visibility at low levels, especially early morning and late evening
- after heavy rainfall in light wind conditions
- in clear air just after morning fog has dispersed
- just below a stratiform cloud base.

When flying through visible moisture, cloud patches or light rain, some of this moisture will evaporate in the carburettor, further reducing the temperature in the airstream. The drop is slight but may be enough to tip the scales. The probability of icing is increased if fuel flow is not leaned – the excess fuel injected into the intake airstream increases the refrigeration.

Combatting carburettor icing

The formation of carburettor ice is indicated by a slow decrease in manifold pressure, in aircraft equipped with a constant speed propeller, or decrease in rpm in fixed pitch aircraft. Corrective action is usually by full application of carburettor heat, which pre-heats the air entering the carburettor. Full carburettor heat should also be applied in conditions conducive to icing, particularly at low throttle settings such as on descent or taxiing, but never on take-off. Carburettor heat will increase the fuel vaporisation in a cold engine. Application of partial heat may cause otherwise harmless ice crystals in the airstream to melt then refreeze on contact with freezing metal.

Non venturi carburettors, such as the various slide types attached to two stroke engines in ultralight aircraft, where the throttle slide performs as a throttle valve and venturi, are considered, for various reasons, not to be very susceptible to icing. Consequently, they are usually not fitted for carburettor heat, or intake air heating, on the principle that any ice formed will be immediately downstream of the slide, or multi-hole spray bar, or around the main jet, and movement of the throttle slide will dislodge it – provided of course that the rpm drop is noticed before things get out of hand.

2007 UK CAA General Advice Leaflet 3C WINTER FLYING Selected Extracts

3 FLIGHT PREPARATION

d The most likely temperature range for **airframe** icing is from 0 to -10°C ; it rarely occurs at -20°C or colder (see para 6(c) for carburettor icing conditions). Pay attention to any icing warnings. Note the freezing level, it can be surprisingly low even in Spring and Autumn; you may need to descend below it to melt an ice build-up; but **beware of high ground**. Remember also that altimeters overread in very low air temperatures, by as much as several hundred feet. You can be lower than you think.

e If you are likely to encounter ice en-route, have you room to descend to warmer air? Will the airspace or performance allow you to climb to cold, clear air? (Note that any ice build up may not melt and will degrade cruise performance). Can you land safely at your destination? If the answers to these questions are NO, **don't go**.

6 EN ROUTE

c Carburettor icing is one of the worst enemies. The chart shows when it is most likely to occur. (See also *Leaflet No 14A – 'Piston Engine Icing'*.)

d Carburettor ice forms stealthily, so monitor engine instruments for loss of rpm (fixed pitch propeller) or manifold pressure (constant speed propeller), which may mean carb ice is forming.

e Apply full carb heat periodically and **keep it on** long enough to be effective. The engine may run roughly for a short period while the ice melts.

f Use carb heat as an intermittent ON/OFF control – either full hot or full cold. Do not use full or partial carb heat continuously unless the Handbook/Flight Manual allow it.

g If the aircraft has de-icing boots, its a good idea to cycle the boots from time to time, even when ice is not expected. This prevents the valves in pneumatic systems from sticking.

i Airframe Icing is most frequently encountered within convective clouds, Cumulus or Cumulonimbus (CU/CB) where the build up of ice can be very rapid. In these clouds the icing layer can be several thousand feet thick and a dramatic change of altitude will be required to avoid icing. It is better to avoid flying through these clouds if you can, either by turning back or changing your route.

Icing can also occur in thin layered clouds, especially during the winter.

j If you see ice forming anywhere on the aircraft, act promptly to get out of the conditions, don't wait until the aircraft is loaded with ice.

Ice forms easiest on thin edges. As the tailplane generally has a smaller leading edge radius than the wing it means that if you can see it on the wing, the tailplane (or propeller blades) will already have a heavier load. Pilots have reported that ice builds up 3 to 6 times faster on the tailplane than the wing and up to double that on a windshield wiper arm. On some aircraft the tailplane cannot be seen from the cockpit. In fact the pencil like OAT probe is often the first place ice forms. If ice does form, keep the speed up; **Don't fly too slowly**. The stall speed will have increased.

In the absence of dewpoint information assume high humidity when:

- the ground is wet (even dew)
- in precipitation or fog
- just below cloud base

CARB ICING

The Manual/Handbook may give a minimum speed to cope with increased weight and drag due to ice build-up.

o Freezing rain can occur during the winter months either at or near the ground, or in a layer above the ground. It occurs when warm moist air is moving into a cold region. The invading warm moist air may cause a layer of air, where the temperature is higher than zero°C, to overrun a much colder layer beneath where the temperatures are below zero°C. Under these conditions precipitation forming in the high cloud layers will melt to form rain as it falls through the warm air which will then fall into the sub-freezing layer beneath. This rain will quickly freeze again in the cold air forming a solid layer of clear ice over everything. This clear ice will build up very quickly and be difficult to 'shake off'.

p Freezing rain is the most severe form of airframe icing. It can be encountered in flight up to altitudes of 10,000 feet,. Aircraft parked outside will be quickly coated with a layer of clear ice, and similarly aircraft in flight. If such conditions are encountered in flight near the ground it is best to land as soon as possible, or if the severe icing is encountered at a higher altitude descend, if possible, into a warmer layer below.

q If you are in trouble, tell someone clearly and in good time and make sure the transponder is ON and set to ****

STALLING SPEED INCREASES

LIFT REDUCES - WEIGHT GROWS - THRUST DECREASES - DRAG INCREASES - CORRECT TAILPLANE LOAD IS VITAL IN PROVIDING LONGITUDINAL BALANCE

r Ice forming on an aircraft can cause odd vibrations and noises. An aerial iced up may begin to vibrate (and can fall off). Don't panic, remember **AVIATE, NAVIGATE, COMMUNICATE.**

Flying through an active cold front <http://www.metoffice.gov.uk/education/higher/air.html#3.2>

