

THE BOMBER COMMAND MUSEUM OF CANADA



Dave Birrell



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The Nanton Lancaster Society is a non-profit, volunteer driven and managed society that is registered with Revenue Canada as a Charitable Organization. Formed in 1986, the Society has the goal of honouring those who served with Bomber Command and the British Commonwealth Air Training Plan during World War II.

The Society established and operates the Bomber Command Museum of Canada in Nanton, Alberta, Canada which is located 75 kilometres south of Calgary, Alberta.



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The Canadian involvement in the tremendous effort and sacrifice that was Bomber Command is commemorated at the Bomber Command Museum of Canada.



BOMBER COMMAND

During the 1930's few would have foreseen that Britain would be as isolated and vulnerable as it became in 1940. Indeed, few people today understand how threatened the future of the entire free world was. The situation for the beleaguered island at this point in its history was bleak indeed.



Offshore was an enemy-held continent, and that enemy was bent on conquering the British Isles. The British army had been defeated in France, supplies from North America were being cut off by the enemy's fleet of submarines, and Britain was suffering from heavy air attacks.

Furthermore, although Canada had declared war on Germany one week after the British declaration, the United States continued to remain neutral and showed little indication that it would become involved.

Faced with this situation during the summer of 1940, British Prime Minister Winston Churchill threw his support behind the defensive power of the Royal Air Force's Fighter Command and the development of Bomber Command with the words,



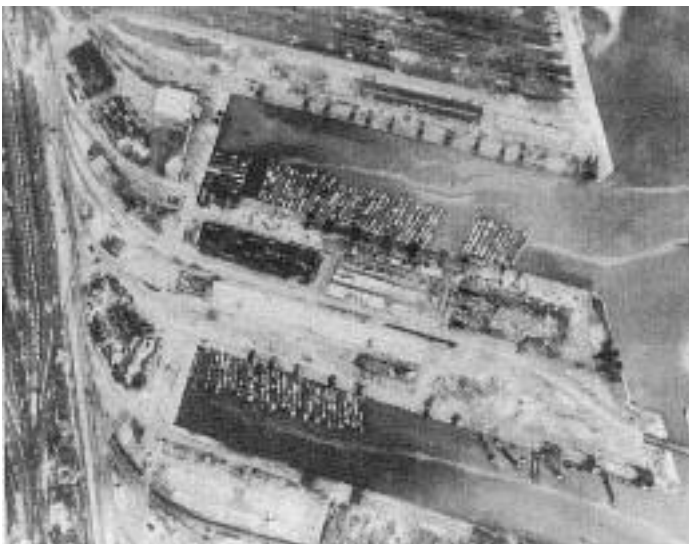
Winston Churchill watches a Short Stirling take off. The Stirling was the first of Bomber Command's four-engined aircraft to become operational.

"The Navy can lose us the war, but only the Air Force can win it. Therefore our supreme effort must be to gain overwhelming mastery in the air. The fighters are our salvation, but the bombers alone provide the means of victory." With this decision a massive effort was begun towards the production of heavy bombers and the training of aircrew to fly them.

This bomber offensive mounted by the Royal Air Force, the Royal Canadian Air Force, and the air forces of other Commonwealth countries has been described as the most continuous and gruelling operation of war ever carried out. It lasted for some 2000 days, and for 4.5 long years, while the world waited for the tide slowly to turn, Bomber Command offered the only weapon capable of waging war against Hitler's European fortress.

Bomber Command took the offensive from the war's early stages, demonstrating to the world that Britain and the Commonwealth did not intend to acquiesce to the totalitarian regimes.

The twin-engined Blenheim, Wellington, Whitley, and Hampden bombers ranged far over Europe during the early years of the war, their crews suffering great hardship from frostbite and enemy action. Following terrible losses during daylight raids, it was forced to operate at night. Navigation was by a compass, the stars and "dead



During September 1940, these Nazi invasion barges were being readied in occupied French ports.



A 408 Squadron RCAF Hampden bomber landing on a grass field during the early years of WW II.

reckoning," using airspeed and assumed wind directions. This often resulted in limited success locating and accurately bombing targets.

Early successes included the destruction of many of the invasion barges assembled in French ports, thus making an attack on the British Isles less likely. During August 1940, Bomber Command played a pivotal role in the war when, after bombs were dropped on London, Churchill ordered Bomber Command to attack Berlin. Hitler was furious and retaliated in force against British cities rather than continuing to focus on the destruction of the RAF and its airfields. This allowed Fighter Command to recover and eventually win the Battle of Britain. Hitler then was forced to abandon his plans to cross the channel and invade.

In 1942, growing numbers of the powerful, four-engined Stirlings, Halifaxes, and Lancasters with their huge bomb capacity, great range, and



420 Squadron RCAF Wellington crew



Arthur Harris (left) chatting with crewmembers of a Halifax bomber following their rescue from the North Sea after spending sixteen hours in a dinghy. Bomber Command aircrew held their commander in high regard.

electronic navigational equipment started to become available and Bomber Command became a more effective force. As well, the Americans had joined the Allied effort and by 1943 their presence was becoming significant.

Under the command of Marshal of the RAF Arthur T. Harris, new tactics were initiated. These involved tightly compressed, narrow bomber streams calculated to swamp enemy defences. The creation of a marker force, the Pathfinders, led to more accurate attacks. Bomber Command's efforts became, what Hitler's armament minister, Albert Speer, called "the greatest battle that we lost."

For much of the war, Bomber Command was the only direct way of taking the fight to the enemy. Throughout the war, for the British and for the occupied peoples alike, the bombers droning across the night skies were a symbol of hope as well as of growing might.

The Allies were under great pressure by the Soviets to invade occupied Europe and create a second front. The efforts and successes of Bomber Command made it possible to resist these pressures until a successful invasion was much more likely.

Although primarily directed against the industrial capacity of Germany, Bomber Command was also prominent in the mining of enemy waters that denied the enemy the use of much of the

Baltic Sea, the "Dambusters" raid, the sinking of warships, preparation for the D-Day invasion, the destruction of V-1 flying bomb and V-2 rocket sites, and pin-point attacks on Gestapo headquarters.

The enemy mounted a massive effort to protect itself from Bomber Command and this, in turn, deprived their army and air force of vital men and equipment. Seventy-five percent of their heavy anti-tank guns, manned by 900,000 soldiers, had to be used as anti-aircraft guns, scattered all over Germany because it could not be predicted where the bombers would strike next. Enemy factories had to concentrate on producing aircraft which were used in a defensive role. This, in turn, deprived the Nazi army of air-support.

Bomber Command's efforts took the fight to the enemy. It created a second front that bled off resources from the Soviet campaign in the east and it diverted massive amounts of resources and manpower from the enemy's primary combat endeavours. It dealt telling blows to Nazi industrial infrastructure and it paved the way, through the destruction of Germany's air defences, transportation network and petroleum resources, for the eventual D-Day invasion.

As with attacks by the Nazis on European and British cities and by the Americans on Japanese and European cities, significant civilian casualties were an unfortunate result of Bomber Command raids. During the war, there was overwhelming public support for Bomber Command's operations.

For those who flew with Bomber Command, the following tribute was written by Sir Arthur Harris, Marshal of the Royal Air Force, and the man ultimately responsible for sending them into battle, night after night, "There are no words with

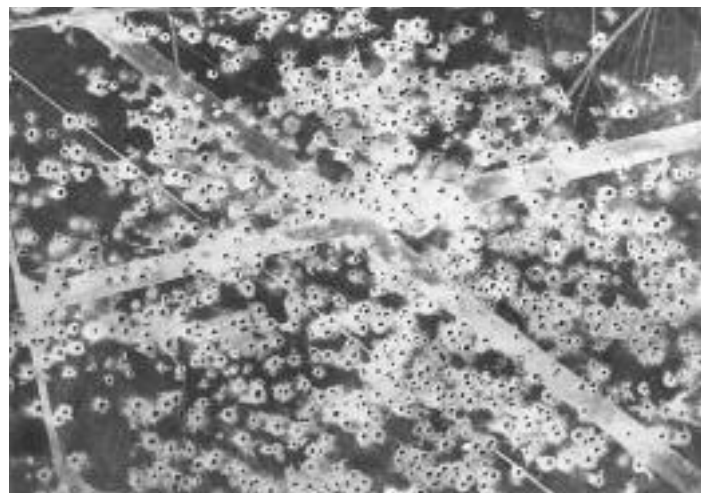
which I can do justice to the aircrew who fought under my command. There is no parallel in warfare to such courage and determination in the face of danger over so prolonged a period . . . It was, moreover, a clear and highly conscious courage, by which the risk was taken with calm forethought . . . It was, furthermore, the courage of the small hours, of men virtually alone, for at his battle-station the airman is virtually alone. It was the courage of men with long-drawn apprehensions of daily 'going over the top'. Such devotion must never be forgotten!"



A Nazi factory at Essen following a Bomber Command Raid.



A Nazi synthetic oil plant destroyed by Bomber Command



An enemy airfield following an attack by Bomber Command

A Typical Raid



07:00: Day is beginning for the 2000 ground staff at a Bomber Command station. The target for the next night has been received, in code of course, as has other information such as bomb loads and timing over the target.

08:00: At the far end of the airfield, armourers roll out the huge 4000 pound bombs and smaller 500 pounders and mount them on trolleys, ready to be towed out to the aircraft. Others pack the cases of incendiaries that will surround the high explosive bombs when they are winched into the bomb-bay. Other armament crews feed tens of thousands of cartridges into the ammunition boxes which will service the gun turrets. At the fuel dump, oil and fuel tankers, or "bowsers," are filled. It will be mid-afternoon before the fueling of the two squadrons' bombers is complete. In the dispersal areas, mechanics rigorously check engines, instruments, radios, and electrical, oxygen, and hydraulic systems.

