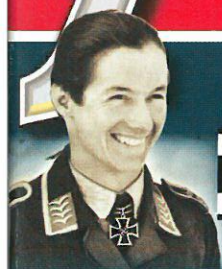


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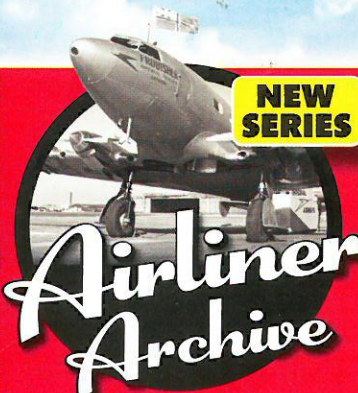
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Britain's
Schneider
engines



Hurricane
Pull-out Poster



HIDDEN HISTORY
Japanese
Balloon
Attacks!



EDITOR'S COMMENT

“Japan’s World War Two incendiary balloon attacks on the USA and Canada were, on the face of it, ineffectual – but they hid a more sinister agenda”



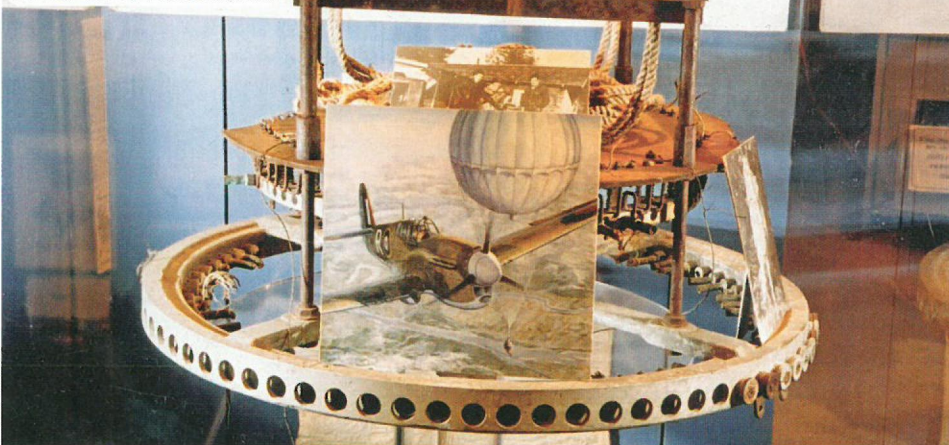
WHEN I FIRST saw the preserved remains of a World War Two Japanese incendiary balloon-bomb – illustrated below – during our 2004 reader tour of Canada, I knew it would make a good subject for an article in *Aeroplane*. But could we add anything to our original story on the subject, published 31 years ago in our August 1978 issue, or to the late John Fricker’s *Crosswind* comment in our February 2005 edition? The answer (eventually) was yes, especially the newly-emerging twist about Japan’s nuclear-weapons ambitions. See this month’s *Hidden History* feature on page 16.

Meanwhile, having said goodbye to the Brooklands Vickers Vimy replica (from a flying point of view) last month, *Aeroplane* needed a new “adoptee”. And we have one, in the very different shape of Consolidated PB5Y-5A Catalina N423RS, recently ferried from Lee-on-Solent to North Weald to begin a transatlantic restoration project. We hope to be following its progress over the coming months and years – see the big picture overleaf and our news story on page 8.

Michael Oakey – EDITOR

PS Another shameless plug for our 2010 *Aeroplane* reader tours – book now to take advantage of the early-bird discount. See pages 49 (Florida EAA Sun ‘n’ Fun Tour) and 80 (Grand Tour of England).

The business end of a Japanese balloon-bomb, preserved in Canada’s CFB Comox Air Force Museum.



TONY KILGALLEN

EDITOR'S CHOICE

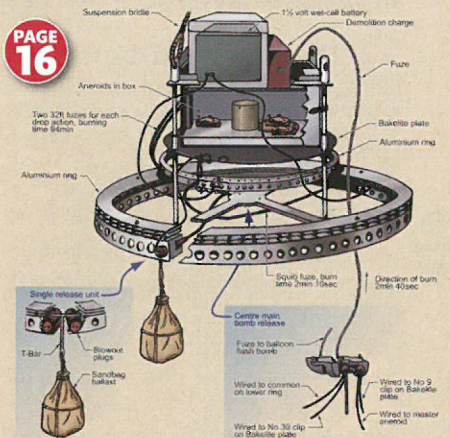
AEROPLANE



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Bf 109 ace
“I-was-there” stories have long been one of *Aeroplane*’s strong points, but this is a rare instance of German WW2 pilot recollections

PAGE 16



Fire from the sky
We look at Japan’s balloon-bomb programme in detail



PAGE 22

Schneider engines
Engine specialist Chris Starr can be relied upon to provide a blend of pace, detail and authority in his powerplant histories