3.2 Fronts

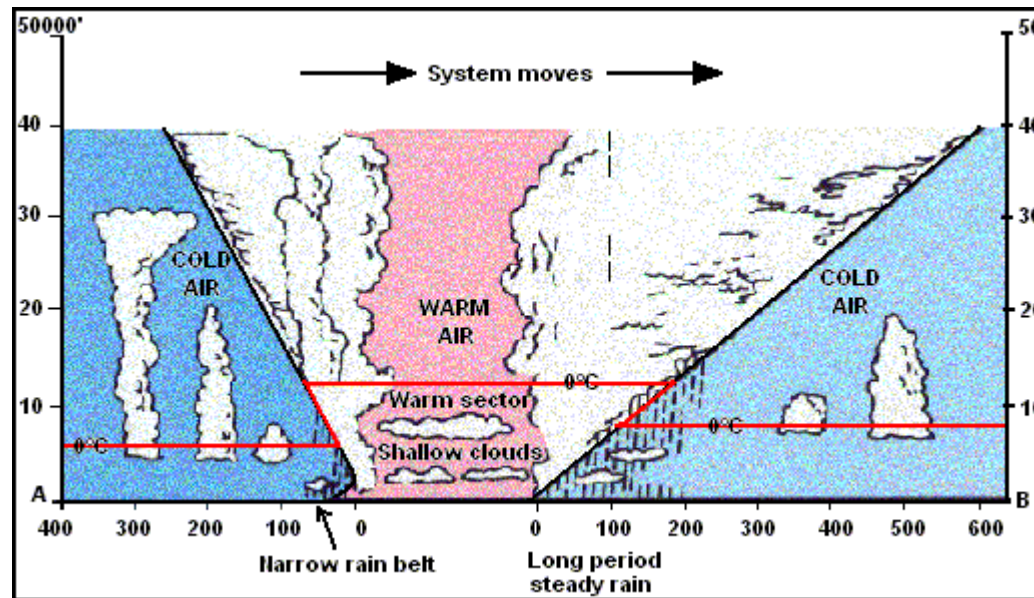


Fig 11: Vertical cross section through a warm sector of a depression

APPENDIX H

SIGNALS SENT FROM THE INITIAL USAAAF INVESTIGATION TEAM
NB THESE WERE NOT COPIED TO ANY RAF OR AIR MINISTRY ORGANISATIONS!

C 6

EJB 98

E227

FJ2

MOPOP JEPAD

FM JFLA 2/ 59TH AIR DEPOT WING BURTONWOOD ENGLAND 310830z

TO JEPC/CSAF WASHINGTON DC

JEIAD CHIEF FLIGHT SAFETY LANGLEY AFB VA

INFO/ JFLC CG 3D AID DIV

QJFPGO CG USAFE WIESBADEN GERMANM

JWXC CG SAC OFFETT AFB FT CROOKNEBRASKA

JWDC CG 15TH COLORADO SPRINGS COLO

UWXFL CG 301ST BOBM WING SMOKEY HILL AFB SALINA KANSAS

H AF GRNC

SUPPLEMENTAL FOUR PD BAKER NINE ABLE NUMBER FOUR FOUR DASH SIX TWO TWO SEVEN SIX NEAR DUNOON SCOTLAND

SEVENTEEN JAN FOUR NINE PILOT SHELDON C CRAIGMYLE PD

- B. AIRCRAFT COMPLETELY DESTROYED AS A RESULT OF CRASH AND SUBSEQUENT FIRE PD POSSIBLE DIPPOSITION UNDER PROVISIONS OF AF REG SIX DASH SIX BECAUSE OF INACCESSABLE TERRAIN AND UNSALVAGABLE CONDITION OF WRECKAGE PD
- E. APPROXIMATELY TWENTY BODIES HAVE BEEN RECOVERED AND TRANSPORTED TO 779TH & 7770TH EUCOM QUATERMASTER MORTUARY SERVICE FRANKFURT GERMANY FOR IDENTIFICATION AND DISPOSITION PD
- F. CAUSE UNDETERMINED PENDING RECEIPT OF STAEMENT OF PILOT OF OTHER BAKER TO NINE FLYONG SAME ROUTE AT TIME OF CRASH PD SUBMISSION OF AF FORM ONE FOUR BEING DELAYED PENDING RECEIPT OF IDENTIFICATION OF CREW AND PASSENGERS CMA INFORMATION IN SECTION C AND D AF FORM ONE FOUR ON PILOT AND COPILOT K AND THOROUGH INVESTIGATION OF ALL KNOWN FACTORS PD SIGNED COMGEN 59K5 AIR DEPOT WING PD END

31QQQPZ JAN

EJB 12

C-9

EJB 1 62
EUA166
DJB43
FL45

OPQP JEPAD

FM JFL 30/CG THIRD AIR DIVISION 171945Z
TO JEPC/CSAF WASHINGTON DC
JEPAD/CG HQ OFFICE OF FLYING SAFETY SVC
LANGLEY AFB VIRGINIA
JFW/CG USAFE WIESBADEN GERMANY
UWXFT/CG SAC OFFUTT AFB FI CROOK NEBR
UWDAF/CG FIFTEENTH AIR FORCE COLORADO SPRINGS COLO
UWXFL/CG 301ST BOMB WG SMOKEY HALL AFB SALINA KANS
JFLA/CG BURTONWOOD DQVOT
ATTN FLYING SAFETY OFFICER

AF GRNC

3AD 1-200 PD PRELIMINARY AIRCRAFT ACCIDENT REPORT FOLLOWS PD

A 17 JAN 1949 PD APPROXIMATELY ZERO NINE FOUR ZERO ZEBRA CMA TWELVE MILES WEST OF DUNOON SCOTLAND PAREN
COORDINATES OF DUNOON FIVE SIX POINT NINE MILES NORTH DASH ZERO ZERO POINT ZERO FIVE WEST PAREN PD

B B-2PA CMA 44- 62276 CMA 32ND BOMB SQ 301 ST BOMB GP SMOKEY HILL AFB SALINA KANSAS PD AIRCRAFT CRASHED AND BURNED
PD

C PILOT – SHELDON C CRAIGMYLE 1ST LT AO-674474 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY
UNKNOWN PD

D SAME

E COPILOT – MYTON P BARRY 1ST LT AO-928749 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

NAVIGATOR – RICHARD D KLAINGEBERG 1ST LT AO-38398 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

BOMBADIER – ROBERT A FRITSCH 1ST LT AO-698967 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

DELBERT E COLE T SGT AF-37472130 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

WAYNE W BAKER M SGT AF-6805865 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

JOHN B LAPICCIA SGT AF-32986735 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

MALCOLM W BOVARD S SGT AF-14031043 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

ANTHONEY V CHRISIDES SGT AF-3755708 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

RUFUS W MANGUM SGT AF-14214466 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

JACE L MEACOCK PFC? AF- PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

HENRY P PRESTOSH M SGT AF-6945007 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

FRANK M DOBBS JR T SGT AF-37102187 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

CECIL G JONES AF-44127969 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

CARL W ROSS SGT AF-13107559 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

ROBERT BROWN JR PFC AF-14268717 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

RUFUS G TAYLOR T SGT AF-34343029 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

PAUL K KNIGHT SGT AF- 31519150 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

FREDRICK M COOK PFC AF-14061495 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD

BRUCE J KARUMHOLZ AF-162773?02 PD 32ND BOMB SQ 301ST BOMB GP 15AF SMOKEY HILL AFB KANSAS PD INJURY UNKNOWN PD
F CAUSE OF ACCIDENT UNDETERMINED AT PRESENT TIME PD INFORMATION RECEIVED FROM AIR TRAFFIC CONTROL CMA
PRESTWICK SCOTLAND TO THE EFFECT THAT ONE MILITARY AIRPLANE CRASHED AND BURNED TWELVE MILES WEST OF DUNOON
SCOTLAND PD THERE ARE UNKNOWN FATALITIES BUT NUMBER AND IDENTIFICATION UNDETERMINED PD THE ROUGH AND
ISOLATED TERRAIN ARE GREATLY JAMPERING RESCUE OPERATIONS PD UNCONFORMED REPORT IS THAT LOCAL RESIDENT NEAR
DUNOON HEARD AN EXPLOSION AT NINE FOUR ZERO ZEBRA PD APPROXIMATELY ONE THREE ZERO ZERO ZEBRA ONE SEVEN
JANUARY FOUR NINE BURNING WRECKAGE LOCATED BY LOCAL SHEPHERD WHO IDENTIFIED NUMBERS ON TAIL SECTION OF
AIRCRAFT AS TWO SEVEN SIX PD

G UNKNOWN

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I CLEARANCE FROM SCAMPTON ENGLAND TO KEFLAVIK ICELAND PD UNREPORTED SINCE APPROXIMATELY ZERO NINE THREE
ZERO ZEBRA AT WHICH TIME ROUTINE POSITION REPORT MADEYO PRESTWICK CONTROL PD

J AIRCRAFT RETURNING TO ZI PD

K UNKNOWN

L UNKNOWN PD

SIGNED COMGENTAD CITE UKD PD END

172015Z JAN

B-29A TECHNICAL DATA

The Boeing B-29A was an improved version of the B-29. Built exclusively at Boeing's Renton, Washington plant, the -A model featured an improved wing design and a four gun forward top turret. The new wing had a span 12 inches greater than the B-29 and was constructed in three pieces--a center section and two outboard sections--rather than the two sections of the earlier model. This allowed for greater strength and quicker installation at the factory plus maintenance in the field was easier.

The top turret was modified for four .50-cal. machine guns to improve the forward defensive firepower. The four gun turret was initially installed on late model B-29s and in some cases retrofitted at field depots. The turret was standard on all -A models and beginning with block 40 aircraft was modified to a more aerodynamic shape (half tear drop).

B-29A production continued after the end of World War II until May 1946 when the last of 1,119 aircraft was completed. The B-29A was used extensively in the Korean Conflict during the early 1950s. However; by the end of the conflict, it was clear the B-29 was not capable of defending itself against the jet fighters of the period. The B-29 was quickly phased out of first line service as the new jet bombers became operational.

SPECIFICATIONS

Span: 142 ft. 2 in.

Length: 99 ft. 0 in.

Height: 27 ft. 9 in. (at rest) 27 ft. 6.7 in. (taxi position)

Weight: 141,100 lbs. (max. overload)

Armament: Twelve .50-cal. machine guns and one 20mm cannon plus 20,000 lbs. of bombs.

Engines: Four Wright R-3350-23, -41, or -57 "Cyclone" radials each equipped with two type B-11 turbo superchargers and each producing 2,200 hp. at take-off power.

Crew: Normal crew of ten consists of Pilot, Co-Pilot, Flight Engineer, Bombardier, Navigator, Radio Operator, (2) Side Gunners, Top Gunner, and Tail Gunner.

PERFORMANCE

Maximum speed: 357 mph at 25,000 ft.

Cruising speed: 220 mph

Range: 6,000 miles max. ferry range and 4,100 miles with 16,000 lbs. of bombs

Service Ceiling: 33,600 ft.

De-icing System

Two proven systems were used. One was the Goodrich rubber boot on the leading edges of the wing and tail surfaces. Spanwise tubes beneath the thin rubber cover were inflated in pulses to crack ice off that had formed. The other de-iced the propeller blades by pumping liquid Isopropyl alcohol into a slinger ring on the propeller hubs that metered the liquid onto the roots of the blades, from it traveled along the blades due to centrifugal force.

http://home.att.net/~jbaugher2/b29_3.html

B-29 CREW RESPONSIBILITIES

Pilot — sat in the left seat on the flight deck, the pilot (always an officer), was in charge of all operations of the aircraft, and in overall charge of the crew

Co-pilot – sat in the right seat on the flight deck, he was also always an officer. He was expected to gain experience, and many did so rapidly. The co-pilot usually handled much of the routine flying at altitude, and performed take-offs and landings when circumstances permitted. The B-29 never acquired a reputation for being a particularly forgiving aircraft, and many co-pilots completed a full tour of duty without ever moving over to the left seat.

Navigator - located up front with the flight crew, behind and to the left of the pilots but facing forward, the navigator (also an officer) was charged with getting the aircraft to and from its destination. The rated navigator's job did not exist until the US entered the war (until then, navigation was done by rated pilots, one of the most skilled being a junior officer named Curtis LeMay). On formation missions, the lead navigator could be the most important crewman in a B-29, often having to cope with visual and celestial challenges greater than those encountered by bomber crews in Europe. The forward upper gun turret had a huge chamber beneath so that the navigator and radio operator were squeezed into opposite corners of a very congested area. On some later models the AN/APQ-9 receiver was moved forward so that the navigator could swivel through 180° and use it.

Flight engineer - located immediately behind the pilots, and facing aft, the flight engineer (an officer on most 15-29 crews in World War 2, who had often trained as a pilot) started the engines, checked them out, helped the pilot to set power for take-off and spent the mission troubleshooting engine temperatures and performance.

The post of flight engineer was gradually opened up to suitably qualified enlisted men as World War 2 progressed, and by mid-1945 many were sergeants.

Bombardier - sat in the 'catbird's' seat, between and in front of the 2 pilots in the rounded nose of the B-29. The bombardier, with his vaunted Nordcn bomb-sight, was responsible for hitting the target. He also had the secondary duty of operating the upper turret of 2

or 3 x 0.50-cal. (12.7-mm) remote-controlled guns and the lower turret of two, his gun sight was latched off to the right when not in use. His command of the turrets could be overridden by the central fire control operator.

Radar operator - the radar operator was initially one of the crew members seated in the rear fuselage area behind the crew tunnel. Later, and particularly on 315th BW aircraft that were stripped of armament towards war's end, the radar operator was an officer seated forward of the tunnel near the flight deck on the left side of the aircraft. The radioman was responsible for the AN/APQ-13 radar found on most wartime B-29s, and the AN/AI'Q-7 Eagle radar that exclusively equipped the Superfortresses of the 315th BW - these arrived in the combat zone near the end of the fighting. The radar operator took over the job of dropping the bombs when the drop was made through the weather.