11:00: The station commander and his staff check weather forecasts and plan the night's operation, preparing for the briefing. In the locker rooms, personnel of the air force's women's division prepare parachutes and the other equipment and clothing required by each of the 252 airmen. As well, women are also responsible for driving trucks and towing tractors.

14:00: The aircrew gather in the briefing room, sitting together facing a stage, upon which a map with the target is hidden behind a curtain. The C/O pulls back the curtain to reveal the target. The crews receive their information including precise courses, known defences, tactics to be employed, timing, operating altitudes, permissible radio



frequencies, and weather forecasts.

16:00: The bomb loads are now in place. Armourers insert the ammunition belts for the turrets. The last of the bombers is fuelled and the mechanics make their final checks. Following the traditional pre-operational meal of bacon and eggs, the crews are issued their flying gear,



escape kits, and parachutes.

17:00: Then begins the wait which was so hard on the nerves. This probably is the most trying time of the whole raid. Smoking a last cigarette, crews are driven out to their aircraft which are dispersed around the perimeter of the field. They go through their long, pre-flight checklists. They know that of the thirty aircraft about to depart, it is likely that two will not return.

18:00: As daylight fades, the 144 engines come to life, one by one. It literally shakes the earth. The thirty-six aircraft taxi to the end of the



runway and the take-off run starts. It is a nerve-wracking affair for the crew as the aircraft strains to lift its full load of bombs and fuel. From that take-off until they return, they are entirely on their own. Other bombers are rarely seen, although their turbulence is often felt. Then comes the long haul, climbing as fast as possible in order to be at the correct height, as ordered at briefing, by the time they reach the enemy coast. In the hope of overwhelming the defences, the bombers travel in a "stream" of numerous aircraft, very close together and travelling the same course, accepting the danger of mid-air collision.

Warned of the bombers' approach by radar, the enemy's batteries of ground-based searchlights and radar-controlled anti-aircraft guns are ready. "Illuminators" fly above the bomber stream dropping strings of parachute flares to assist the German fighters not equipped with onboard radar. The aircraft may be attacked by fighters at any time.

The bombers' best defense is cloud and darkness. Their .303 calibre guns are no match for



Luftwaffe Ju 88 fighter with radar equipment mounted on the nose



A Halifax with its wing tanks on fire



A Bomber Command aircraft is hit by flak and explodes with the loss of seven airmen.



Over the target

the 20 mm cannon of the Luftwaffe night fighters. The crew of a badly hit bomber has a one-in-five chance of escaping. The G-forces of a diving or spiralling aircraft are often overwhelming as the aircrew attempt to reach their stowed parachutes, clip them on, and make their way to an escape hatch.

22:00: The climax of every trip is the "run" over the target, often through searchlights, the burst of anti-aircraft shells, and too often a tremendous, mid-air explosion or a long, thin, stream of fire hurtling towards the earth -one of the bombers going down. The bomb aimer, spotting the red, green, or yellow target indicators dropped by the Pathfinder Force to mark their target, guides the pilot for the final few minutes of the bomb run. All the time, the flashes from the gun muzzles of heavy flak batteries can be seen as the guns fired –then came the wait of a few seconds, approximately 12 to 17 seconds, and finally the thud and blast of air as the shell explodes near

you. Often you can smell the fumes from the shell explosions as you fly through the spot where the explosion took place a second before. The aircraft lifts 100 feet as its load is released. Then the doors are closed and the weaving to avoid fighters begins again as the aircraft turns for home. However, the crew remains vigilant for the entire flight. Even in the landing circuit, bombers have fallen victim to enemy intruder aircraft.

02:00: The English coast, often treacherous with its low-lying fog, is sighted often after nine hours in the air. Ground crew anxiously wait for "their" aircraft. Stiff and weary, the airmen climb into the waiting truck and head for the debriefing hut. There, fortified with coffee and rum, they go through the necessary questioning about the night's events. Another operation has been successfully completed. One more day of war is over.



Following a mid-air collision, this Halifax was somehow flown back to base but without the bomb aimer and navigator who were in the nose section

The Strain of Flying with Bomber Command

*-from "A Thousand Shall Fall" by Murray Peden DFC
(re-printed with the permission of the author and Stoddart Publishing Co. Ltd.)*

Each time I found myself on the battle order the ordeal of waiting - an ordeal punctuated by the ritual of air test, briefing, and flying meal - seemed intensified, the muscles of the abdomen hardening until they felt like the extended ribs of a miniature umbrella. The tension would ease briefly as we finally got started and raced down the runway on takeoff, then it returned with redoubled force as we approached hostile territory, to reign supreme and worsen progressively as the trip wore on. Time moved with the glacial slowness that overtaxed nerves can occasion, making operational flying an exacting test of nerve and self control.

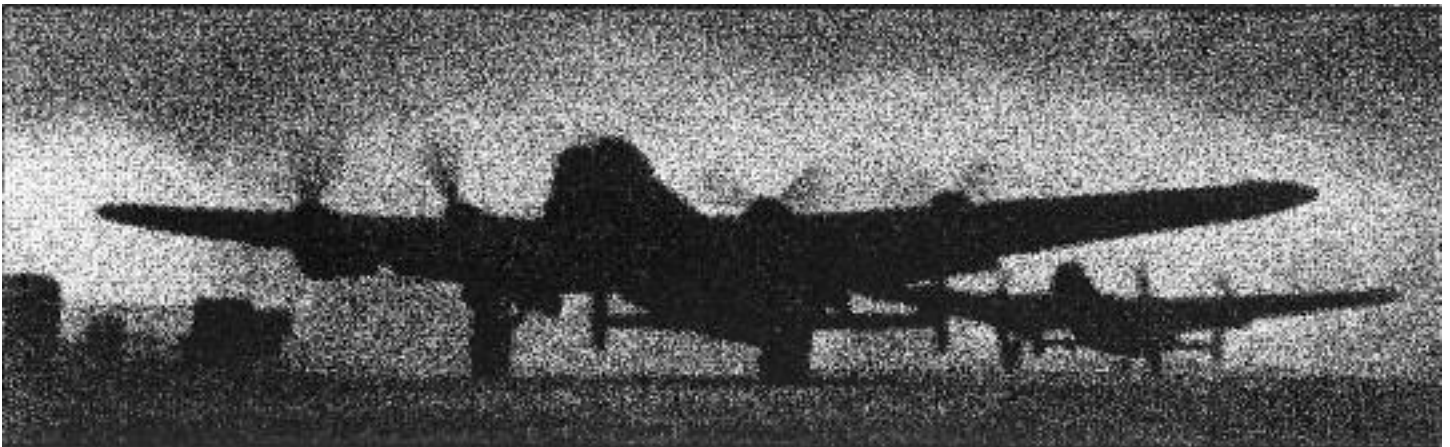
To a person wanting to visualize how intense the strain could become, how suppressed fear could swell and gnaw inside, I offer the following as a comparison, perhaps easier to imagine than the unfamiliar surroundings of a darkened bomber cockpit framed in faintly luminous dials.

Imagine yourself in a building of enormous size, pitch black inside. You are ordered to walk very slowly from one side to the other, then back. This walk in the dark will take you perhaps five or six hours. You know that in various nooks and crannies along your route killers armed with machine guns are lurking. They will quickly become aware that you have started your journey, and will be trying to find you the whole time you are in the course of it.

There is another rather important psychological factor: the continuous roar emanating from nearby machinery. It precludes the possibility of your getting any audible warning of danger's approach. You are thus aware that if the trouble you are expecting does come, it will burst upon you with the startling surprise one can experience standing in the shower and having someone abruptly jerk open the door of the steamy cubicle and shout over the noise.

If the killers stalking you on your walk should happen to detect you, they will leap at you out of the darkness firing flaming tracers from their machine guns. Compared with the armament they are carrying, you are virtually defenseless. Moreover, you must carry a pail of gasoline and a shopping bag full of dynamite in one hand. If someone rushes at you and begins firing, about all you can do is fire a small calibre pistol in his direction and try to elude him in the dark. But these killers can run twice as fast as you, and if one stalks and catches you, the odds are that he will wound and then incinerate you, or blow you into eternity.

You are acutely aware of these possibilities for every second of the five or six hours you walk in the darkness, braced always, consciously or subconsciously, for a murderous burst of fire, and reminded of the stakes of the game periodically by the sight of guns flashing in the dark and great volcanic eruptions of flaming gasoline. You repeat this experience many times -if you live.



Bomber Command's Losses

Bomber Command operated for 2000 days and flew almost 400,000 operations.

12,330 Bomber Command aircraft were lost.

**Of the 120,000 airmen who served, 55,573 were killed,
8403 were wounded, and 9838 became Prisoners of War.**

Of those killed, 10,250 were Canadians.

Their average age was twenty-two.

**During 1943, the chances of a Royal Canadian Air Force Halifax crew
surviving their tour of thirty operations was 16%.**

The successes of Bomber Command were purchased at terrible cost. Of those who were flying at the beginning of the war, only ten percent survived. Even those who began their service after D-Day (June 6, 1944) suffered almost fifty percent losses. The loss rate was comparable only to the worst slaughter of the First World War trenches. The only group with a higher loss rate during WW II were Nazi U-Boat crews.

Canadian pilot and author Murray Peden recalled, "The crews faced formidable odds, odds seldom appreciated outside the Command. At times during the great offensives of 1943 and 1944, the short-term statistics foretold that fewer than 25 out of each 100 crews would survive their first tour of thirty operations. On a single night, Bomber Command lost more aircrew than Fighter Command lost during the entire Battle of Britain. Yet the crews buckled on their chutes and set out with unshakeable resolution night after night. They fell prey to the hazards of icing, lightning, storms and structural failure, and they perished amidst the bursting shells of the flak batteries. But by far the greatest number died in desperately unequal combat under the overwhelming fire-power of the tenacious German night fighter defenders.

