



Flightlines

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Above: The Ford Tri-Motor's "dated" flight deck.
At left: An externally mounted engine.
Photos courtesy of Doug Partington



Sitting in the business end of the Ford Tri-Motor.

Flying in a Ford Tri-Motor

By Ted Lowrey

As Canadian Warplane Heritage members look at certain aircraft and see beauty, both the aesthetic beauty of its appearance and the functional beauty of its design features. And the exterior finish suggests to us a history of usage – “chapters in a book” that reminds us of what once was.

However, the special aspect of our CWH Museum and other facilities like it is that we are allowed to do more than think about an aircraft's history. We are allowed to fly in an aircraft and deeply sense its history. Think of flying in our Lysander, or our Dakota, or our Lancaster.

The skills of our pilots help us to actually “feel” the history of the aircraft. Our restoration of such aircraft preserves aviation heritage; but by sharing it with a younger generation through flight opportunities people can actually experience that heritage.

An aircraft of which some have been restored so that people can fly in it and actually sense its history is the Ford Tri-Motor. First flown in 1922 as a single-engine, eight-passenger “airliner,” it was designed and built by the Stout Metal Airplane Company and called the Stout Air Sedan.

The company, the aircraft development, its production and its promotion was assumed by Henry Ford. In 1926 Ford built a new 60,000 square foot Tri-Motor factory “laid out to accommodate the Ford system of progressive production.”

History suggests Ford never made a profit bringing his business efficiencies to the building of the Ford Tri-Motor. What he did, in the mid-1920s, was to change the expectations of passenger airplane travel. Air travel then was in its earliest stages and the Tri-Motor, the most advanced airliner of its day, brought about these changes.

Firstly, it introduced a new level of safety. With three engines, (two suspended below the wings), it was first flown in June of 1926. It has two more engines to rely on if one ceases.

Also, it must have been reassuring to fly in an all-metal aircraft when other air-

craft of the day were made of wood and fabric wrapped around a framework of some form of metal tubing (Consider the construction of some of our museum's pre- and early WWII aircraft as they lay partially disassembled for servicing on our museum floor).

The aircraft body was made of aluminum alloy, corrugated for extra strength in certain areas. Corrugation added rigidity, but increased drag and lowered performance. Even the control surfaces – rudder, elevators, ailerons – were made of metal (Many of our Museum WWII aircraft have fabric-covered control surfaces).

Secondly, there was a new level of comfort for the passengers. They sat in modern-for-the-time seats that were de-

signed for both comfort and appearance, and could be quickly removed to convert the Tri-Motor to a freight-carrying aircraft. Passenger air travel was in its earliest stages and Henry Ford was well aware of how to demonstrate its advantages. One of the things he did was to have very prominent, well-known people fly in Tri-Motors and then let North America know the convenience these people experienced.

Over one hundred airlines used the Tri-Motor, as well as non-airline operations. Indeed some were used by our Allied Armed Forces during WWII.

The specific Ford Tri-Motor that is the centrepiece of this story first flew in 1929 and was owned by Eastern Airlines. For a period of time, from 1930 on, it was owned by Cubana Airlines and was based in Havana.



At left:
A Model T
Ford race
car (from
Australia),
the same
age as
the Ford
Tri-Motor.

signed for both comfort and appearance, and could be quickly removed to convert the Tri-Motor to a freight-carrying aircraft.

Passenger air travel was in its earliest stages and Henry Ford was well aware of how to demonstrate its advantages. One of the things he did was to have very prominent, well-known people fly in Tri-Motors and then let North America know the convenience these people experienced.

Thirdly, Henry Ford brought construction efficiencies to the building of Tri-Motors (that the company would later bring to the building of WWII B-24 Liberators). The 1927 price was \$45,475 for a Tri-Motor, around \$740,000 in today's dollars.

Twenty-eight years later this author flew out of Havana, in a DC-4, fortunate to escape from the Cuban Revolution. He was looking forward to flying in an airplane that at one time flew in and out Havana.

Most Ford Tri-Motors were flown to their end-of-life, or wrecked and just abandoned. Because of their historical significance some of these Tri-Motors have been purchased and restored to static display or flying condition. CWH members can appreciate these efforts.

Ford Tri-Motors were built between 1926 and 1933. Significant numbers are 79 of the smaller 4-ATs, and 117 of the larger 5-ATs, plus a few experimental models to bring the total build number to 199.

Early 4-AT models were built with three identical Wright radial engines with around 220 horsepower each; they carried two crew and up to 12 passengers. Later model 5-ATs used three 420-horsepower Pratt and Whitney radials, and carried two crew and up to 17 passengers. 5-ATs had a maximum speed of around 150 mph, cruised at 90 mph, and had a range of 550 miles.

Its all-metal construction, simple control systems, three engines, and reasonable cost made it the “airliner of choice” until more modern airliners, like the DC-3, were developed in the mid-'30s.