Radio operator - also located on the right side of the flight deck behind the pilots, the radio operator was always an enlisted man. He handled the communications gear and kept the VHP command radio (used by the aircraft commander) and Collins HF 'Mixmaster' voice/Morse radio (used for longer-range communication) in working condition. The HF unit was attached to a [railing antenna that extended behind the aircraft. In practice, little radio communication took place during a real-world bombing mission ••- any actual talking was done by the pilots. The radio operator also handled Morse communications, which were important to every mission.

Central fire controller (CFC), or top gunner - this enlisted crew member was first among equals as one of five men assigned to the Super fortress's ambitious, remote-controlled General Electric defensive gun system.

The B-29 normally carried an AN/APQ-13 radar bombing/navigational aid set. This set was developed jointly by the Bell Telephone Laboratories and the Massachusetts Institute of Technology Radiation Laboratory. It was manufactured by Western Electric, which was in those days the manufacturing arm of the Bell System. The radar antenna for this unit was housed inside a retractable 30-inch hemispherical radome located between the bomb bays and protruding below the fuselage a couple of feet when extended. Later in the war, the AN/APQ-7 Eagle radar unit was used. The Eagle antenna was mounted in a wing-shaped housing installed underneath the forward section of the fuselage. The unit was also devised by Bell Labs and MIT, and was manufactured by Western Electric.

B-29A NAVIGATION EQUIPMENT

Radar / Navigation <http://www.worldnewsstand.net/05/military/No6.htm>

AN/APQ-13 (H2X) radar enclosed in a 30" radome X-Band Bombing Radar "Mickey" manufactured by Bell The AN/APQ-13 radome was located at the bottom of the fuselage, between the bomb bays. On airplanes with modified bomb bays (such as SB-29's etc.) often the radome would be moved forward in the lower forward turret position. The latter was of course deleted.

AN/APQ-7 EAGLE 3 cm radar better target definition this wing shaped antenna in a housing installed underneath the forward section of the fuselage. It spanned 17 ft, had a 31" chord and was about 8" thick weighing nearly 1,000 pounds. X-BAND Search & Bombing Radar "Eagle Mk.1"; manufactured by Western Electric

AN/APN-4 LORAN (LONGe RANge) radar navigation system manufactured by Philco. 1.950 MHz. consisted of two units each about 1 ft x 2 ft by 2.5 ft. One unit was the power supply while the other contained the oscilloscope display tube, timing circuits and receiver. Together they weighed about 80 pounds. By 1945 the APN-9 came into use at an amazing weight reduction - it only weighed 40 pounds.

The oscilloscope screen was about four inches in diameter and would display a station master and associated slave signal from about 1500 miles over water and 600 miles over land. With practice a fix could be determined in about three minutes. As an example, the minimum error for navigating the 1400 miles to Japan from Tinian was about 28 miles. With two successive fixes ground speed, drift, and ETA could be determined. The relative simplicity of LORAN and the fact that it could be used regardless of weather made it invaluable as an navigational tool until the aircraft arrived over Japan when airborne radar provided a more accurate fix. For some unknown reason the Japanese either never tried or failed to jam any of the LORAN systems. By the end of World War II there were 75 standard LORAN stations serving the needs of aircraft and vessels in operation with over 75,000 receivers in use.

AN/APN-9 LORAN (LONGe RANge) radar navigation system manufactured by RCA; replaced AN/APN-4

LORAN

LORAN is an acronym for Long Range Navigation. Loran is a system used to determine the position or location of the aircraft on a navigation chart. A LORAN radio receiver measures the differences in the arrival time of radio signals sent from known stationary transmitting stations. These differences define the sender station's location on the map or chart. Lines drawn from these stations place the aircraft's location at the intersection of these lines. However, it now appears that LORAN was not available in the UK at that time! RIN reply to e-mail.

http://www.uscg.mil/hq/g%2Dcp/history/LORAN_Section_2.html Details of USCG 3 Station LORAN Network including Hebrides

<http://www.raggedbutright.net/pages/7/index.htm>

SMOKY HILL AFB –SHELDON’S HOME BASE

Smoky Hill AFB <http://www.smokyhillmuseum.org/Pages/conzn.html#top>

In 1942, the Smoky Hill Army Air Field opened as a processing and staging area for heavy bombardment units going overseas during World War II. It was located five miles south of Salina. It was renamed the Smoky Hill Air Force Base in 1948, but deactivated in 1949. The base changed its name to Schilling Air Force Base after being reactivated in 1951, hosting the 802nd Air Division and the 40th and 310th Bomber Wings and the 550th Strategic Missile Squadron.

<http://www.globalsecurity.org/wmd/facility/schilling.htm>

The Strategic Air Command's 97th Bombardment Wing was based at Schilling Air Force Base during 1946 and 1947, equipped with B-29s. By 1947 the 97th and 301st bombardment wings of the Strategic Air Command, flying B-29s were based at Smoky Hill AFB. The 22nd Bombardment Group (Very Heavy), equipped with the B-29 Superfortresses, moved from Kadena Air Base Okinawa to Smoky Hill AFB, in May 1948. The 22nd Bombardment Wing shared its commander with the 301st Bombardment Wing until the 22nd moved to March AFB on 09 May 1949. The name of the base was changed to Smoky Hill Air Force Base in January of 1948. The Defense Department deactivated the base in August of 1949, with the 301st being relocated to another Air Force Base.

The History of Air Traffic Control History in the UK
<http://www.nats.co.uk/library/history5.html>

1947 – First Ground Controlled Approach (GCA) radar equipment installed at Heathrow and Prestwick.

1947 – UK airspace divided into five flight information regions (FIRs) each with its own control centre: south eastern (Uxbridge), south western (Gloucester), northern (Preston), central Scotland (Prestwick) and northern Scotland (Inverness).

1948 – Control zones established within eight miles of major airports.

1949 – VHF radio telephony area cover service for Uxbridge centre begins with sites at Birdlip (Gloucestershire), Riddlesdown (Surrey), Lympne (Kent) and Pulham (Norfolk).

1949 – British European Airways Dakota airliner on a scheduled flight collides with RAF Anson with loss of 14 lives.

1949 – Airlines call on Government to improve UK ATC with a ‘corridor system of control,’ similar to the US airways.

1949 – Senior British air traffic controllers visit Chicago to study US ATC operations

1950 – London Radar becomes operational Heathrow

1950 – Green One, Europe’s first airway opens, running from Woodley near Reading to Strumble Head on the Welsh coast.

1950 – Inverness control centre moves to Redbrae House, Prestwick.