"Yet despite the chilling odds, the flow of volunteers never faltered. The price was known to be enormous, but it was a price which continued to be paid with unquestioning courage. If today it represents a debt which can never be repaid, it is at least a debt which must never be forgotten."

**"All your operations were planned with great care and skill.
They were executed in the face of desperate opposition and appalling hazards,
they made a decisive contribution to Germany's final defeat.
The conduct of the operations demonstrated the fiery, gallant spirit
which animated your aircrews,
and the high sense of duty of all ranks under your command.**

**I believe that the massive achievements of Bomber Command
will long be remembered as an example of duty nobly done."**

-Winston S. Churchill (in a post-war letter to Arthur Harris)

The Canadian Contribution

Although several hundred Canadians were serving with Bomber Command at the outbreak of war as part of the Royal Air Force, Canada's involvement was one that grew as the war progressed. Through the training of large numbers of aircrew in Canada by the British Commonwealth Air Training Plan, the number of Canadians serving in the air war increased dramatically and members of the Royal Canadian Air Force played a major role.

Canadians played a major role in all aspects of Bomber Command, both operationally and in terms of leadership.

In October of 1942, 6 Group of Bomber Command was created to be completely manned by Canadian officers and men and by the end of the war it had grown to fourteen squadrons. 405 Squadron RCAF finished the war serving with 8 Group RAF, the Pathfinder Force. Despite the creation of 6 Group, thousands of Canadians continued to serve in Royal Air Force Squadrons, both in RAF and RCAF uniforms and approximately one third of all Bomber Command aircrew were Canadians.

The Canadian Squadrons were based at airfields in the vicinity of Lincoln and York with the exception of three squadrons which were temporarily posted to North Africa in 1943 to assist with the invasion of Sicily and Italy.

The RCAF's effort reached its peak in 1944 when 25,353 sorties were flown. In total, 6 Group flew a total of 40,822 sorties. 271,981 hours were flown, a total of 126,122 tons of bombs were dropped, and 814 aircraft lost. Eight thousand decorations for bravery were awarded to 6 Group aircrew.



ROYAL CANADIAN AIR FORCE BOMBER SQUADRONS AT THE END OF THE WAR, THEIR NICKNAMES, AND BASES

405	(City of Vancouver)	Gransden Lodge
408	(Goose)	Linton-on-Ouse
415	(Swordfish)	East Moor
419	(Moose)	Middleton-St. George
420	(Snowy Owl)	Tholthorpe
424	(Tiger)	Skipton-on-Swale
425	(Alouette)	Tholthorpe
426	(Thunderbird)	Linton-on-Ouse
427	(Lion)	Leeming
428	(Ghost)	Middleton-St. George
429	(Bison)	Leeming
431	(Iroquois)	Croft
432	(Leaside)	East Moor
433	(Porcupine)	Skipton-on-Swale
434	(Bluenose)	Croft



One of the RCAF's most highly regarded pilots and leaders, Group Captain John Fauquier DSO & 2 Bars DFC was the Commanding Officer of 617 Squadron, the legendary Dambusters, when their Lancasters were dropping the 22,000 pound "Grand Slam" earthquake bombs.



425 Squadron Royal Canadian Air Force

BOMBER COMMAND AIRCRAFT

Avro Lancaster

The Lancaster evolved from the Avro Manchester that first flew in 1939 and served with operational squadrons early in the war.

Even before it flew on operations, the designer, Roy Chadwick, realized that it had serious shortcomings and made plans for a major modification. He added twelve feet to the wingspan and replaced the two troublesome Vulture engines with four of the proven Rolls-Royce Merlin V-12's. The result was the Lancaster which made its maiden flight in January 1941 and became operational the following year.



Avro Manchester

Lancasters first flew operationally in March 1942. It had speed, ceiling, and lifting power that no other aircraft of the day could match. Weighing 36,900 pounds empty, it was capable of taking off with an additional 33,100 pounds -in other words, it could almost carry its own weight again.

The Lancaster's massive bomb bay stretched for 33 feet and, unlike other bombers, was one continuous uninterrupted space. For this reason, the Lancaster had the versatility to undertake raids with large, specialized weapons.

Of the 7377 Lancasters built, 3932 were lost in action. Lancasters flew a total of 156,000 sorties and dropped 608,612 tons of bombs.

Sir Arthur Harris, wartime chief of Bomber Command, wrote that the Lancaster was, "The finest bomber of the war! Its efficiency was almost incredible, both in performance and in the way it could be saddled with ever-increasing loads without breaking the camel's back. The Lancaster far surpassed all the other types of heavy bombers. Not only could it take heavier bomb loads, not only was it easier to handle, and not only were there fewer accidents than with other types, the casualty rate was also consistently below those of other types."



A Canadian-built, 426 Squadron RCAF Avro Lancaster Mk X. 430 Lancasters were built by Victory Aircraft Ltd. in Malton, Ontario.



The Lancaster's wing spars were within the fuselage allowing for a huge, unimpeded bomb bay but creating a significant obstacle for the aircrew.

Handley-Page Halifax

The Halifax became operational in November 1940. All but five of the fifteen RCAF Squadrons were originally equipped with Halifaxes. The Canadian squadrons flew Halifaxes on most of their operations.

In its multi-role capability, the "Hali" was unchallenged. In addition to its work as a bomber, it was also employed as a glider tug, and maritime reconnaissance aircraft. Nine squadrons of the RAF's Coastal Command utilized the Halifax for anti-submarine, meteorological, and shipping patrols.

This great aircraft acquired the affectionately bestowed nickname of "Halibag."



Short Stirling

The first of the four-engined bombers to fly, the prototype Stirling took to the air in May 1939, becoming operational in February 1941.

The largest of the British-built heavy bombers, the Stirling rendered great service and was said to have been second to none as a sturdy and dependable aircraft. When it was introduced during the darkest days of the war, it also served as a morale-building symbol of Britain's growing aerial offensive power.

During the autumn of 1943, the Stirling's loss rate was much higher than those of the Halifax and Lancaster and the aircraft was removed from bombing operations early in 1944. However, Stirlings continued to serve by mine-laying, electronic countermeasures, completing agent/supply drops over Europe, and as a glider tug.



Vickers Wellington

When the war began, the only aircraft available to Bomber Command were twin engined and included the Vickers Wellington, Armstrong-Whitworth Whitley, Bristol Blenheim, and Handley Page Hampden.

The "Wimpey" featured a geodetic form of construction and was the RAF's most formidable bomber when war was declared. It participated in reconnaissance operations on the first day of the war and attacked German warships on the second. Five and one half years later, its last operation was a raid to Northern Italy in April 1945. Wellingtons served in several other roles, including that of being the primary aircraft at Bomber Command Operational Training Units, as a night-fighter, convoy protection, and the detection and exploding of magnetic mines.



Bristol Blenheim

Just one minute after the war began, a Blenheim flew the RAF's first sortie, a photo-reconnaissance operation. The next day, Blenheims were bombing enemy warships. Squadrons were based in France in the early months of the war and other squadrons based in Britain were assigned to intercept enemy shipping. Blenheims contributed to Bomber Command's offensive operations over Europe for almost two years before they were replaced by superior aircraft.



Handley-Page Hampden

Eight squadrons of Hampdens were operational at the beginning of the war and were in action immediately, raiding enemy naval installations and ships. However, they were unable to protect themselves from enemy fighters. Casualties became so heavy that the Hampden was taken off operations, re-equipped with better armour and armament, and then used only at night.



Armstrong-Whitworth Whitley

Designed for night operations, Whitleys were in action over Germany from the first night of the war during which they dropping leaflets over the Ruhr Valley. They served widely during the early years of the war, participating in the first raids on Berlin and Italy in 1940. In 1941, they were used in the first paratroop operation of the war over southern Italy

Having played its part with Bomber Command, the Whitley bowed out of front line operations in April 1942. However it continued to serve with training units, Coastal Command, and as a glider tug.



De Havilland Mosquito

Its sleek, wooden design, together with lightness and lack of any defensive armament or armour, allowed the Mosquito to travel at speeds in excess of 400 mph to avoid enemy fighters. Yet it could deliver the same bomb-load to distant targets as the heavily armoured, four-engined B-17 flown by the American Air Force.

Mosquitoes played a major role with the Pathfinders, the Bomber Command group that used flares to mark the targets for the main force aircraft.



BOMBER COMMAND ENGINES

Rolls-Royce Merlin

A British design, the legendary Merlin is a supercharged, liquid-cooled, V-12 engine with a capacity of 27 litres. Production began in 1936 and when war broke out, the Merlin was an in-production, and reliable engine.

A series of rapid developments brought about by wartime needs markedly improved the engine's performance, The Merlin 224's that power the Lancaster produce 1620 hp.

The Merlin was used in forty aircraft but is primarily associated with the Spitfire, Hurricane, Lancaster, and the Mosquito.

When war broke out, the British immediately sought to establish a production line outside the U.K. The Packard Motor Car Company was selected to take on the job and the first Packard-built Merlin ran in August 1941.

The Merlin powered more Bomber Command aircraft than any other engine. Almost all the Lancasters built were Merlin powered as were all the Mosquitoes and a large percentage of the Whitley, Wellington, and Halifax bombers.



Bristol Hercules

The Hercules was first produced by the Bristol Engine Company of England in 1939. It is a 14 cylinder, two-row, supercharged, air-cooled, radial engine with a displacement of 38.7 litres. The Hercules I developed 1375 hp. As the war progressed, the engine was modified such that the most widely built version, the Hercules XVI, was able to deliver 1650 hp.

The engine's design employed sleeve valves in which a machined sleeve fits between the piston and the cylinder wall where it rotates from side-to-side and slides up and down within the cylinder. As it does so, ports in the side of the sleeve align with the cylinder's inlet and exhaust ports at the appropriate stages in the engine's cycle.