And now it was my turn to fly in a Ford Tri-Motor, an aircraft whose production stopped before I was born – this one number 146 of 199.

My son Scott and I arranged a two-and-a-half day holiday around my Tri-Motor flight, Saturday morning and two Cleveland Indians baseball games Friday and Saturday nights. Flights operated from Carl Kellar Airfield, next to the Liberty Aviation Museum in Port Clinton, Ohio, on the southwest shore of Lake Erie.

The cost of a 20-minute flight, pre-booked, was \$70 U.S.

Scott and I were at the airfield well before the Tri-Motor's first flight at nine o'clock on Saturday morning. The drive from Cleveland took about an hour and a quarter. Just after we arrived a Grumman Avenger was brought out of a hangar, started up, unfolded its wings and took off.

As I watched it leave the runway I became more appreciative of the dedication, skills, and efforts of our CWH Avenger restoration crew. Some day we will watch their efforts come to completion as our CWH Avenger takes to the air.

Because I had pre-booked I was able to go on the 9 a.m. flight. Other than our CWH DC-3 this was the easiest vintage aircraft I've climbed into. However, there was just enough room for its nine passengers. Unlike our Lancaster or our DC-3, in which once the aircraft is safely airborne you can un-strap yourself and move around, in the Tri-Motor we remained in our seats, seatbelts on, for the whole flight.

• continued on next page



Museum's News Briefs



Photo courtesy of Eric Dumigan

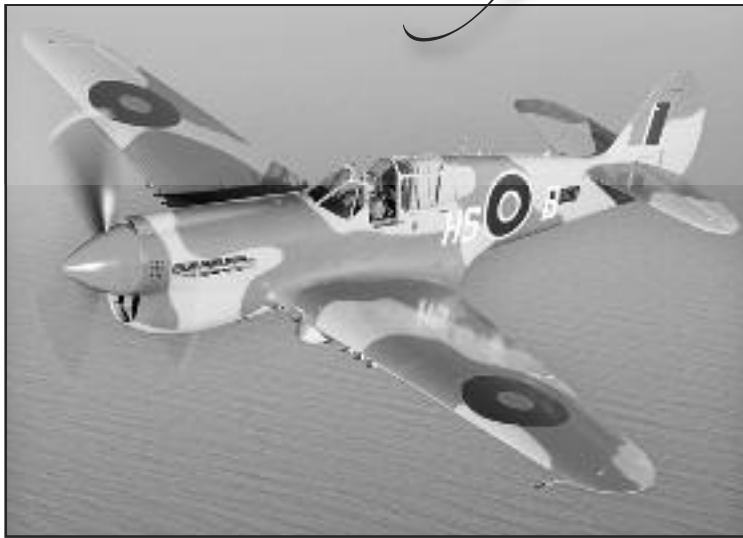


Photo courtesy of Gavin Conroy

SkyFest: June 20-21, 2015

For Father's Day weekend this year we offer an intimate event on the ramp at the Canadian Warplane Heritage Museum. Although not an air show, there will be flying throughout the day featuring all of the museum's flying aircraft with support from specially invited guests.

Confirmed are the P-51 Mustang and P-40 Kittyhawk from Vintage Wings of Canada, plus the Military Aviation Museum's de Havilland Mosquito, Supermarine Spitfire and Hawker Hurricane.

Discounted member rides in Canadian Warplane Heritage Museum aircraft including the Tiger Moth, Cornell, Chipmunk, Stearman and Harvard will be available all weekend long. Member upgrades to flights are available on first come, first serve basis except the Lancaster which will be by advanced reservation. Helicopter rides will also be available for purchase.

Ticket prices: Adult (age 16+) \$14.99; Child (age 6-15) \$11.99. Parking is \$4.99 per vehicle. SkyFest tickets are limited to only 2,000

tickets per day due to limited parking spaces. Purchase your ticket early as we expect to sell out. For additional information or to purchase tickets online, visit warplane.com.



Photo courtesy of Doug Fisher



Reunion of Giants: The Official Lancaster UK Tour Documentary

Suddenly SeeMore... Productions Inc. was contracted by the Canadian Warplane Heritage Museum to record last year's spectacular Lancaster trip to the UK. Their crew accompanied our flight crew for the journey.

Reunion of Giants documents this historic mission as it unfolds, through the eyes of the flight crews, veterans, friends and family — all part of the bombers' history, including this new chapter as VeRA crosses the Atlantic.

As of writing, TV release details were still being finalized. Following the TV release, an extended version will be available worldwide on DVD/Blu-ray (all formats). Ordering details are also still being finalized.

If anyone hasn't had a chance to view the three-minute trailer for *Reunion of Giants: The Official Lancaster UK Tour Documentary*, it can be found on YouTube: <http://youtu.be/50I2rem6d3g>.