B-29 OPERATIONS IN WW2

<http://www.b-29s-over-korea.com/firebombing/firebombing1.html>

General Arnold cabled General Wolfe in India that the first 175 B-29s would depart on March 10, 1944. He went to Salina on the 9th to witness the historic event. When told that not a single B-29 was ready to go he was enraged, and the ensuing crisis became known as "The Battle of Kansas". Heads rolled, phones were ringing, streams of trucks and trains were arriving with parts. The Battle of Kansas was finally being won with the wrath of General Arnold pushing it. By March 26, the B-29s were on their way for the 11,530 mile trip. The gigantic process of building airfields and living quarters was slowly progressing. Bases in China were being completed. Four airfields with 8,500 ft. runways were built in three months by 300,000 Chinese workers. The B-29 turned out to be it's own worst enemy. The crashes due to malfunction claimed more lives than the Japanese air defenses. The number one problem now was that everything, bombs, gas, ammo, had to be delivered "over the hump". Overheating engines continued to plague the bombers. Gen. Arnold kept demanding action against the Japanese. He ordered Wolfe to launch 70 planes no later than June 15. They were assigned a prime strategic target, the coke ovens of Japans steel plant, the Imperial Iron and Steel Works at Yawata in Kyushu. Of 75 planes one crashed on take off, six aborted, and four turned back. Only 47 of the remaining 64 found the target. Several were hit by flak, three crashed. Seven planes were lost, recon photos showed some bombs missed the target by as much as 20 miles. Relations between Arnold and Wolfe deteriorated. Wolfe in an effort to appease Arnold stepped up his flights, with 24 planes dropping incendiaries and fragmentation bombs on the Nagasaki shipyards. The attacks on Japan increased, with the B-29s, suffering unacceptable losses due to weather, malfunction, flak, and fighter attacks which now included ramming. Gen. Arnold, still not satisfied with the unsatisfactory performance, appointed the commander he originally wanted, Gen. Curtis LeMay.

GENERAL CURTIS LEMAY TAKES OVER

Gen. LeMay took over with a vengeance, striking the Okayama aircraft complex on Formosa with 130 B-29s. On Oct. 25 he launched an attack against a factory at Omura on Kyoshu. 59 planes reached the target causing considerable damage. The XX Bomber Command continued their air strikes against airfields on Formosa, factories in Mukden, Manchuria, and Omura, Japan. From India the B-29s hit targets in Burma, Bangkok, Saigon, Camranh Bay, Pnompenh, Kuala Lumpur, and Singapore.

Gen. Arnold was overjoyed when American forces, after a fierce struggle, took over the Mariana Islands late in 1944. Bases were being constructed on Saipan, Tinian, and Guam. By Nov. over 100 planes were stationed on Saipan.

THE MARIANAS

It was only a matter of time before hundreds of B-29s would be reaching all of Japan as the airfields on the Mariana Islands were completed. Guam in 1945 became a superbase. Japanese defenses were considerably better than expected. Antiaircraft fire was fairly accurate, fighter pilots were very aggressive, willing to ram the B-29s. The flights were long, with many planes running out of fuel and ditching. Damaged aircraft had priority in landing, with sometimes hundreds of planes stacked up behind them, all running on empty.



GEN. NORSTAD, GEN. LeMay,[center] GEN. POWER ctsy Wide World

The B-29s kept coming. On Oct. 19, 1944, the 8,500 ft. runway was completed on Saipan. Gen. "Rosey" O'Donnell took command of the 73rd Wing. Prime targets in Japan were to be aircraft factories and oil refineries.

The American Generals who were planning the attacks could never have known that their biggest problem would be the weather over Japan. The changing winds were unpredictable, particularly around the Mt. Fuji area. Heavy winds pushed the planes in different directions, some obtaining a ground speed of 450 MPH. Winds of over 150 MPH played havoc with the bombardier. The jet stream repeatedly created unexpected and unacceptable results. The B-29s were flying at altitudes of 25,000 to 30,000 ft. to put them above anti-aircraft fire and fighter attacks. The Japanese fighter was not capable of reaching such altitudes. However the jet stream was a problem they could not live with.

Gen. Arnold selected Gen. Haywood Hansell Jr. to run the XXI Bomber Command. He had been Gen. Arnold's Chief of Staff for the 20th Air Force, in charge of all B-29 operations. A conflict was in the making, as Hansell resented what he considered a change of policy in Washington. Gen. Norstad, who replaced Hansell as Chief of Staff for the 20th AF, wanted him to run a test mission with 100 planes dropping incendiaries on Nagoya. So the line was drawn. Hansell wanted only precision bombing, Norstad was an advocate for area bombing. Another controversy arose when Gen. Arnold notified Hansell that the loss rate of the B-29s was unacceptable. Hansell defended the losses. By the end of 1944 the results of the bombing raids were considered ineffective. On Jan. 3, 1945, Hansell finally conceded to Norstad and sent 97 B-29s to fire bomb Nagoya. Only 57 reached the target and the incendiaries dropped from 30,000 ft. only burned out an area the size of three football fields. Five B-29s were lost. Hansell had met Gen. Norstad's demand for an incendiary test, but his job was coming to an end. On Jan. 6, Gen. Norstad personally arrived on Guam to tell Hansell that Curtis LeMay would replace him. Losses under Hansell had been severe and could not continue. Hansell's last flight proved successful. His flight of 62 planes hit the Kawasaki aircraft factory from 25,000 ft, cutting production by 90 percent without a single loss. LeMay took over, and was plagued with the same problems that caused Hansell to lose his job. Bad weather, the jet stream, and swarms of fighters continued.

Norstad renewed his request for the firebombing of Kobe, Japan's most important shipyard city. On Feb. 4, LeMay sent 129 B-29s carrying a mixture of incendiaries and fragmentation bombs. Kobe was partially obscured by clouds, and only half of the planes found the target. Still, results were impressive. Japanese fighters shot down one B-29 and damaged 35. Six days later 84 B-29s bombed the Nakajima aircraft plant. Results were poor, only seven incendiaries hit the factory area, 97 G.P. bombs fell in the factory area but 43 were duds. It seemed LeMay was not accomplishing any more than Hansell. It was time to take Iwo Jima so the B-29s could have an emergency landing area. The cost was enormous. 7000 U.S. Marines were killed and over 19,000 wounded.