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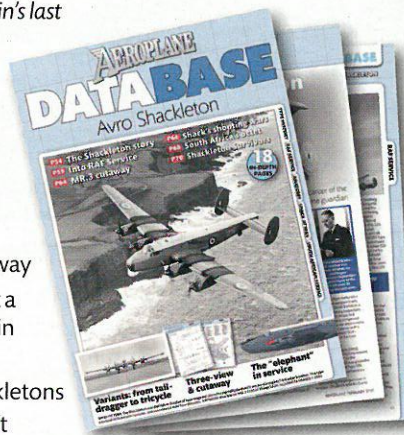
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AEROPLANE

established 1911

Aeroplane traces its lineage back to the weekly *The Aeroplane*, founded by the legendary C.G. Grey in 1911 and published until 1968. It was relaunched as a monthly magazine in 1973 by Richard T. Riding (Editor for 25 years until 1998)



Divine Wind

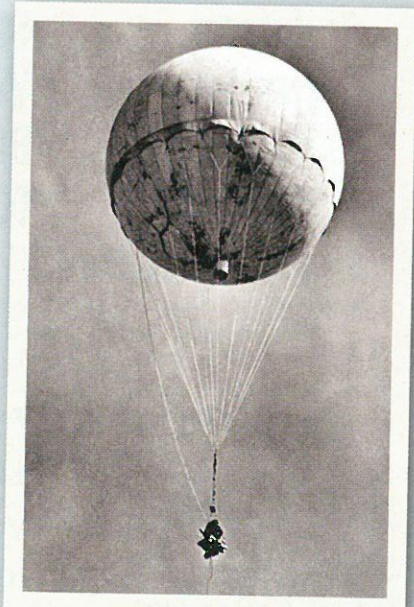
TO DESTRUCTION



ABOVE RIGHT Intended initially to start forest fires and cause a nuisance, the Japanese balloon bomb was later considered as a means of atomic weapon delivery. **BELOW** Japanese groundcrew manoeuvre a balloon at the Sagami Arsenal in the spring of 1944.

As a young Canadian Air Cadet during 1944–45 WILLIAM CAMERON witnessed RCAF Hurricanes attempting to shoot down Japanese bomb-carrying aircraft. Over *Canada*? Read on for the full story . . .

AS A YOUNG Air Cadet in Moose Jaw, Saskatchewan, during 1944–45, I had the unique experience of watching Royal Canadian Air Force (RCAF) Hawker Hurricanes claw their way up into the clear blue skies to intercept, and attempt to shoot down, Japanese bomb-carrying aircraft. That is a rather astounding claim, but it is absolutely true. I admit, however, that while the basic premise is factual, the use of “bomb-carrying aircraft” does require further explanation.



A new menace from above

In early November 1944, military authorities in Canada and the USA were alarmed to learn that large balloons, carrying a number of incendiary and high-explosive devices, were landing in various locations in the Canadian western provinces and in the north-western USA.

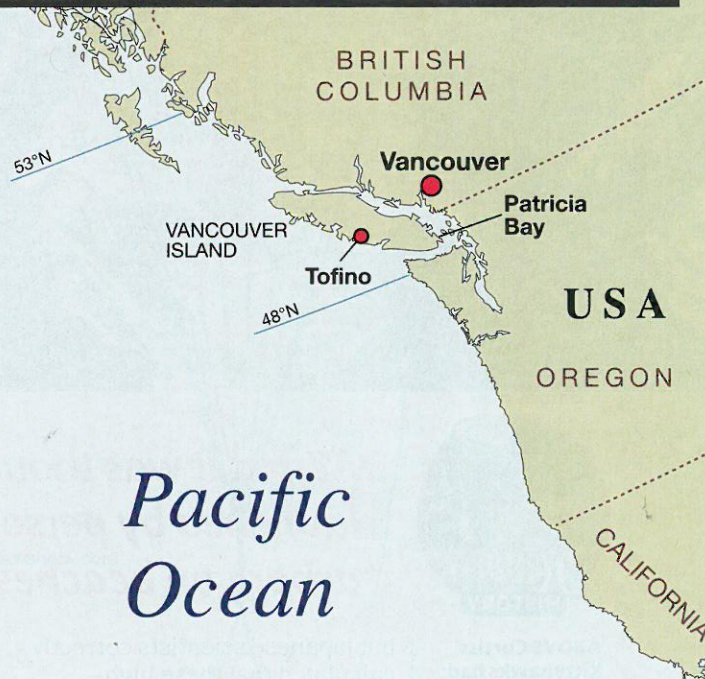
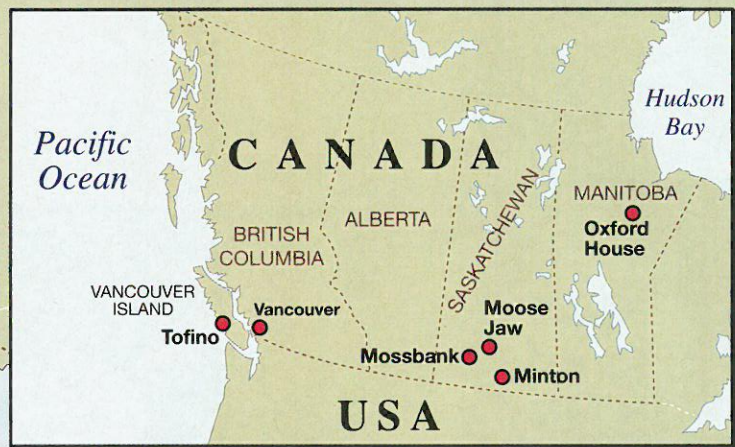
There were no initial reports of casualties, and the purpose of the balloon offensive was not clearly understood. However, there were concerns that in addition to being a nuisance, there might well be a risk of biological warfare. As a result, to prevent undue panic among the

population, the governments of the USA and Canada imposed a news blackout about the balloon attacks for the duration of the war, in both countries.