Hamilton Airshow - August 15 & 16

Instead of a night show like last year, we move to a late afternoon start for the 2015 version of the Hamilton Airshow. The museum opens at 3:30 p.m. for this unique airshow event. Guests are immediately shuttled by bus to a large marquee tent located in the middle of the Hamilton International Airport right at the show line. Dinner follows shortly with a premium barbecue (cash bar available) as well as entertainment.

The three-hour flying show begins at 5:30 p.m. and features a unique blend of aerobatics, parachutists, jets and vintage aircraft.

The star attraction for the 2015 Hamilton Airshow is the world's only civilian owned Harrier! One of the most requested aircraft on the air show circuit, the Harrier is known for its vertical/short takeoff and landing (V/STOL).

We are also thrilled to present a unique and fast-paced formation air show act flying their four Yak 52s — "Yak Attack" — fly an intense display of pure quality.

• continued on next page

Tri-Motor

• continued from the front page

The interior, classy in the 1920's, was dated by today's standards.

Two of the engines on the Tri-Motor are mounted, well-braced, externally, one beneath each wing. Each passenger can see, only a few yards away, an operating engine. That offers an unusual impression; the engines are working very hard, but the aircraft is moving quite slowly. If you let your mind relax you may wonder what decade you are flying in.

As I was relaxing "flying in a different decade," I looked out to the ground and saw a giraffe looking up at us. Now I wondered if I might be flying over a different continent. (There is a tourist attraction — the African Safari Wildlife Park — very close to the airfield.)

As soon as the flight landed and the nine passengers got off, nine more climbed on. The pilot didn't even unfasten his seat-belt.

It was time for Scott and I to have breakfast. Attached to the Liberty Aviation Museum is the Tin Goose Diner — a 1950's-style stainless steel diner. Our breakfasts were nicely presented and served. As we sat enjoying them every 20 minutes we could see the Tri-Motor taxi in, unload, reload and taxi out for another flight. A '50s-style diner and a '30s-style aircraft — it was fun.

Next we visited the Liberty Aviation Museum. It was a traditional war museum with enclosed displays of books and records, maps, uniforms and pictures. It did have a number of different kinds of WWII military ground vehicles — from both sides.

One small display that caught my attention were two sheets of aluminum alloy, one corrugated. You were invited to touch both sheets to sense the strength corrugation gives a piece of metal.

There were two things that reminded us of our CWH Museum. One was a fully restored B-25J Mitchell, flight ready. The second was an airplane undergoing total restoration — in this case a Ford Tri-Motor.

The museum admission fee of five dollars seemed appropriate.

Around noon Scott and I left Port Clinton for Cleveland and baseball.

The Tri-Motor comes to Port Clinton for a week once a year. If you're not interested in baseball there are a number of tourist attractions around Port Clinton. There is a well-known chain hotel about a mile from the airport.

The Ford Tri-Motor is the property of the EAA Center in Oshkosh. It flies throughout the United States each year to offer people Tri-Motor rides.

I would very much recommend the experience.



Canadian Warplane Heritage Museum

Flightlines

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Fighter Night Run - June 19

This event is geared towards the photo enthusiast and features the P-51 Mustang and P-40 Kittyhawk from Vintage Wings of Canada and the Military Aviation Museum's Supermarine Spitfire and Hawker Hurricane for an exclusive night run-up.

Tickets limited to 100 at \$99.99 each. For information or to purchase tickets, visit warplane.com

**Already 75%
Sold Out (as of
March 10, 2015)**



Photo courtesy of Parr Yonemoto

News Briefs

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Hamilton Airshow - August 15 & 16

Many of the Canadian Warplane Heritage Museum's fleet of vintage military aircraft including the Avro Lancaster, B-25 Mitchell, Fairey Firefly, Westland Lysander, DC-3 Dakota, PBV Canso and the latest addition, a Noorduyn Norseman will be flying in the show.

Additional warbirds performing – from Vintage Wings of Canada – their P-51 Mustang and P-40 Kittyhawk. As well, the Military Aviation Museum will be displaying their newest Focke Wulf FW190.

No air show seems complete

these days without a jet truck so the Flash Fire Jet Truck will be rocketing down the runway right in front of you.

Aerobatics will be flown by Hamilton's own Trevor Rafferty in his custom-built Javelin. As well, Rick Volker's years of aerobatic performances in the Sukhoi have given Rick the ability to squeeze new, exciting manoeuvres that seem impossible out of his Harvard!

Ticket prices: Reg. \$124.99 - currently on sale for \$99.99 (includes parking, premium barbecue and three-hour air show). Air

show tickets are limited to 1,200 per day due to limited parking spaces. Purchase your ticket early as we expect to sell out.

For additional information or to purchase tickets online, visit warplane.com.

Note: The museum will also be open from 8 a.m. to 2 p.m. for viewing of the static aircraft. Regular Museum admission rates apply (tickets available at the door only).



Photo courtesy of Derek Mickeloff

Project High Flight

In Hamilton alone, there are over 12,000 students at more than 25 schools who cannot rely on supplemental assistance from parents or the community for student-funded educational field trips.