THE FIREBOMBING

Curtis LeMay had been sent to the Marianas to get results. So far conventional high altitude bombing had not produced the desired results. The weather at altitude was rendering results sometimes useless. He realized he needed a complete change in strategy. The big change he envisioned was to change the altitude to get them out of the jet stream, and also save considerable gas. He also decided he would firebomb every city in Japan. In 1944 a group of manufacturers including Standard Oil and Du Pont came up with a jellied gasoline called napalm. It would stick to anything and set ferociously hot fires. Gen. Thomas Power, Commander of the 314th Bombardment Wing, carried out a fire raid test over Tokyo. Bombs were dropped from 25,000 ft. and burned out a full square mile. He reported to LeMay that he thought by going in at the lower altitude with a larger bomb load there would have been much greater destruction. Then came the radical decision by LeMay. The planes would go in at 10,000 ft. He ordered the removal of bomb bay fuel tanks claiming by not going to altitude they would not need the gas. All .50 cal. Guns would be removed, and all ammo. With no guns the gunners did not need to go. They would approach at night, low, not in formation but singly, each plane now carrying twice the previous bomb load. LeMay knew his job depended on this radical decision, and he also knew his tactics would kill thousands of civilians. How many Americans would be killed in an invasion of Japan? It was to be a huge gamble. His crews reacted negatively when told. They claimed they were being sent on a suicide mission. LeMay replied "if this raid works the way I think it will, we can shorten the war". On March 9, 334 B-29s took off from Guam, arriving in Japan under good weather conditions. The planes were stacked up from 4,900 ft. to 9,200 ft. They dropped one 500 pound cluster of fire bombs every 50 feet. The target area was 3 by 5 miles, containing a large industrial complex, however each square mile held over 100,000 civilians. The bombs fell, and within thirty minutes the resulting fires were out of control, driven by 40 mph winds. Tokyo, hit by strings of incendiaries, became a holocaust. Water boiled in the canals after the temperature reached over 1800 degrees F. For three hours the B-29s kept coming. Only a few fighters appeared causing little damage. We lost 14 planes with damage to 42. An official Japanese count reported nearly 84,000 killed, 41,000 injured, and over 250,000 buildings destroyed in this one raid. 16 square miles burned out. The Japanese called the raid "Slaughter bombing". LeMay was driving his crews to exhaustion, as he launched four more raids in the next eight days against Osaka, Kobe, and twice on Nagoya. In only five raids the B-29s wiped out 32 square miles in four major cities. The population of Tokyo dropped to half as panic stricken civilians fled. Washington was finally satisfied that fire bombing was the answer to crushing the Japanese, and sent LeMay a list of 33 additional Industrial targets, and gave the resupply of incendiaries to XXI Bomber Command the highest priority.

The bombing of Kobe was a little different. Napalm bombs were in short supply so 2,355 tons of magnesium thermite bombs were used. The thermite bombs burned with an intensity of 2300 degrees F. Three square miles were incinerated and substantial damage was done to the aircraft plant, dock area, and the Kawasaki shipyards which built submarines. The morale of the Japanese people hit bottom as industries were wiped out, and city populations dropped.

The Marianas were now crowded with over 700 B-29s which were accompanied on missions by hundreds of P-51s. On April 13, 327 B-29s swept over Tokyo at night incinerating eleven square miles. Two nights later 303 Superfortresses were back over Tokyo burning six square miles. Also destroyed was three and a half square miles of the town of Kawasaki, and a mile and a half of Yokohama. Admiral Nimitz ordered Lemay to drop thousands of mines which virtually shut down all shipping. The mine laying left the Japanese in chaos, as the results were so effective Japan was actually starving. Nimitz praised LeMay and called the results phenomenal. On May 11 Nimitz released Lemay from his obligation to take out the Kamikaze after destroying 483 on the ground and 218 in the air. Nimitz would later realize the full fury of the Kamikaze as ship after ship, including carriers, went to the bottom. How was the number of suicide planes miscalculated by such a large amount. There were times when the outcome of the invasion of Okinawa was in doubt, as the Kamikazes attacked with such vengeance.

BACK TO THE FIREBOMBING

LeMay, back on the top priority of demolishing Japan, on May 14 sent 472 B-29s loaded with incendiaries bombed Nagoya. Two nights later 457 planes finished off Nagoya and LeMay removed it's name from the list of cities to be bombed. On May 23, 520 B-29s hit Tokyo industrial complex. They were met with blinding searchlights, heavy smoke, heavy flak, and night fighters with orders to ram. This time they were also attacked by the Baka suicide bombs. Seventeen B-29s were lost on this single raid. Another five square miles of Tokyo was burned. Two nights later 502 planes returned, but this night was to be one to remember forever. 26 B-29s were lost and 100 damaged. On the ground another 17 square miles burned, leaving Tokyo over half destroyed. Yokohama was next on the list. The B-29s were protected by P-51s who shot down 26 planes. Despite the excellent fighter cover five B-29s were lost and 175 damaged. Yokohama was mortally wounded with nine square miles burned. LeMay could now concentrate on Japans industrial complex in Osaka, Japans second largest city. This mission also was destined to end in tragedy. 148 Mustangs joined the bombers which soon ran into a weather front with near zero visibility. Planes collided and 27 crashed. Only 27 mustangs of the original 148 joined 458 B-29s to hit Osaka. The Japanese fighter assault was fierce, as they downed five B-29s. Three square miles of Osaka was burned. It was to be a very costly mission. On June 5, 473 B-29s attacked Kobe in daylight with no escort. Four square miles of the industrial complex was destroyed. The losses of B-29s was continuing at a staggering rate, with nine shot down and 176 damaged. Many of the planes could not make it all the way back and either ditched or landed at Iwo Jima.

LeMay was considering rotating his crews after 35 missions. Major Shorty Hull received word his wife had just given birth. Hull was convinced that LeMay would order him to fly more missions, so he demanded to be allowed to fly the Kobe mission. His aircraft was shot down, his crew parachuted and was captured. They were tried for committing war crimes, found guilty and beheaded the same day.

Two more raids hit Osaka on June 7 and 15, burning out another four square miles. The final raids on Osaka ended Bomber Commands plan to incinerate metropolitan Japan. Our cost was monumental in terms of aircraft and crews. LeMay tried to convince Norstad that the B-29 could

win the war by continuing the bombing without invading the homeland. He said we could just keep bombing them until they quit. During the summer the Marianas was super crowded with over 1000 B-29s. In June a new outfit named the 509th Composite Group with 15 B-29s was stationed at an isolated area on Tinian. The crewmembers never talked about why they were there, only the Commander Col. Paul Tibbets knew why.

LeMay continued to insist that with his plan the war would be over shortly. He had already paralyzed the entire country, destroying most of the aircraft factories, oil refineries, steel plants, and burned down most of the cities. His next program would be to bomb four cities, Omuta, Hamamatsu, Yokkaichi, and Kagoshima. After that opposition was so light he dropped leaflets in advance not only to save lives but to frighten workers away from their jobs. After observing the almost total devastation, LeMay advised Gen. Arnold that very shortly he would not have any cities left to destroy. Kyoto was off limits because it was a religious and cultural center. LeMay noted that four cities were left - Hiroshima, Nagasaki, Niigata, and Kokura. Of course these cities were reserved for the A-Bomb. The last mission sent 828 B-29s and 186 fighters over Japan without a single loss. On Aug. 6 and 9, 1945, the A-Bombs were dropped, and Japan surrendered unconditionally. Several conflicting reports put our losses of 414 to 512 Bombers, with 576 fliers killed and 2400 missing in action. Training losses in the U.S. were reported to have claimed another 260 B-29s. Our "Road To Victory" was a very costly one.