Bomber Command aircraft powered by Bristol Hercules engines included all of the Short Stirlings, most of the Wellingtons, the Lancaster Mk. II's, and later model Halifaxes.

The engine was also used on the Bristol Beaufighter, a highly successful night-fighter, fighter-bomber, and torpedo bomber.



BOMBER COMMAND AIRCREW

A four-engined bomber crew numbered seven -a pilot, flight engineer, navigator, wireless (radio) operator, bomb aimer/front gunner, mid-upper gunner, and rear gunner. The earlier twin-engined bombers had a crew of three to five, the Mosquito, only two.

Almost all were very young, a man of twenty-five would likely be referred to as the "Old Man" or "Grandpa." They were of different ranks, came from all walks of life, and often from more than one country. However, they quickly bonded together to form a very special, tightly-knit crew. This bond was based on mutual trust, dependence, and shared experiences –both terrifying ones in the air and enjoyable ones while off duty.

This camaraderie was crucial to maintaining morale and efficiency in the air. Most felt that their crew was one of the best in Bomber Command. They generally spent many of their off-duty hours together as well as the first day or two of a leave.

The bomb-aimer's compartment was situated in the front of the aircraft at a level below that of the main cockpit. Lying on his stomach and looking through the bomb sight out the large perspex blister, the bomb-aimer would guide the aircraft to the target and release the bombs by



Quentin Snow (centre) and his crew following the completion of the thirtieth and last operation of their tour that included nine trips to Berlin. They were extremely fortunate to have survived.

calling orders to the pilot such as, "Right, steady, left, left, steady . . . bombs gone." The bomb aimer had the additional responsibility for manning the front gun turret that was positioned directly above him, although this was not necessary on most operations.

As well as flying the aircraft and regardless of rank, the pilot was always in command of the



Bomb Aimer



Pilot

aircraft and it was he that had to make decisions in sudden emergencies -a huge responsibility for an airman, many of whom were as young as nineteen, and had never driven a car. There were no co-pilots on almost all Bomber Command aircraft. On many, a single piece of armour plating was placed behind the pilot's head, the only armour in the aircraft.

Seated to the right of the pilot was the flight engineer. He assisted the pilot on take-off and landings by handling the throttles. During flight, he was constantly checking his panel to monitor fuel and pressure gauges to assess engine performance and fuel consumption from the aircraft's wing tanks. As well, he had to be prepared for any emergency caused either by enemy action or mechanical/electrical malfunction. Although flight engineers were generally trained to fly the aircraft "straight and level" they had no formal pilot training and hoped that they would never have to try to land the aircraft.

The navigator worked in a curtained off compartment so that the light he required would not give away the presence of the bomber to enemy fighters. Few navigators had the time, or the inclination, to leave their station during a raid. They were constantly plotting the aircraft's course and making adjustments for wind and other factors, having to know the aircraft's position at all times, regardless of adverse weather or enemy



Navigator

action. As electronic navigational aids were developed, the navigator's work load became even greater.

In addition to his duties related to the radio equipment, the wireless operator was also expected to have a working knowledge of the navigator's equipment, understand the aircraft's electrical and intercom systems, and administer first aid as necessary. As well, he was generally on



Flight Engineer



Wireless Operator

duty as a lookout in the astrodome in the event of contact with enemy fighters and over the target. The astrodome was a dome shaped piece of perspex which protruded above the aircraft's fuselage in order that the navigator could take star shots to assist with navigation.

The mid-upper gunner and rear-gunner completed the bomber crew. The rear gunner was particularly cramped in his turret. Some had to place their flight boots into the turrets before climbing in, and then put their boots on.

At night and at 20,000 feet, the temperature in the turrets frequently fell to minus

forty degrees and frostbite was common. Both air gunners were extremely vulnerable, alone and separated from the rest of the crew, and in the coldest part of the aircraft. They continuously scanned the night sky for enemy fighters from the moment of take off until the aircraft landed, sometimes ten hours later.

Their most important duty was to spot the fighter and instruct the pilot to take evasive action. When this occurred the fighter generally broke off the contact and looked for another bomber with less alert air gunners. If they did engage an enemy fighter, although they could fire lots of shells, they were of small, .303 calibre whereas the attacking fighters had 20 mm, and in some cases, 30 mm cannons.

Of the 2500 personnel who were housed on a wartime Bomber Command station, only ten percent were aircrew. Dozens of others were required to prepare each bomber for flight and the ground crew were most appreciated by the aircrew.

Generally working outside, the conditions were often windswept, wet, and cold. Their contribution to the successes of the effort cannot be overemphasized. The ground crew took immense pride in "their" aircraft and would joke that they were only "loaning" the bomber for a few hours and that the aircrew were "not to break it."

But it was the ground crew who wept for the missing aircrew as they waited through the long, cold nights for their bomber to return. It was a sad time when most of the bombers had returned and their dispersal stood empty. Some ground crew lost ten or more bombers.



Mid-upper Gunner



Rear Gunner



Ground Crew

SPECIAL OPERATIONS

The Dams Raid

The problem of how a bomber-delivered weapon could breach a major dam was solved by Dr. Barnes Wallis, who developed a 9250 pound cylindrical weapon which, when released at an altitude of 60 feet while rotating backwards at a rate of 500 rpm, would skip along the surface to the dam, roll to a point near the base, and then explode, causing shock waves which would crumble the dam.

A special squadron led by Wing Commander Guy Gibson was created. The crews were hand-picked and began training for low-level, night operations. The problem of how to determine when the aircraft was at an altitude of precisely sixty feet was solved by installing two spotlights on the aircraft whose beams crossed at a distance of sixty feet.

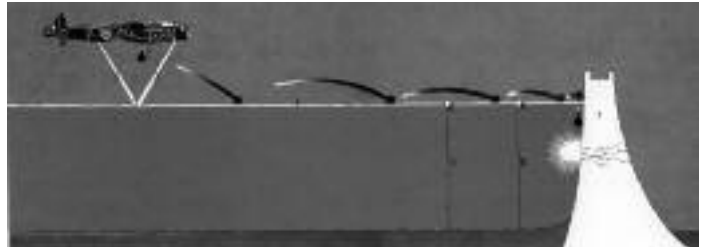
The Lancasters flew at extremely low altitude, beneath power lines at times, to reach the dams. The Mohne and Eder Dams were breached but the Sorpe Dam, of a different construction, was not.

The Dambusters' Raid was the most brilliant tactical air attack of the war but the success was achieved at great cost. Eight of the nineteen Lancasters failed to return, 53 aircrew were killed, and three others survived but were taken prisoner.

The destruction of the dams caused widespread flooding and interrupted industry, communications, and various utility services. As well, the enemy was forced to redeploy troops and weapons, and to repair the dams.

Perhaps the most significant consequence of the raid was the effect it had on the morale of the British and their allies. It provided a timely psychological lift for the allied side which had had its back to the wall for almost four years.

As in all Bomber Command operations, Canadians played a major role in the Dams Raid. Of the 133 aircrew involved, 30 were Canadian. Of these, 14 were killed and one became a Prisoner of War.



The breached Mohne Dam



The Canadians who returned from the Dambusters Raid

Sinking the Tirpitz

The German Navy's mighty 42,900 ton Tirpitz posed a grave threat to Allied shipping. Sister ship to the more famous Bismarck, the battleship carried a main armament of eight, fifteen inch guns. Her presence in a Norwegian fjord obliged the Allies to maintain a large fleet in northern waters to guard against her and repeated attempts were made by both the Royal Air Force and the Royal Navy to sink her.

These attacks were somewhat successful but little effect on the battleship's double layer of armour plate could be expected until British inventor, Sir Barnes Wallis, designed a special bomb for the job. He devised the "Tallboy," a 12,030 pound weapon capable of piercing the Tirpitz's armour plating.

Following two somewhat successful attempts, the final attack took place on November 12, 1944. The weather was clear as Wing Commander Willie Tait led the Lancasters over the last mountain and the fjord with the Tirpitz came into view. The battleship began to sparkle with flashes as the anti-aircraft fire rose to 14,000 feet.

The bombs were released and the crews waited thirty long seconds. A great yellow flash burst on the foredeck and the Tirpitz was seen to tremble as it was hit by at least two Tallboys. It then suffered a tremendous explosion as the ammunition magazine blew up and the Tirpitz capsized..

With the sinking of the Tirpitz, Hitler lost the last influential ship of his surface fleet and this marked the end of the Nazi's naval war in northern waters.



Operation Manna

In April 1945, the Canadian Army had liberated much of the Netherlands but 120,000 well armed enemy soldiers were cut off in the western part of the country. 3.5 million Dutch citizens were starving after four years of occupation, including the recent difficult winter.

Then on April 29th the Lancasters of Bomber Command arrived. Arie de Jong wrote, "There are no words to describe the emotions experienced on that Sunday afternoon. More than 300 Lancasters, flying exceptionally low, suddenly filled the western horizon."

The approaches to the drop zones were made at very low altitude in order not to damage the food as it was dropped in gunny sacks without parachutes. One Canadian pilot recalled, "flying by a windmill and people waved at us from its balcony. We had to look up to wave back!"

Operation Manna ended with Germany's surrender on May 8th. Although over 11,000 tons of food were dropped in the ten days of the operation, some 20,000 people had died of starvation.



BRITISH COMMONWEALTH AIR TRAINING PLAN

As the focus of a Commonwealth-wide effort to instruct aircrew, Canada made a major contribution to Allied air superiority during World War II. Referred to as the "Aerodrome of Democracy," Canada had an abundance of air training space beyond the range of enemy aircraft, excellent climatic conditions for flying, immediate access to American industry, and relative proximity to the British Isles via the North Atlantic.