Since 2000, the Canadian Warplane Heritage Museum's Education Service's attendance has grown to more than 20,000 students from schools in Hamilton and the Greater Toronto Area. An average of 125 students are on site every day!

For Grade 6 in particular, we have created an exciting approach to the Ontario Science and Technology curriculum, specifically the Properties of Air and the Characteristics of Flight. Classes are held in an aviation environment with "classrooms" situated beside or under the museum's aircraft.



We now offer a new museum program that offers a rare source of inspiration, allowing Grade 6 students from inner city schools the chance to enjoy the same educational opportunities as their peers get to experience.

Providing accessible learning experiences to this group makes the Project High Flight initiative so important and you can make sure young students at these schools are not left out when their families cannot afford to support special educational opportunities for their children.

For additional information or to sponsor a class, visit warplane.com.



*From the desk
of the
President
and CEO*

As Canadians we have much to be thankful for, given the 148 year old history of our great nation. This year in particular we remember the 70th Anniversary of the Allied Victory in Europe and Japan, as well as, the tremendous duty, service, and sacrifice of our Veterans in order to preserve our freedoms and way of life.

We also will participate in the 75th Anniversary of the Battle of Britain celebrations at Ottawa this September and recognize the contribution of Canadians in that key air battle, which likely saved England from a pending invasion that could have changed the fate of the free world.

Apart from these very special celebrations and acts of remembrance, this year will also see the return of the Canso and Firefly to our skies, and the addition of a Norseman and Avenger to the museum's flying collection. Modifications and aircraft restoration work will also begin in earnest in preparation for the new C47 D-Day and RCAF veteran aircraft to join our operational fleet as well.

While 2014 was a great year for us on all fronts, I am very confident that during our 43rd year of operation that there will be many new initiatives and accomplishments realized by the museum family.

The continued successful preservation and presentation of our rich Canadian military aviation legacy, so that all generations of Canadians, both young and old, can experience and learn first-hand in some cases, about our great Canadian aviation heritage will remain at the core of our purpose.

We will also be holding a BCATP Fly-In event at the CWH Museum on Saturday, May 30 and our Member Ride "Skyfest" Father's Day Weekend on June 20- 21, as well as the CWH Hamilton Airshow on Saturday, August 15 and Sunday, August 16, 2015.

So please check out all the information at warplane.com on these and other exciting events planned for this year.

In closing I hope you will take the time this summer to "Come Fly with Me" as the "Chairman of the Board" used to sing!!

Looking forward to seeing you on the Flight Line!
Per Ardua ad Astra

— Dave Rohrer

Richard "RJ" Franks passes



On December 23, 2014, Rick "RJ" Franks passed away peacefully after a long illness. RJ was the second person to serve as the Canadian Warplane Heritage Museum's Chairman of the Board and CEO and the museum is greatly indebted to him for his leadership, support, guidance, and friendship, particularly during some prior challenging periods at the museum. "RJ's" passion at the museum was definitely flying the Hurricane.



CANADIAN WARPLANE HERITAGE MUSEUM

Spring Preview

NEW

BATTLE OF BRITAIN 75TH ANNIVERSARY • 1940-2015

NEW



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\$22.99



\$42.99

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Sizes: M-XXL, Colour: Navy heather



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Flygirl



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A second tour – sixty-five years later

By Ted Lowrey

Robert Roswell (Ross) Wilson enlisted in the Royal Canadian Air Force in September of 1942. He started aircrew training as a pilot at Oshawa, Ontario in April 1943, in a Tiger Moth. Indeed all his pilot training was in Tiger Moths.

After 12 hours of instruction he soloed. By the end of May he had 37.5 hours of flight time, of which 14 hours was solo flying. (More than 60 years later Ross, as a CWH member, flew in our Tiger Moth; and for the first time flew in our CWH Harvard and Stearman).

In July of 1943 Ross was re-mustered to train as a navigator on Ansons in London, Ontario. On Nov. 12, 1943 he was awarded his navigator wings and his commission as a Pilot Officer.

In February of 1944 he shipped out to England on the Andes – a flat bottom South Atlantic liner. Ross wrote that they spent six or seven days zigzagging across the Atlantic. The most apprehensive part of the trip was being anchored a full day off-shore from Liverpool waiting for their turn to dock.

After landing they went by rail to Bournemouth and then to Northern Ireland for further training. Training was started on Wellingtons and then on Halifaxs.

Ross was assigned to RCAF 434 Squadron, at Darlington-Croft, in Yorkshire. Flying Officer Robert Roswell Wilson flew a complete tour of Ops, (30 combat operations). His first Op was Essen, in the Ruhr Valley on Oct. 23, 1944. His last Op – number 30 – was against railway facilities in Hanover on March 28, 1945. All his Ops were with the same pilot, Pilot Officer Cy Ferris.