EPILOGUE

General Curtis LeMay notified Bomber Command and Gen. Norstad that every Japanese City was severely damaged, that Japan had no supplies, no fuel, no aircraft defense system, and it would be only a matter of time if the firebombing continued before Japan would surrender. He had no voice in the dropping of the bomb. The argument will go on forever, was it really necessary? It should not be forgotten that the word "surrender" was not in the Japanese vocabulary. They were still a fanatical nation, willing to commit suicide before surrender. How many Americans would have been killed had we invaded Japan? Some put the figure at half a million, maybe more. There was a solution to stop the killing and we took it. The Enola Gay, Smithsonian controversy is a prime example of the erratic feelings of many Americans, Sometimes we are our own worst enemy. Demonstrations and dissent have increased alarmingly. There is the great possibility that someday we will just "self destruct".

WINSTON CHURCHILLS ADDRESS TO THE HOUSE OF COMMONS, AUGUST 16, 1945

There are voices which assert that the bomb should never have been used at all. I cannot associate myself with such ideas. Six years of total war have convinced most people that, had the Germans or the Japanese discovered this new weapon, they would have used it upon us to

complete destruction with utmost alacrity. I am surprised that very worthy people, but people who in most cases had no intention of proceeding to the Japanese front themselves, should have sacrificed a million Americans and a quarter million British lives in the desperate battles and massacres of an invasion of Japan. Future generations will judge these dire decisions, and I believe if they find themselves dwelling in a happier world from which war has been banished, and where freedom reigns, they will not condemn those who struggle for their benefit amid the horrors and the miseries of this gruesome and ferocious epoch.

Expert Comment on the Effect of Icing on Aircraft Aerials

From: Graham, Michael
Sent: 28 January 2009 14:10
To: Brian Canfer
Subject: RE: Airframe Icing Expert?
Dear Brian,

I have managed to find an expert in the College on aerial performance (Dr. Stepan Lucyszyn). He confirmed that deposition of ice on an aerial would very likely have a severe effect. It is due to the electrical conductivity of the ice 'shorting out' the voltage signal to the aerial and the effect can occur for a moderately thin layer of ice. [Before I managed to contact him I had looked into the effect of the thickness of ice blanketing the signal as water is known to do, but that effect is not likely to be significant here because the order of a metre or so of ice thickness would be required!]. He says that they could do tests of the situation but I guess this might involve some expense in setting them up. But it does look as if aerial icing may be a factor in this accident.

Regards,

Mike

Note: Mike Graham is a University Professor who specializes in aviation matters, he is also the son of Flt Lt Des Graham, DSO, MBE, RAF who was instrumental in getting the RAF Mountain Rescue Service established in 1943.

LIST OF PERSONNEL AND WEBSITES CONTACTED DURING THIS RESEARCH

Name	Tel number, e-mail or URL	Area	Comment
William Patrick		Kinloss MRT on 17/1/49, took part in the recovery of the 20 bodies.	Good clear memory, copy of interview with FC in 1992
Eric Grant	eric@eric4.wanadoo.co.uk	Researcher, had contacted pilot's wife and niece	
Jim Lawson		Freelance researcher, submitted the Daily Mail article	
Trevor Muston	edit@navynews.co.uk	Navy News re Holy Loch Placed request in RN News	No response
Caroline Richmond	caroline.richmond@ufcnet.net	Lochgoil community contact	
John Williamson	John.Williamson@mildenhall.af.mil	USAF Wing historian Mildenhall	Tried to help re wings
Dafydd Gates	dafydd.gates@metoffice.gov.uk	Met Office re 1949 aero codes	
	http://www.wpafb.af.mil/museum/ac/cw.htm	B-29 radio procedures	
Sqn Ldr Dick Oddy	DASC Bentley Priory 0208 838 7000 ext 7616	Archives	USAF equivalent
Professor Mike Graham	Imperial College London	Ideas	Gave details of icing on HF aerials
Dryden NASA	e-mail returned, not allowed to contact them!		
NASA Aviation safety Reporting System	e-mail re whereabouts of accident reports. Captain Charles R. Drew	Referred me 2 Pentagon!	

	NASA's Aviation Safety Reporting System (ASRS) NASA's Security Incident Reporting System (SIRS) cdrew@mail.arc.nasa.gov (408) 541-2832 [Office DID] (408) 541-2800 [Office, general number] (408) 206-8526 [cellphone] http://asrs.arc.nasa.gov		
Scottish daily Record	0141 309 3000	Copy of 18 Jan paper	
Dunoon Observer	01369 706854 Reporter Dick Gault		
Central ATC school Shawbury	01939 250351 ext	Question about flight rules, did not know, suggested CAA	
Flight planning RAF Shawbury	Maps and charts to plot track etc SAC Matt Johnson 01939 250351 ext 7249		
Richard Gault son Fraser	Commanding Officer of the Dunoon Air Training Corps 01369 704725	Access to his vast database about the crash.	
Louie F. Alley	Freedom of Information Act Manager HQ AFSC/JAR 9700 G Avenue SE, Suite 236B Kirtland AFB NM 87117-5670 Tele: (505) 846-1193	Accident report, referred me to Maxwell AFB,	
	United States Air Force Historical Research Agency at Maxwell Air Force Base, Alabama (Montgomery)	afhranews@maxwell.af.mil	only hold the 3 page report
Pentagon 14 Jul 05	http://www.pentagon.mil/faq/comment.html Ref No 050714-000066	Chased for response 29 Aug	Sent full report
CAA	Directorate of Airspace Policy CAA House. 45-59 Kingsway. London WC2B 6TE 020 7453 6599		
Tammy Caine	Tammy Caine	SwanLake8@aol.com	Loaned a