Canada had been the location of a major recruitment and training organization during the First World War and Great Britain turned to it again when war began in 1939. To Prime Minister Mackenzie King, the scheme had the advantages of keeping large numbers of Canadians at home and avoiding the raising of a large expeditionary force. Canada agreed to accept most of the plan's costs, but insisted that the British agree that air training would take precedence over other aspects of the Canadian war effort. The British expected that their Royal Air Force would absorb Canadian air training

graduates as in WW I, but King demanded that distinct Royal Canadian Air Force squadrons be formed.

The construction of the training schools was a massive undertaking in itself. On the prairies, farmer's fields were transformed in a matter of a few months into operational schools. This involved the levelling and paving of runways, taxiways, and tarmacs, the building of several huge hangars and dozens of other buildings for accommodating, teaching, and providing other services to the young airmen, and the installation of electrical, water, sewage, and other services.

As well, an aircraft construction industry was developed to provide the thousands of aircraft necessary. As just one example of this, 2882 twin-engined Avro Ansons were built at factories in Nova Scotia, Manitoba, Ontario, and Quebec during the war.

At the plan's peak, 94 schools were operating at 231 sites across Canada, 10,840 aircraft were involved, the ground organization numbered 104,113 men and women, and three



BCATP instructor and student pilot



Student navigators

thousand trainees graduated each month. A total of 131,553 pilots, navigators, bomb aimers, wireless operators, air gunners, and flight engineers were graduated.

The first step for those who qualified for pilot training was a posting to an Elementary Flying Training School (EFTS). An eight week course involved all aspects of basic flight and navigation and about fifty hours of flying in the single engined "primary" training aircraft such as de Havilland Tiger Moths, and later in the war, Fairchild Cornells.

Successful graduates of an EFTS would be posted to a Service Flying Training School (SFTS) where students were expected to improve their navigational skills, master instrument and night flying, and participate in formation flying exercises. Most faced the challenge of adapting to larger, twin-engined aircraft such as the Avro Anson or Cessna Crane. Pilots who were judged to be suited to flying fighter aircraft flew the single-engined Harvard aircraft, much more powerful and demanding than the aircraft at an EFTS. Upon graduation from an SFTS, the pilot received his wings and was ready to continue his training at an Operational Training Unit (OTU), generally in Britain.

Other aircrew were assigned to BCATP schools devoted to their speciality such as navigation, wireless, and bombing and gunnery schools where a variety of aircraft were used in their training.

The presence of a BCATP base had a major effect on the nearby communities, not the

least of which was providing a sizeable economic boost for towns which had still not recovered from the depression of the 1930's.

The air force personnel were generally made welcome and participated with the civilian population in various sporting, cultural, and social events both on the base and off. Inevitably romances developed and the concluding report of the BCATP reported that more than 3750 Canadian girls had married members of foreign air forces who had been stationed in Canada.

With the massive presence in the country of the BCATP, the RCAF became the service of choice for tens of thousands of young Canadians and of the total graduates of the Plan, 55% were Canadians with the others being primarily Britons, Australians, and New Zealanders. As the war progressed, this major commitment to the air war overseas, and particularly to Bomber Command, inevitably exacted a very heavy toll in Canadian casualties during operations.



Billy Bishop VC pins wings on one of some 9000 Americans who joined the RCAF and trained in the BCATP prior to the United States entering the war.

"It was just marvellously well organized, a great credit to Canada. I don't think it could have been done anywhere else but in this country. We had a tremendous mixture of peoples from all over the Commonwealth. I don't know how it ever got organized from Ottawa, but it's always been a marvel to me how well it worked."

-Station C/O RCAF

The BCATP in Southern Alberta

The BCATP played a very brief but memorable role in the history of Alberta. Abruptly, it appeared on the scene, was very important for five years, and then just as quickly was gone, leaving behind dozens of abandoned airbases and derelict yellow airplanes in hundreds of farmers' yards.

For most of the war, 4 Training Command headquarters in Calgary was responsible for the schools in Alberta, B.C., and most of Saskatchewan. The legendary clear skies of this part of Canada undoubtedly played a role in the decision to locate so many bases in the province.

Although Nanton did not have a training station, it was surrounded by other towns that did and the appearance of aircraft was commonplace. Murray Peden recalls that he and his friend Francis Plate would enliven their solo training flights by, "arranging to meet over some town in the aerobatic area -usually Nanton- where we would proceed to take turns topping the other's performance."

LAC's Peden and Plate were training at 5 EFTS at High River, 25 km north of Nanton. Initially utilizing Tiger Moth aircraft, the station converted to Cornells for the latter part of the war.

At the Vulcan base, some 28 km east of Nanton, the BCATP operated 19 SFTS, and during the early years of the war, 2 Flying Instructor School. Another SFTS, No. 15, was located at Claresholm, 40 km south of Nanton. All across southern Alberta the daily appearance in the skies

of training aircraft with their distinctive "BCATP yellow" colour was a clear indication that the province was playing a significant role in the war effort.

Today, grass and tumbleweeds are slowly repossessing the runways which once bustled with planes as thousands of young men learned the basics of wartime flying. At some of the schools, such as Pearce northeast of Fort Macleod, all of the buildings have been removed and there are few indications of the former presence of the base other than the "Airport Dairy Farm," whose name probably leaves most passers-by wondering as to its origin. In other locations, such as Lethbridge, portions of the runways and tarmacs utilized by 8 Bombing and Gunnery School that trained air gunners and bomb aimers have formed the basis of the city's airports. Some of the hangars continue to house aircraft. The hangars and some other buildings at Claresholm are being used for various purposes including the construction of modular homes.

The Vulcan BCATP base is the most imposing and thought provoking. Located between Nanton and Vulcan, the isolated hangars remain very much as they were left by the BCATP in 1945, the huge structures looking like a movie set on the prairie. It is well worth a visit and it is generally possible to walk through one of the hangars and get a feeling for the effort involved in their construction, the massive timbers and cable reinforced truss system being most impressive.



Calgary stations 3 SFTS (left) and 10 Repair Depot (right) with the runways they shared in between. The road that connected the two stations is now Crowchild Trail. Note Glenmore Reservoir beyond.

Standing in the middle of one of these giant hangars, one cannot avoid reflecting on what it must have been like when they were a hive of activity, filled with aircraft being flown and serviced by men and women from various corners of Canada and the world who were playing their part in what was a massive international effort.



Tiger Moths at 5 Elementary Flying Training School in High River



The Warren Twins from Nanton graduated from 5 Elementary Flying Training School in High River



Abandoned 19 Service Flying Training School Hangar at the former RCAF Vulcan station



BCATP STATIONS IN ALBERTA

Elementary Flying Training Schools

- 5 (Lethbridge and High River)
- 16 (Edmonton)
- 31 (De Winton)
- 32 (Bowden)
- 36 (Pearce)

Service Flying Training Schools

- 3 (Calgary)
- 7 (Fort Macleod)
- 15 (Claresholm)
- 19 (Vulcan)
- 34 (Medicine Hat)
- 36 (Penhold)
- 37 (Calgary)

Flying Instructors Schools

- 2 (Vulcan, Pearce)

Air Observers (Navigators) School

- 2 (Edmonton)
- 3 (Pearce)

Wireless (Radio) School

- 2 (Calgary)

Bombing and Gunnery School

- 8 (Lethbridge)

LANCASTER FM159

The museum's aircraft (Serial No. FM159) is one of 430 Canadian-built Lancasters, having rolled off of the Victory Aircraft assembly line in May 1945. It was flown to England and placed in storage. But FM159 had arrived too late for the war and was never assigned to an operational squadron.

During the fall of 1945, FM159 was flown to Pearce, Alberta and later to Fort Macleod, Alberta where it was placed in storage. Because of its low air-time, it was chosen to be reactivated with the post-war RCAF. It was flown to Trenton, Ontario in August 1951 and two years later underwent extensive modifications by de Havilland in Dartmouth, Nova Scotia.

Lancaster FM159 became operational with RCAF Maritime Command at Greenwood, Nova Scotia where it served for two years with 103 Rescue Unit. Then, following further modifications, it was coded RX-159, and began flying with 407 Squadron based at Comox, British Columbia. As well as service on the west coast, FM159 made two trips to Britain to participate in anti-submarine exercises with NATO forces. It also flew ice reconnaissance flights in the Arctic, even landing at Alert, the northernmost point in Canada, after a 12.5 hour flight.

The aircraft's primary role was reconnaissance and anti-submarine patrols off the west coast but it was also utilized for search and rescue and other operations. One notable flight was a NORAD exercise when it snuck into the United States at low-level and made three



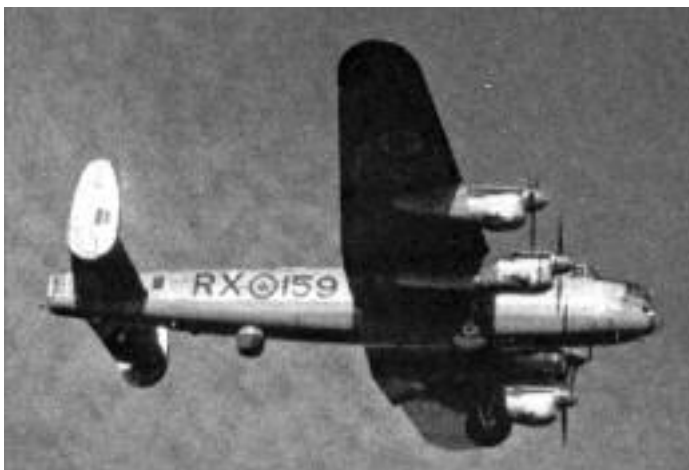
View of the B.C. coast from FM159's cockpit



407 Squadron Lancaster RX-159 taxiing for take off to Alaska

simulated bombing runs over Spokane before the USAF sent up a Sabre to see what was going on.