After his last Op he was assigned training and administrative duties. Ross flew his first 12 Ops in the Halifax. In 1944, December, 434 Squadron converted to the Lancaster, so Ross flew his last 18 Ops in Lances.

Their target destinations list cities often named in historic accounts about Allied bombing efforts in Europe – Cologne, Munich, Mannheim, Wiesbaden, Bonn, Hanover . . .

Their 22nd Op on Feb. 13, 1945 was a nine hour and 45 minute flight against Dresden. They were part of the “first wave of attack” that eventually destroyed the historic city of Dresden. (With the help of CWH member Ivan Sury this author has written about the raids on Dresden, published in the November, 2005, issue of *Flightlines*. It’s a story that can be written in many different ways).

The Op on which they faced the most danger was their 3rd, on Nov. 1, 1944 to Oberhausen in the Ruhr Valley, in a Halifax. Approaching the target they were coned by enemy searchlights. The nose of the Halifax was hit by flak. The aircraft was damaged. The bomb aimer, the flight engineer, and Ross the navigator, were injured. Wireless operator Douglas Martin was killed.

The bomb aimer was blown back under



Members of Ross Wilson's crew (Ross is pictured third from the left).



Pilot Officer Ross Wilson, 1944

Ross's seat; Ross gave him first aid. Pilot Cy Ferris continued on with the bombing run. Navigator Ross Wilson, though injured, plotted the return trip to England and a landing was made at an emergency aerodrome – Woodbridge.

Because the Op was successfully completed, in spite of the damage, injuries, and one death, the bomb aimer was awarded a Distinguished Flying Medal, and the pilot was awarded a Distinguished Flying Cross.

The crew was given a two-week leave to recover.

We know that crude humour is a technique that men often use to recover from a traumatic loss. Ross recorded that the flight engineer had received a wound/burn between his legs. The Medical Offi-

cer at Woodbridge after repairing his injuries told him “a few inches higher and the wife would have lost her wedding present”.

Flying Officer Wilson's last WWII flight in a Lancaster was April 17, 1945 (He then waited 61 years before he again flew in a Lancaster – the CWH Lancaster, on June 10, 2006, piloted by Sten Palbom).

He was discharged September 17th, 1945. It was time to come home to Canada, and return to civilian and family life. This he did with enthusiasm and great joy.

However, his trips to the cities he'd “visited” during WWII were not over. This time Ross Wilson and his daughter Joanne Weeks would plan the trip, pick the destinations and choose the activities.

The trip took place in July of 2010, and lasted three weeks – two in Europe and

one in England. They frequently used rail passes and there wasn't a set itinerary of seeing different famous sites. Joanne and her father would decide at night where to visit the next day.

The first and second week of the tour was spent in continental Europe. They traveled to seven countries, staying in cities Ross had “visited” during his 30 WWII Ops. Ross wanted to see some of the historic buildings he had seen so long ago, only from the air.

Some of the buildings had received little or no damage during WWII bombings – Ross enjoyed seeing these. Some of the buildings had received significant damage, but had been restored to their centuries-old original appearance – Ross also enjoyed seeing these.

Joanne told this author that undamaged buildings carried the “darkness of ageing.” Rebuilt buildings, or sections of buildings, were lighter in colour because of the use of fresh material. You could tell the difference.

Although the two Canadians visited many buildings their most poignant visit was to the main Cathedral in the city that was the target of Ross's 26th Op – March 2, 1945 – Cologne.

Ross clearly remembered that during the pre-raid briefing it was very much stressed that their target that night was the Cologne rail facilities, especially a railway bridge. But the bombing crews were to avoid the Cathedral, even though the railway ran close to it.

“Don't hit the Cologne Cathedral.”

Joanne and Ross took the train to Cologne. The railway station contained a small hotel, where they stayed. The next day they sat at a restaurant patio on square adjacent to the Cathedral. They had breakfast on the patio. They had lunch on the patio. Ross only wanted to look at the outside of the Cathedral.

Later in the day Joanne did persuade her father to tour the inside.

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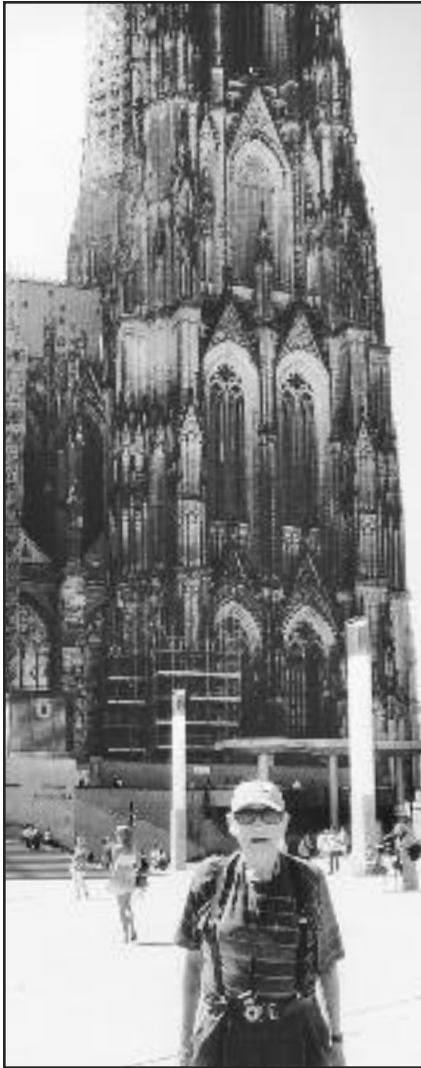
Ross Wilson, in 2010, enjoying a beverage in a British pub he had once visited during the Second World War.
Photos courtesy of Joanne Weeks