	201 N. Vista Visalia, Ca. 93292 Niece of Sheldon Craigmyle		series of letters sent to either Sheldon or Allene 1942-1949. Replied to e-mails providing family information
Met Office Archives Exeter	01392 360987 Steve Jebson Information Officer and Visual Aids Manager Met Office National Meteorological Library and Archive FitzRoy Road Exeter Devon EX1 3PB United Kingdom Tel: +44 (0)1392 884845 Fax: +44 (0)1392 885681 E-mail: steve.jebson@metoffice.gov.uk http://www.metoffice.gov.uk	Forecast/aftercast for 17 Jan 49	Comprehensive reply received 20/21 Jul 2005
BBMF RAF Coningsby	Ext 7905 for Lancaster aircrew	Airframe icing especially clearance rates	No reply
IWM Duxford	01223 499355 Peter Merton 01223 835000 John Delaney for on-board access to their B-29 jdelaney@iwm.org.uk direct line 01223 499354	navigation equipment	Their B29 had been mothballed, no nav kit on board. They did allow me unfettered access to the aircraft.
Prestwick airport	01292 511107 atswatchmanager@gpia.co.uk	Asked about ATC facilities at the	

	eallison@gpia.co.uk	time	
AIS Aeronautical Information Services (Heathrow)	0208 745 3456	No resources, suggested AHB!	
Berlin airlift	http://www.usafe.af.mil/berlin/berlin.htm	Why use Bombers??	
Berlin airlift veterans association	http://www.konnections.com/airlift/index.html as above!	as above!	Deterrence, 60 came over
Scottish Met Office Saughton House Broomhouse Drive Edinburgh	Records hazel.clement@metoffice.gov.uk	0131 528 7311	supplied numerous charts and observations for 17 Jan 1949
US Veterans website	http://ww2.vet.org/	Ask them to post a general request for info about B-29 ops and fits in UK 48/49	e-mail rejected
B-29 vets site	dhberry@coolsite.com , radarrichard@ww2.vet.org	info about B-29 ops and fits in UK 48/49	
B-29 sites	http://www.xmission.com/~tmathews/b29/i.html	Listing of other B-29 sites	
Smoky Hills	http://www.pbs.org/shptv/b29/		
	http://www.b-29s-over- korea.com/firebombing/firebombing1.html	B-29s in far East, background material	
Korean B-29s	http://www.raggedbutright.net/pages/7/index.htm	B-29 diagram and details of that nav fit	unable to help
Kevin Kearney	Berlin Airlift Historical Association airlift48@aol.com		
CRO	RAF Scampton	info about B-29 ops and fits in UK 48/49	No response
CRO	RAF Waddington	info about B-29 ops and fits in UK 48/49	Try AHB!

CRO	RAF Marham	info about B-29 ops and fits in UK 48/49	No response
RAF Kinloss	201 Sqn .Track Barra Head to Keflavik	314°T	
	http://www.accident-report.com/contact_us.html	Web site found whilst researching LORAN!	
jerry.proc@sympatico.ca	http://www.jproc.ca/hyperbolic/index.html	Loran	Replied, no Loran in UK 1949
Royal Institute of Navigation	http://www.rin.org.uk/default.asp	Nav techniques in 48/9	Detailed reply from Walter Blanchard
list of related a/c crash web sites	http://www.aeroinfo.org.in/aviation/incidents.html		
Accident reports	http://www.aviationarchaeology.com/src/reports.htm	e-mailed request, can they provide a better report?	
Dr NR Hall	Loan of 3 books with details of the B-29	Crew access, tunnel and de-icing details for airframe	diagram omitted nose crew access
301st Association	Lowell Thompson, Historian P.O. Box 714 Kellogg, ID 83837 E-Mail: thunderp51@aol.com	Contact details for B-29 crews	e-mailed 31 Jul 05
AFHSO/HOS Reference and Analysis Division 31 st July 2005	200 McChord Street, Box 94 Bolling AFB, DC 20332-1111 USA tel: 001 202- 767-4781	letter sent asking about crew records	
301st website	www.301bg.com		
Private web site	Marvin T. Broyhill marv@strategic-air-	Contact details for B-29 crews	e-mail returned

	command.com		
Robert House	http://www.strategic-air-command.com/stories/stories_home.htm < grhouse@compuserve.com >	as above	
Dumfries and Galloway Av Museum	01387 256680 Ron Waugh Dumfries & Galloway Aviation Museum. Former Control Tower Heathhall Industrial Estate. Dumfries.DG1 3PH info@dumfriesaviationmuseum.com	Background info + full crew list	
Robert Door author	robert.f.dorr@cox.net	Any help, he wrote Aeroplane article and several previous B-29 books	Unable to help!
	http://www.peakdistrictaircrashes.co.uk/away44-62276.htm	Crew list and photos	
Washington Sqns	http://www.rafmarham.co.uk/history/washington.htm	115 Sqn + 149, 90, 15, 44, 207 and 35 Sqn	
Joe Bridge	RAF Marham webmaster	Washington contact in UK	
Chris Howlett Washington Newsletter editor 15 Aug 05	The Barn . Badbury Cross. Isle Abbots. Taunton Somerset TA3 6RS chris_howlett@tiscali.co.uk 01460 281500	Gave advice, info and contacts, also forwarded e-mail to B-29 group in USA	
Peter Smith 15 Aug 2005	Haverhill Aviation Group, contact details for B-29 crew chief		supplied next day
Bunny Bowers B-29 crew chief	Tel: 01440 703504	In reality a Washington crew chief, confirmed that although 20 POB was cramped it did often happen in an a/c going home.	
Boyd Thompson 16/8/05	http://32ndbombsquadron.com/32ndreun.html	Contact details for B-29 crews, he forwarded to all group members	

USAFE AFHSO Archie DiFante	http://www.af.mil/main/contactusemail.asp	as above	Full report supplied foc!
Darell landau	19 th Bombardment Wing Association dwlandau23@peoplepc.com	As above	
USCG 18 Aug 2005	LORAN chain sprice@comdt.uscg.mil	http://www.uscg.mil/mailform/dist-mail.html	Very useful response
Bill Dietz 25 Aug 05	USCG LORAN historian	Asked to comment on status and accuracy of the chain in 1949	
USAF records in national archive 27 Aug 05	http://www.archives.gov/global_pages/contact_us.html	General request for details of a/c activities in Europe	
George Lane	B-29 Nav! judygerg@infowest.com	sent various e-mails	Very useful
Bolling AFB historian 27 Sep 05	Andrews Stephens Andrew.stephens@bolling.af.mil	e-mailed re radar operator in crew list	Initial response referred me to UK websites! 2 nd response said no such records available
Randolph AFB Contact centre 28 Sep 05	Aircrew categories https://webcolab.afpc.randolph.af.mil	Ref 050928-000005	
Col and Mrs T Elsesser	Contact telephone numbers for US military museums etc		Found MJFB's book
<i>Michael JF Bowyer</i>	His book "Force for Freedom The USAF in the UK since 1948" ISBN 1-85260-415-8	Confirmed ferry crew/passenger numbers and details of UK activities of B 29's	
Air Force Historical Research Agency Maxwell AFB, Alabama	afhra.maxwell.af.mil		

AFHSO Research	AFHSO Research [afhso.research@pentagon.af.mil]	Recommended MJFB's book as the authority	
Peter Jenny	Tel 01292-287797 Prestwick Controller and author of several books	Provided copies of the Prestwick Approach chart 10 Nov 1944 and Oceanic crossing chart c1945	