In 1958 the squadron was re-equipped with the Neptune and FM159 was flown to the former location of 3 SFTS training base in Calgary where it was "struck off strength." The following year a civilian crew flew the aircraft to the former 19 SFTS airfield 28 kilometres east of Nanton where it, and two others, were to be scrapped.



407 Squadron Lancaster RX-159 airborne



Nanton volunteers preparing Lancaster FM159 for its trip to Nanton in September 1960



Lancaster FM159 about to ford the Little Bow River en route to Nanton in 1960

After hearing of this, George White of Nanton wrote to Crown Assets regarding the possibility of obtaining an aircraft as a tourist attraction and a Memorial. Together with Howie Armstrong and Fred Garratt, Mr. White purchased FM159 for \$513 and, as the wheels were too far apart to use the roads, had it towed across the grain fields to Nanton. A fencing crew worked to prepare the way for the plane and a second crew followed, putting the fences back up. A bulldozer was required to fill in road ditches and at one point the strange procession had to ford the Little Bow River. After reaching Highway #2, about three kilometres north of Nanton, FM159 was towed into town and parked by the side of the highway.

Unfortunately, over the next six years, the aircraft suffered the theft of its instruments and virtually all the interior equipment, and vandals broke all of the plexiglass and fabric control surfaces.

Then, in the fall of 1966, Nanton resident Ray McMahon led a two year long effort to save what had become an eyesore rather than tourist attraction and Memorial. Harry Dwelle made a major contribution by fabricated tin coverings for



By 1966, engines and props had been installed but FM159 had been ravaged by vandals and thieves.



Ray McMahon with FM159 in 1968 after completing his work

the cockpit and gun turrets which kept the weather and the birds at bay. To protect FM159 from future thieves and vandals, it was placed on steel mountings, and a fence erected around it. George, Howie and Fred then donated the aircraft to the Town of Nanton.

FM159 was finally a presentable tourist attraction and Memorial and over the next 23 years, became an icon for the Town as millions of vehicles drove by within a few metres of her nose.

But although steps were being taken to keep up its appearance, virtually nothing was being done to tell its story, honour those who built, maintained, and flew Lancasters, or take advantage of what was becoming a valuable historic artifact.



Lancaster FM159 in 1970

S/L Ian Bazalgette VC DFC

FM159 has been dedicated to the memory of Squadron Leader Ian Willoughby Bazalgette VC DFC, a Lancaster pilot who was awarded the Commonwealth's highest award for valour for his actions during a raid in 1944. He was the only Albertan to be so recognized during WW II.



Ian Bazalgette was born in Calgary but received most of his education in Britain. He joined the Royal Air Force in 1941. After completing a tour of operations with 115 Squadron, "Baz," as he was known in the RAF, volunteered for additional combat service with the Pathfinder Force.

S/L Bazalgette's 635 Squadron Lancaster was hit by flak while approaching the V-1 Flying Bomb site that was his target. Both starboard engines were knocked out and the wing was set on fire. As the Master Bomber and Deputy Master Bomber had both been put out of action, it was up to Baz to mark the target for the remainder of the force. This he did but then the aircraft went into a violent dive.

S/L Bazalgette regained control but soon after, a third engine stopped running. He then ordered four of his crew to abandon the aircraft but chose to remain on board in an attempt to save the two others who were injured and could not jump. After taking care to avoid the small French village of Senantes, Baz managed to land the aircraft. Sadly, it then exploded and all aboard were killed. The surviving crew members evaded enemy soldiers and made their way to the allied forces. The story was told and the Victoria Cross awarded the following year. The citation stated that, "His courage and devotion to duty were beyond praise."

A Dedication Ceremony was held on July 27 1990. Mrs. Ethel Broderick, Ian's sister, unveiled a plaque and the markings of the Bazalgette aircraft (F2-T) were unveiled by Chuck Godfrey DFC, Baz's wireless operator on the VC flight, and George Turner, his flight engineer.



"Beyond Praise," a commissioned painting by Len Krenzler

Flight/Sergeant Larry Melling DFC attended the ceremony as well. He had joined 635 Squadron about a month after Ian. He clearly recalled being impressed by Baz on his first day at the squadron when he walked into the Flight Office, "He had a tremendous sparkle in his eye is the best way to describe it. He stood out amongst the people who were there. He was an inviting sort of a person, a person that you wouldn't hesitate to approach. He was always the first to volunteer for a job, no matter what sort of job it might be."

FM159's friends from 407 Squadron were represented in Nanton on this special day. The squadron's c/o, Lt. Col. Terry Chester, spoke at the ceremonies and a squadron Aurora aircraft performed a flypast.



Special guests at the Dedication: (l-r) George Turner, Ethel Broderick, Marion Hildebrand, Larry Melling, Chuck Godfrey

BOMBER COMMAND MUSEUM OF CANADA

The Nanton Lancaster Society

The Nanton Lancaster Society was formed following the Town of Nanton's suggestion in the fall of 1985 that perhaps a group could be formed to, "take care of the Bomber." At this time no one had been in the aircraft for eighteen years and virtually nobody in Nanton knew very much about Lancasters in general or FM159 in particular.

But a core group was formed and an inaugural meeting was held in March 1986. Various committees were formed and by May some Lancaster related artifacts were on display and Lancaster T-shirts and caps were for sale in the Tourist Information Booth next to the aircraft. The founding members had also made the decision that the best way to, "take care of the Bomber" was to have it become the centrepiece of an aviation museum –a rather ambitious undertaking for a community of fewer than 2000 people

1987 saw the first issue of the Society's newsletter which was sent to its five hundred members, a delegation from Nanton visited the Canadian Warplane Heritage Museum in Hamilton which was restoring a Lancaster to airworthy condition, and in May, the first "Open Bomber Day" was held. This featured public tours through the Lancaster and was most successful with long lines forming at a step-ladder leading to the cockpit. This was the first solid indication that the public was interested in the Lancaster and provided momentum to the museum project.

Guided tours of the Lancaster during the months of July and August began in 1988 which also saw the opening of a restoration shop and a Society float in the Calgary Stampede Parade.

During these early years, upwards of a



Recovering elevators and other Lancaster parts
dozen field trips were undertaken to nearby farms, whose owners in the late 1940's had purchased a Lancaster for \$300 so that its components could be made use of on the farm. During the 1950's, these aircraft were purchased from the farmers by a company interested in the aluminum. This was melting down, leaving whatever remained on the farm.

Numerous and varied parts including tires, undercarriage struts, turrets parts, and even crew door ladders had been left behind on the farms. Many truck loads of Lancaster parts and display material were acquired. The farmers were always quite happy to support the museum's efforts.

As well, the Society began to understand the significance of the BCATP. With plans of future restoration and displays, the remains of twin-engined Ansons and other training aircraft that had been sold to farmers after the war were collected.



"Open Bomber Day" -1987



The beginnings of the Bomber Command Museum of Canada -1987



FM159's port elevator after the windstorm. The elevators had been covered with tin after the original fabric was destroyed.

During a blizzard in February 1989, the port elevator blew off of the aircraft. This became a "blessing in disguise," as the Society made the most of the opportunity to demonstrate to its membership, the Town of Nanton, and the general public that a museum building was required if the aircraft was to be preserved and properly restored.

Throughout these early years of the Society's history, its members were becoming more and more knowledgeable regarding Bomber Command, and the BCATP. This increased the momentum and commitment as a need was seen to preserve an important part of Canadian military history that was not being addressed elsewhere.

With this in mind, an expanded display was opened in May 1989 and in the fall, a decision was made to begin fund raising for a museum building large enough to house the Lancaster.

The Beginnings of a Museum

The initial museum building was constructed in 1991.

FM159's tires had suffered the effects of thirty years of sunlight so before the aircraft could be taken down from its supports to be moved, the mainwheels and tires were replaced. The wheels and tires of the Lancaster that had been restored by the Canadian Warplane Heritage's Museum had been serviced and reconditioned for flight. However their plans changed and these wheels and tires became available for FM159. A trade was finalized that saw some of the Nanton museum's spare ailerons and flaps sent to Hamilton.

Finally, on a bright Saturday morning, FM159 was rolling again, this time towed by a farm tractor into her new home.



Nanton wartime Lancaster pilot, Joe English, was in the cockpit as FM159 was rolled into her new home.

Although it was definitely a good thing that the Lancaster had its building, it was sad to see walls being built on all sides of her. It would be twelve years before the tarmac was paved and doors were installed so that FM159 could be out in the sunlight again.

With the completion of the building, the Society's momentum continued to grow as more aircraft, vehicles related to the BCATP, artifacts, aviation art, and opportunities presented themselves. During 1998 a major expansion to the original building was completed, providing space for a library, additional displays, and storage. During 2002, the museum's main entrance was expanded and in 2007, another major expansion was added to the north.

It is important to note that the establishment and development of the museum has been accomplished through a massive volunteer effort involving many hundreds of individuals.



The moving crew with FM159 safely inside

The Restoration of Lancaster FM159



Lancaster FM159's cockpit in 1986

During the spring of 1986, a number of the new "Lancaster Enthusiasts" became curious and decided to see what it was like inside the aircraft. As the fuselage was explored by flashlight, it was found to be somewhat dusty but otherwise quite clean -not a single bird had been able to manoeuvre its way through the tin that had covered the broken perspex since 1967. The post-war modifications installed by the RCAF during the 1950's were still in place.

The cockpit panel and flying controls were most disappointing. Only one instrument remained in place and it had been smashed. The pilot's control yoke was missing and the four throttles and mixture levers had been bent over, broken off, and taken away. There was no equipment of any kind in the aircraft. The navigators/wireless operator's table had been made rotten by rainwater that had leaked in. It was clear that the interior restoration would be "starting from scratch."

Just five months later, first restoration project had been completed and the beautifully restored pilot's instrument panel was placed on display. A Society member had travelled to the UK,



Restored Lancaster instrument panel

picked up most of the instruments and other parts required, and then completed the job at his home in Lethbridge.