Hamilton Airshow
August 15 & 16
2015
Limited to only
1,200 tickets/day!

Vintage Wheels & Wings Show
2015
2015
2015
July 19
2015



Ross Wilson (above), in 2010, in front of the War Grave of his Wireless Operator, Douglas Martin, at Brookland Cemetery in England, and at right, by the Cologne Cathedral – which Ross had first seen from the air in March of 1945.



Second tour

Sitting on the patio, spending that day looking at the Cologne Cathedral, was the most emotional day of their trip. Joanne could understand how her father's mind was drifting back to 1945. This was the purpose of the trip – for both Ross and Joanne.

In England the places they visited were sites significant to Ross Wilson's WWII postings.

One day they went by taxi to the old airstrip – Darlington-Croft – where he had been stationed. The old airstrip had been converted to a racetrack. There were motorcycle races going on, but not on the main runway.

When the race organizers heard what the taxi driver told them about his special passenger, they cleared and blocked off the main runway and let the taxi driver, and his passengers, travel up and down the runway, so that Ross could imagine he was back

in a Lancaster building up ground speed for a take-off. Ross loved it.

English people have a wonderful gift of hospitality, and a great sense of military history, and they will do their best to honour the emotions and feelings of a military experience.

Another day Joanne and Ross visited Brookland Military Cemetery, south of London, to pay their respects to wireless operator Douglas Martin, the one member of their crew that was lost. They found a very large cemetery, beautifully maintained, and with a very helpful staff. They were directed to Doug Martin's grave. Much time was spent there, and pictures were taken.

Of course there were a number of pubs Ross visited while in England in WWII. He and Joanne found some of them.

(English pubs don't change

• continued from previous page

much over the years, and Canadians are always welcome. At least that was this author's experience when he stayed in Horsham a few years back).

Both Joanne's home and Ross's home were on the family farm in Glanbrook, close to the Hamilton airport where our CWH Museum is located. Each time our CWH Lancaster would fly over their houses Ross would run out the back door and salute the Lancaster, year after year.

In May of 2013 Ross's time on earth with his family and friends was over.

Later that month, on a Saturday morning, the Lancaster on one of its early season flights, flew over her house. Joanne ran out, like her father had always done, and saluted it. She continues to do so.

Our Lancaster and our other aircraft have reminded so many servicemen and servicewomen, and their families, of what they once experienced.

Thank you Joanne for sharing your father Ross's story with us.



Development Office update

By Pamela Rickards, Vice President - Operations

What an exciting start to the year here at our museum! We have had some very successful trade shows at our facility which has brought many new visitors to our museum.

We have, unfortunately, lost a few of our members and supporters over the last number of months and I would like to take this opportunity to say how much we appreciate the bequests that we have, and continue, to receive from people who consider Canadian Warplane Heritage in their planned giving.

These generous donations enable the museum to continue with our mandate to preserve and maintain this vital part of Canada's rich aviation heritage.

If you would like any information on planned giving, please do not hesitate to contact me or review the information available on our website, under the "About Us" tab on top and then the pull down tab marked 'Planned Giving.'

I would like to take this opportunity to thank all of you who have once again contributed to our "Keep us Flying" campaign this year. Your financial support is very important to us and is very much appreciated.

With the many events that are held here at the museum, I would like to suggest that you bookmark our website www.warplane.com and visit regularly to keep up-to-date on the happenings here at Mount Hope.

Our secure on-line shopping section can accept new memberships, membership renewals and donations electronically.

Canadian Warplane Heritage Museum is proud to recognize those supporters who have made significant contributions to our museum of the past few months and we are thrilled to add the following to our donor walls:

"Cornerstone" Major Donor Wall — \$100,000 +
David & Sally Rohrer

"Wings of Platinum" Major Donor Wall — \$50,000 - \$99,999
In Memory of William Thomas Beavin

"Wings of Bronze" Major Donor Wall — \$5,000 - \$9,999
In Memory of F/L H.F. Ewer, DFC, RCAF
Stackpole International

"Friends of Flight" Memorial Hangar Doors — \$1,000 - \$4,999
F.O. Robert K. Sheridan, 106 Squadron RCAF
James Douglas Black, Leading Aircraftman, RCAF

"Friends of Flight" Donor Wall — \$500
IPMS Hamilton
Major Ed Wood RAF 630 Sqn., Group 5 & wife Jackie M.
Bill and Joan Baxter
In Memory of Sgt. Austin Wilford Scott, Lancaster Mechanic, Bomber Command

Life Members now include:

Robert Fenn
Ron Gunter
Jean Oatman
Oliver De Lecq Marguerie
Ronald Schindler
Colin Lindsay
Mark Kent
Lawrence Acket
Francis C. Lotocki



In 2010, Ross was able to rediscover some of the pubs that he had first visited in March of 1944-45.



Operation Chastise

Bomber Command's attack on the Ruhr dams

(Part 1 of Operation Chastise was published in the November 2014 Flightlines)

By Alan Topham

Once approval was given for full-scale trials, a Wellington BIII was modified by Vickers to accommodate four 4-foot-6-inch diameter spherical bombs code named Big Highball.

After ground balancing and spinning tests of smooth and dimpled examples, a flight test on Dec. 2, 1942 with four welded steel mock-ups rotated to maximum rpm using the plane's hydraulic system was successful.

Two days later, the Wellington, now modified to spin two spheres, dropped them but they broke up on hitting the water. Reinforced smooth and dimpled bombs were badly damaged when released from 60 feet at top speed. Better results were obtained in January 1943 when wooden spheres were dropped from over 40 feet at about 280 mph and back-spinning at nearly 500 rpm.

At this point, the code name was changed to Upkeep to avoid confusion with the testing of the 3-foot-10-inch diameter Highball for naval use.

Wallis presented another paper entitled Air Attack On Dams in January 1943 and the following month an Air Ministry meeting gave permission for one Lancaster to be modified for the Upkeep bomb.

Vickers handled the attachment arms and the weapon while Avro took care of changes to meet Type 464 Provisioning Lancaster.

His threatened resignation from the project when told by Vickers that their work was to be stopped due to other commitments was avoided when the Chief of the Air Staff said Upkeep must take priority over Vickers' design work on their four-engine Windsor bomber project. Every effort had to be made for the attack to be in 1943, before May 26 because falling water levels in the dams would make the attack less effective.

Three Lancasters were provided for trials, followed by a further 27, later cut back to 20, to be delivered by May 1 for operational use. Squadron X, commanded by Wing Commander Guy Gibson, was formed at Scampton, Lincolnshire, on March 17 from 5 Group aircrews and renumbered 617 Squadron (motto "Après Moi Le Deluge") nine days later.

Full-size drawings of Upkeep had started in February 1943. Calculations of its size were based on an explosive charge against a 1/50th scale model of the Mohne using construction details which were published in the German technical press in 1913, and a live test in July 1942 using a 500-pound submarine mine which breached a redundant dam in Wales.

These tests had indicated a contact charge of 7,500 pounds of the explosive Amatol then in general use by Bomber Command would be required, but Torpex, 30% more powerful than Amatol, was approved; this decreased the charge to 6,600 pounds which was contained in a steel



The Mohne dam early May 17 taken by a 542 Squadron Spitfire.

cylinder 50 inches in diameter, 62 inches long, fitted with three standard Admiralty pistols set at 30 feet, and a delay self-destruct pistol that was armed on release from the aircraft.

Steel bands retained wooden cladding on all but the drive and bearing ends, giving a barrel-shape with a maximum diameter of 80 inches.

The first modified Lancaster arrived at Scampton on April 8 and used for further trials. Several drops of inert bombs were made at various heights and speed but the casing repeatedly shattered on impact with the water even when released from 50 feet; however, the 3/8-inch thick steel cylinder ran on and bounced for up to 700 yards.

The cladding was therefore removed overnight from the stock of Upkeeps; the bomb would be cylindrical, weigh 9,250 pounds, back-spinning at 500 rpm, released at 60 feet and a speed of 232 mph.

A live test in the North Sea was made on May 13; the Upkeep bounced seven times over about 800 yards, sank and detonated. An unarmed version proved the bomb would not explode should it happen to be jettisoned 'safe' in an emergency.

Operation Chastise was on and Bomber Command was informed on May 15th to attack the Mohne, Eder and Sorpe dams at the first suitable opportunity.

The Attacks and Aftermath

Nineteen aircraft took part in Chastise, a first wave of nine with the Mohne as the primary target, a second wave of five to attack the Sorpe, and a reserve for the Diemel, Ennerpe and Lister dams as secondary targets or as directed during the operation.

Eight aircraft crashed (six to flak, two hit power cables) with the loss of 53 aircrew killed and three taken prisoner, nine returned without Upkeep (one was torn off the low flying aircraft over the Zeider Zee) and two returned with Upkeep (one after flak damage, the other due to navigation problems).

Of the other 16 Upkeeps expended, 11 were aimed at targets, three were lost with aircraft downed by flak, and two with those that hit power cables.