Regarding the extent of the planned restoration, ambitious goals were being set, the Society's first newsletter referring to, "the dynamic, taxable exhibit stage and beyond."

During 1987, the parts-gathering field trips around southern Alberta and beyond continued and a control yoke and throttle quadrant was acquired. As well, a bomb-sight arrived from the UK and Tim Mols, one of the lead AME's restoring Lancaster FM213 at the Canadian Warplane Heritage Museum in Hamilton, inspected FM159. He reported that not only was restoration to taxable status possible but that the aircraft could eventually be restored to flyable status.

With this in mind, particular attention was being paid to FM159's Merlin engines. They had been purchased at Fort Macleod and mounted on the aircraft in 1962 but were simply engines, with none of the ancillary equipment or necessary connections, etc. The Society's Fall 1988 newsletter reported that, "The engine crew boss had mated an auto oil pump to an electric drill. This set-up was plumbed into each engine in turn, to force inhibiting oil through all parts of the Merlins including the propeller hubs. The volunteer crew also removed the valve covers in order to visually monitor the oil reaching this area."

FM159's gun turrets continued to be a focus. A mid-upper turret had been acquired and arrangements were made whereby it was restored to operational use by a company that was



A first look at the Merlins



Looking down from the bomb aimer's position, shortly after FM159 had been rolled into the building and the tin covering the broken perspex had been removed.

producing a movie in Montreal. Then, three mid-upper turret domes were discovered in the UK and arrived courtesy of the Royal Air Force.

A derelict rear turret had also been acquired and during early 1992, a group of volunteers undertook to restore it to operational status. This was completed and FM159's rear turret was officially placed on display during the summer of the following year.

Other volunteers removing the sheet metal that had covered the fabric-covered ailerons and elevators and cleaned up the last of the broken plexiglass in the cockpit area.

During 1995, work began on the fabrication of the wooden ribs for FM159's elevators. Most of the ribs had been destroyed during the early 1960's when the aircraft was on outside display. The process of covering the elevators with fabric was begun.

The first work on the restoration of the engines began that summer as well. The starboard-inner was selected to begin with and



The restoration of FM159's canopy

various missing components were installed and some connections completed. These were the first steps to restore one of FM159's engines to runnable, but it would be another decade before the roar of a Merlin would be heard at the museum.

Of course, at this point it was not even possible for FM159 to be rolled outside as there was only a single, 22 foot wide door in place. But the potential was understood and the volunteers persevered.

The wooden rear canopy framework had deteriorated. It was braced and then removed so that a new one could be made. The tubular forward canopy framework was prepared for new plexiglass. This beginning of a focus on FM159's plexiglass also saw the installation of the plexiglass on the restored rear gun turret.

During 1999, British AME Ian Hickling checked FM159's Merlins to determine their status. He gave the engines a clean bill of health for future running.

Soon the major project of fabricating and installing the cockpit plexiglass was undertaken. The rear section of the canopy was completed the following year.

An experienced woodworker volunteered to build a new navigator's table. As it extended into the wireless operator's position, this led to the restoration of both the navigator's and wireless operator's positions with the placement of the wartime radios, navigator's instrument panel, and other equipment.

The summer of 2000 saw the first visible sign of FM159 coming to life when volunteers completed the necessary work on the port-outer



Engine restoration crew working on the Lancaster's starboard inner -the first of the four engines to run.

engine so that they could hook up a battery and spin the propeller.

This very visible event seemed to add momentum to the efforts to “Run the Merlins.” the museum’s engine crew began work in earnest to restore Lancaster FM159 to a state where the engines were runnable and the aircraft was taxi-able.

Another vital piece of the puzzle fell into place early in 2002 when four additional overhead doors were installed. When the tarmac was finally paved in the fall of 2003, FM159 was finally rolled out into the sunlight again, in much better shape than she had been in prior to entering the building.

The task undertaken by the engine restoration team was daunting, requiring perseverance, creativity, patience, and a long-term view. For one thing, all the work was to be done by volunteers, most of whom had full-time employment, and the group only got together on Tuesday evenings.

Wiring, fuel lines, and other connections had to be run from the cockpit, old instruments made functional, and many engine and ancillary parts acquired and reconditioned. The propellers required professional attention and specialized tools had to be made.

The goal of having the starboard-inner running for the summer of 2005 was set and met, coinciding with the Dedication of Canada’s Bomber Command Memorial on the front lawn of the museum.

As the engines were being restored, other systems on the Lancaster were being addressed. The hydraulic system was rejuvenated and the bomb doors and flaps became operational. The

pneumatic system was restored and FM159’s brakes were made serviceable again.

Then, on August 17 2013, 27 years and several thousands of volunteer hours after the cowlings were first removed in 1986 and the first volunteers began work on the engines, the roar of four Merlins was heard on the tarmac of the Bomber Command Museum of Canada.

The following year, FM159’s four Merlins were started as, by now, they had been several times before. But this time was different. There were no chocks or brakes holding her back and FM159 taxied for the first time since she was parked on the tarmac at the old Vulcan Aerodrome in 1959.



Four Merlins running on FM159 for the first time since 1959



FM159’s first Rolls-Royce Merlin started up in 2005



FM159’s first taxi run

The Museum's Aircraft

INTRODUCTION

The museum's aircraft collection focuses on telling the story of Bomber Command and the training plan that supported it. As well, we include aircraft that have a direct connection to citizens of Nanton who had noteworthy careers in the Royal Canadian Air Force..

AVRO LANCASTER

Clearly the centre-piece of the museum, Lancaster FM159 serves as an example of the four-engined aircraft flown by Bomber Command during the latter years of the war. It carries the markings of S/L Ian Bazalgette VC DFC, a Calgary-born pilot who was the only Albertan awarded the Victoria Cross during World War II.



BRISTOL BLENHEIM

The museum's Blenheim serves as an example of the twin-engined aircraft flown by Bomber Command during the early years of the war. It is dedicated to the memory of Barry Davidson, a Calgary pilot who was shot down on July 6, 1940, his first operation, and spent the remainder of the war as a Prisoner of War.



De HAVILLAND TIGER MOTH

The Tiger Moth was the most widely used basic trainer in the BCATP. Most pilots who trained prior to 1943 took their initial flights in this aircraft. One of two Tiger Moths in the museum collection, 1214 served at 5 EFTS in High River. Gordon Jones flew the aircraft as an RCAF instructor, later acquiring and continuing to fly this Tiger Moth until he was 90 years old. The aircraft remains flyable.



NORTH AMERICAN HARVARD

During WW II, the Harvard served as an advanced trainer at Service Flying Training Schools where pilots who had learned to fly on Tiger Moths or Cornells were prepared to fly fighters such as the Spitfire. The museum intends to dedicate the aircraft to S/L Joe McCarthy, the RCAF's "American Dambuster" who flew the aircraft during the 1950's.



FLEET FAWN

Serving extensively as a training aircraft, Fleet Fawns were flown by the RCAF from 1931 until 1947. #264 was delivered to the RCAF in 1938. It served at the Flight Instructor Schools at Camp Borden and Trenton. It has been restored to runnable status.



MESSERSCHMITT Bf 109

The Me 109 was the “backbone” of the Luftwaffe’s fighter force during WW II. It fulfilled multiple roles including bomber escort, fighter-bomber, day/night fighter, and ground-attack. This full-size mock-up features a working canopy and fully equipped cockpit with many original instruments and controls. Its presence enables the museum to better tell the history of Bomber Command.



CANADAIR TUTOR

Designed and built in Canada, the Tutor was used by the RCAF for basic pilot training from 1963 until 2000. 431 Air Demonstration Squadron, “The Snowbirds,” have been flying the Tutor since 1971. As well as being used for pilot instruction at 15 Wing Moose Jaw, Tutor #177 served with the Snowbirds for ten seasons. 431 Squadron flew Halifax and Lancaster bombers during WW II.



AVRO CANADA CF-100

The only Canadian designed and built combat aircraft to become operational, the "Canuck" played a critical role during the first two decades of the Cold War. #18152 honours Bruce Warren and his identical twin Douglas who were born in Nanton and fought together flying Spitfires during the war. Tragically, Bruce was killed in 1951 flying a CF-100 prototype due to an oxygen system failure.



CANADAIR T-33

For many years, the T-33 was the most widely used jet trainer in the world. The museum’s T-33 flew with the RCAF’s Advanced Flying School at Portage la Prairie, Manitoba from 1954 until 1967. Its markings and the Golden Hawks crest on its nose are those of a T-33 flown by W/C Jack Allan, a Nanton native who was the Commanding Officer of the Golden Hawks aerobatic team for three years.



BEECHCRAFT 18 EXPEDITOR

The RCAF’s version of the Beech-18 was known as the 'Expeditor'. It began service in 1943 being used for multi-engine training for pilots and to train navigators and radio operators. The museum’s aircraft served with the RCMP from 1946 until 1973. It was used primarily for the transportation of personnel and supplies but it also saw service in search and rescue work, anti-smuggling roles, and mercy flights.



De HAVILLAND MOSQUITO

Mosquito RS700 was designed as a high altitude photo reconnaissance aircraft. It was acquired by Spartan Air Services and was utilized to map numerous areas on Canada including the Arctic as well as parts of South America. The property of the City of Calgary, the aircraft is being restored to taxiable status by the Calgary Mosquito Society. It's presence in the museum provides visitors the opportunity to view three aircraft types that flew with Bomber Command.



AVRO ANSON

Although used primarily as a training aircraft, Ansons served operationally with the RAF in the early years of the war as a light bomber and coastal patrol aircraft. One of 2882 Canadian-built Ansons, the museum's aircraft (#7481), served with the BCATP at Fort Macleod and at Pearce, Alberta. It is currently under restoration to taxiable status.