Target details are:

Mohne - five bombs, three hits (one struck the shoreline, the other



Two direct hits on the crest and some near misses after a Tallboy attack on the Sorpe. Two anti-torpedo nets and several barrage balloons are just visible.

was dropped late and skipped over the dam). Over half of the retained water cascaded through the 75-metre breach; this was repaired by late October 1943, ready for autumn rains but capacity had been reduced by almost 50%. The power station was rebuilt in 1955.

Eder - three bombs, two hits (one released too early). The 70-metre wide breach released about 2/3 of the water. Temporary repairs by October 1943 gave reduced capacity until permanently repaired in 1947. The downstream valley was wider than that at Mohne and flood damage was consequently less.

Sorpe - two non-spinning Upkeeps dropped conventionally, close to the shoreline from 60 feet. The self-destruct pistol fired and the explosions made craters below the water adjacent to the crest. No breach.

Ennerpe - One Lancaster was directed to bomb this dam and, in poor visibility, attacked after identifying the target by its profile. The dam was not breached. Post-war recovery of bits and pieces of bomb from the Bever Dam, of similar profile and about five miles away, suggest that this, not the Ennerpe, had been attacked.

Upgraded defences around these and other dams included barrage balloons plus 88mm and more 20mm anti-aircraft guns.



The breach in the Mohne on the morning of May 17. The power station has gone.

The wave of water from the Mohne, the backbone of the Ruhr water supply system, was initially eight feet high at over six metres per second. Together with that released from the Eder, hydro and electrical installations of great economic importance, water purification plants, railway lines, roads and bridges were destroyed or damaged.

Loss of life – both civilian and foreign workers – was, according to German reports, 1,294, of which 476 were German.

Thousands of Todt workers were transferred from the Atlantic Wall to repair the damage.

The German bomb disposal organization recovered the virtually intact Upkeep from one of the Lancasters that crashed after hitting power lines and circulated detailed drawings of it nine days after the attack; these were used by CWH's woodworking group to make the museum's replica. Data on Highball and Upkeep were kept secret until 1962.

Concurrently with the development of Upkeep, Barnes Wallis had, at Bomber Command's request, produced a report in June 1943 detailing a deep penetration 12,000-pound bomb to be dropped from 18,000 feet; it was a scaled down version of his earlier 10-ton bomb.

The MAP-approved 4,000-pound trial and 12,000-pound operational bombs were code named Tallboy small (S) and medium (M) respectively. Tallboy large (L) at 22,000 pounds became Grand slam.

Tallboy trials showed the need to strengthen the casing, and offset the four tailfins to spin the bomb and give it stability. Lancaster bomb doors were bulged to accommodate the 12,000-pound version.

On Oct. 15 1944, 18 Lancasters from IXB 9 Squadron each with a 12,000-pound Tallboy, made a daylight attack on the Sorpe from 15,000 feet down to 10,000 feet approaching from the air side of the dam. There were two direct hits on the crest and three on the earth bank.

Although not breached, the dam was partially drained for repairs. All aircraft returned to base.

An unexploded bomb was retrieved from the water side in December 1958 and its three delay pistols safely removed.

Sufficient Torpex for 100 Upkeeps had been made available but the weapon was never used again and the remaining stock, minus the delay pistol, was dumped at sea.

By the end of WWII, 854 Tallboys and 41 Grand slams had been dropped on various targets, all in Europe.

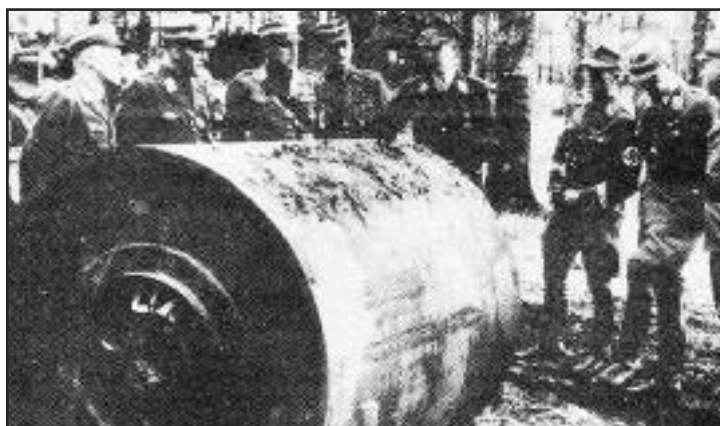
Ref: 1) *A Hell of a Bomb* (2002) ISBN 07524 2386 X

2) *Bombs Gone* (1990) ISBN 1 85260 060 8

3) *IX (B) Squadron Association's TABS No. 30* (2012)



A Lorraine loads a Tallboy from the dump onto its special trolley.



At left: The Upkeep recovered from Lancaster AJ-E that struck power lines near Haldern-on-Rhine, Germany. All the crew perished.