FAIRCHILD CORNELL

During the spring of 1941, the Cornell was selected to replace the Tiger Moth and over the next two years become the primary RCAF trainer used under the BCATP. On warm days at some high-altitude training schools such as High River, the Cornell's performance was less than adequate with long takeoff runs being required. Cornell #14424 served with 32 EFTS at Bowden, Alberta. The aircraft is displayed in the condition it was acquired and awaits restoration.



WESTLAND LYSANDER

With excellent short and rough field performance, the Lysander could insert and remove agents from enemy occupied areas and retrieve Allied aircrew who had been shot down and had evaded capture. Canadian-built Lysanders were used primarily as target drone tugs at Bombing and Gunnery schools of the BCATP. The museum's aircraft is a 2/3 scale replica that has been flown.



FUTURE RESTORATION PROJECTS

The museum has also begun the restoration of a North American Yale, a single engined, fixed undercarriage, lower powered and lighter weight version of the well known Harvard advanced trainer. Yales served with the BCATP primarily at

Wireless Operator Schools. Other future projects include a Cessna Crane and Airspeed Oxford. Both are twin-engined aircraft that were used at BCATP Service Flying Training Schools as advanced trainers.

Aircraft Restoration

In 1988, just two years after the formation of the Nanton Lancaster Society, a restoration shop was set up in a borrowed building at the edge of Nanton. With the completion of the museum building in 1991, the restoration shop moved into a permanent and much larger facility. Following the 2007 expansion a separate engine shop became available to compliment a much larger general shop area.

The museum's restoration volunteers utilize as much of the original material as possible and work towards, where possible, restoring our aircraft to taxiable status.



Fleet Fawn shortly after it was donated to the museum



The restored Fleet Fawn's upper wing



This wing framework, together with numerous other components and engines that have been acquired, is the beginning of the re-building of a Halifax Bomber for the museum.



The Lancaster's Martin mid-upper turret was one of the first restoration projects



Numerous Ansons were collected in order to restore a single example



The interior, wooden structure of the Anson's 23 foot wide horizontal stabilizer. It will be covered with plywood and fabric.



A Bristol Bolingbroke leaving a Saskatchewan farm to be restored as a Bristol Blenheim bomber.



Working on the perspex gun turret dome for the Bristol Blenheim



The Anson's fuselage is made up of a steel tube framework that supports wooden stringers and formers. Eventually these will be covered with fabric.



The museum's wood-shop. Many of the aircraft under restoration have substantial wooden components.



The museum's engine shop includes specialized tools for working on our operational engines



Calgary Mosquito Society volunteers working on the Mosquito in the museum's north hangar.



The Lancaster's Merlin engines are often worked on during the winter months.



The museum has acquired a significant collection of Spitfire parts. This restored cockpit panel is the first step in the re-building of a Spitfire aircraft.

Museum Exhibits and Activities



The museum's BCATP exhibit area includes a large model of 5 EFTS High River.



A prized artifact is "Minnie Simcoe," who flew during WW II as a mascot with 431 Squadron. Prior to being placed on display in the museum, Minnie flew with today's 431 Squadron, The Snowbirds.



The history of Bomber Command



This display tells the story of the 10,000 Bomber Command aircrew who became Prisoners of War.



The story of the Dambusters Raid is told through display panels, artifacts, video, and artwork.



Numerous aircraft engines are on display including "cut-aways" that show the interiors.



Visitors may tour the interior of the Lancaster, beginning at the rear turret and then forward for a look into the cockpit section as in this photo. Cockpit tours are available during our special event days.



Visitors may enter the museum's full-scale Lancaster cockpit section.



A museum visitor "flies" a Lancaster utilizing one of the museum's flight simulators.



School and other groups regularly visit the museum to learn about aviation and history



The cockpit of the museum's Snowbird Jet is always available for photo-ops.

Library and Archives

Just as the museum's aircraft and displays focus on Bomber Command and the BCATP, so does the museum's library and archives.

As well as a highly specialized collection of both recently published and historic books and manuals, the museum has accumulated a large collection of historic documents and photographs.

The museum has been entrusted with a large collection of logbooks, medals, photographs, and other memorabilia that formerly belonged to Bomber Command airmen.

Based largely on material from our archives, the museum has published several books. Researchers, authors, publishers, and individuals interested in a family member's history are welcome to make use of this collection.

Aviation Art

The museum has impressive collections of over 200 pieces of aviation art, all of which pertain to the museum's focus. These include original paintings, several of which were commissioned by the museum, as well as valuable, signed, limited edition works. Some were painted by wartime aircrew and many others by highly respected, post-war and contemporary artists.



"Operation Manna" by John Rutherford



"North American Harvard" by Andy Kindret



"Beyond Praise" by Len Krenzler



"The First of the Ten Thousand" by John Rutherford



"Dispersal" by David Mould

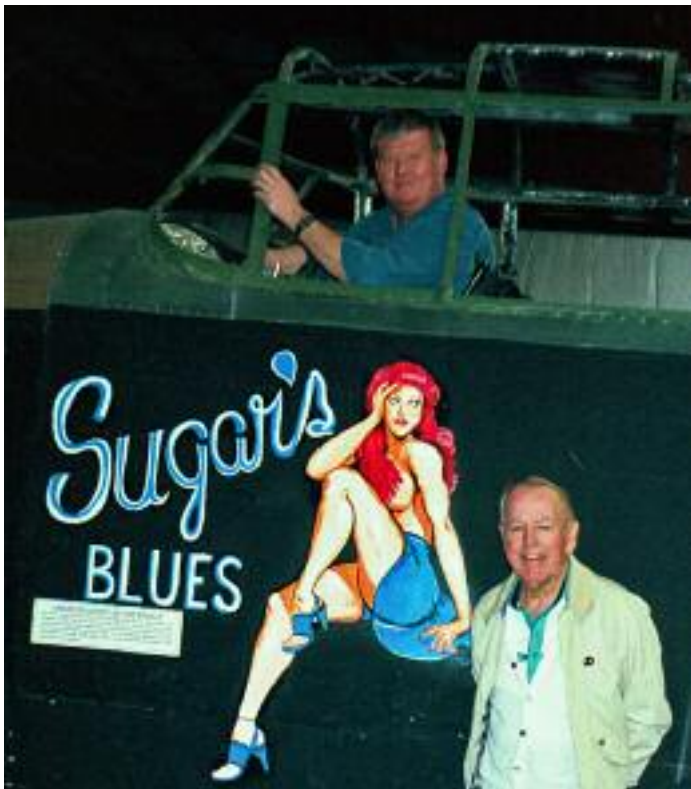


"Short Stirling" by Andy Kindret

Nose Art

During World War II, the personalization of an aircraft by giving it a name and painting an image on it began in the early months of the war, grew in frequency as the war progressed, and reached its peak in 1945. If a crew was assigned a particular aircraft they were often able to select the name and artwork and this enabled a powerful bond to develop between the men and their machine. Today, the artwork provides a window into the lives of these brave, young airmen.

The museum's collection includes sixty pieces of Bomber Command replica nose art. Our archives include a database of over two thousand photos of nose art, most of which were on Canadian aircraft.



"Sugar's Blues" with replica artist Clarence Simonsen and 428 Squadron nose artist Tom Walton



"Dipsy Doodle" -424 Squadron RCAF



"Johnny Walker" -9 Squadron RAF



"A-Train" -424 Squadron RCAF



"Bambi" -No. 424 Squadron RCAF

Special Events

Beginning in 1990 with the Dedication of Lancaster FM159 to the memory of S/L Ian Bazalgette VC DFC, the museum has regularly held special events to honour and draw attention to the history the museum presents as well as to special people and historic events related to Bomber Command and the BCATP. These events offer the opportunity to start up and operate the museum's aircraft and engines.



Ethel Broderick, Ian Bazalgette's sister, unveils a memorial plaque at the 1991 Dedication Ceremony.



In 1993, Dambuster pilot Ken Brown CGM and his wife Beryl attended the museum's Fiftieth Anniversary Commemoration of the Raid.



Royal Canadian Air Force aircraft and personnel regularly participate in the museum's special events.



Guest speakers at museum events include authors, historians, and military personnel.



Lancaster "Night-Runs" are always impressive.



“Bikes & Bombers” is a popular annual event.



The Fleet Fawn bi-plane “runs-up” at museum events.



The museum’s “Travelling Display” at an airshow.



The museum’s “Fly-In” attracts vintage aircraft.



Turning gas into smoke and noise with the Bristol Hercules engine is most impressive.



Visitors outside the museum following an engine run.



CANADA'S BOMBER COMMAND MEMORIAL

Prior to entering the museum, visitors walk past an impressive granite wall that lists the names of all the Canadians who were killed serving with Bomber Command. There are more than 10,600 names on the wall.

Engraved on the wall is the following tribute by Father John Lardie, 419/428 Squadron RCAF Padre.

"Three thousand miles across a hunted ocean they came, wearing on the shoulder of their tunics the treasured name, "Canada," telling the world their origin. Young men and women they were, some still in their teens, fashioned by their Maker to love, not to kill, but proud and earnest in their mission to stand, and if it had to be, to die, for their country and for freedom.

"One day, when the history of the twentieth century is finally written, it will be recorded that when human society stood at the crossroads and civilization itself was under siege, the Royal Canadian Air Force was there to fill the breach and help give humanity the victory. And all those who had a part in it will have left to posterity a legacy of honour, of courage, and of valour that time can never despoil."



**Canada's Bomber Command Memorial
Nanton, Alberta, Canada**



Winston Parker, 419 Squadron veteran and former Prisoner of War, pointing out the name of a friend.



A school group working together to count the names.



The crew whose photo is etched onto the Memorial is that of Robert Clothier (3rd from the right) who went on to play "Relic" in the CBC-TV series "The Beachcombers."



52 Squadron Royal Canadian Air Cadets