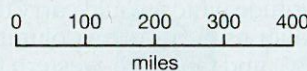
The balloon attack programme was conceived by *Rikugun Shosho* (Major-General) Kusaba of the Imperial Japanese Army, and its implementation was undertaken by the Ninth Army Technical Research Laboratory, beginning in September 1944, under the command of *Rikugun Shosa* (Major) Teiji Takada. The name given to the weapon was *fusen bakudan*, or fire bomb.

Some sources also give the





Pacific Ocean



MAP BY MAGGIE NELSON © 2010

balloon bomb's name as *fugu*, the name of a poisonous blowfish much prized by Japanese *sushi* chefs, which, if not properly prepared, can be fatal.

Balloon construction

Experiments were undertaken with a rubberised-textile balloon envelope, but the majority of the balloons were constructed with a special paper called *washi*, made from the mulberry tree. The balloon envelopes were some 10m (33ft) in diameter, and were waterproofed with green persimmon juice, in the same way that the Japanese had waterproofed parasols for centuries past.

The upper sphere of the balloon was made of four-ply paper, while the lower sphere was three-ply. Around the mid-section of the balloon envelope a series of 19 strongpoints were sewn into the envelope fabric to make a suspension curtain, attached to which were shroud lines of about 12m (40ft) in length. The shroud lines joined at their lower end, and supported a four-spoke "chandelier" aluminium ring carrying automatic altitude-control devices, a battery, 36 ballast sandbags of 3kg (6.5lb) each, a 15kg (33lb) anti-personnel fragmentation bomb and five incendiary bombs of 5kg (11lb) each. The hydrogen-filled balloon envelope was capable of lifting about 450kg (995lb) at sea level, the payload capacity diminishing with altitude.

Teenage schoolgirls all over Japan were enlisted to sew and glue the paper panels in the production of the paper balloons. The glue was made from the flour of a tuber — similar to a potato — and much of the nutritious glue was eaten by hungry workers!

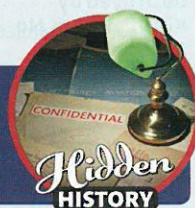
Assembly took place in many locations in Japan, and the finished balloons were brought to locations for hydrogen-filling, sand ballast attachments, bomb loading and launching. About 15,000 units were built, some two-thirds being launched before the project came to an end.

Into action

The launch programme began on November 3, 1944; balloons began landing on the USA's California coast three days later. Over the winter of 1944–45 and on into the spring of 1945 approximately 9,000 balloons were launched across the North Pacific Ocean.

The balloons were released to rise into the Jet Stream which flowed from west to east across the North Pacific at altitudes of 30,000–40,000ft, and at speeds usually in excess of 100 m.p.h. The science of Jet Stream location was primitive in the mid-1940s,

THESE FEATURES aim to bring lesser-known historic aviation stories to a wider audience through the pages of *Aeroplane*. If you have such a story to tell, get in touch with us!

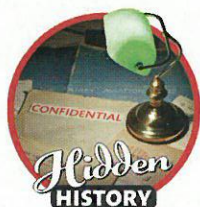


Royal Canadian Air Force pilots run to their waiting Hawker Hurricanes, including this one, RCAF 5658. Although Hurricanes were frequently sent to intercept the Japanese balloon bombs, they struggled to gain sufficient altitude.





THE ALPHA ARCHIVE



At first it was thought that the balloons were being launched by personnel from Japanese submarines landed ashore on beaches along the west coast of North America

ABOVE Curtiss Kittyhawks had better luck shooting down the balloon bombs, at least two being destroyed by Kittyhawks of No 133 Sqn RCAF.

but Japanese scientists correctly calculated that these high-altitude winds would carry the balloons over British Columbia (BC) and the north-western USA, where on-board barometers and timers would release the bombs.

While the existence of the Jet Stream was known, the variation

in the direction, speed and height of the winds was still largely a mystery, and so it was anticipated that many of the balloons would fall into the Pacific Ocean.

The flightplan for the balloons was based on a three-day transit time, flying at altitudes between 25,000ft and 38,000ft at an average speed of around 100 m.p.h. The theory was that during hours of daylight the hydrogen in the balloon would heat, and the balloon would rise. Before topping 38,000ft, barometric devices would release small amounts of hydrogen from the envelope, and the balloon would stabilise. After dark the hydrogen would cool, and the balloon would sink. Before sinking to 25,000ft, barometric devices would release pairs of sand-filled ballast bags from either side of the aluminium suspension ring in order to maintain a level attitude of the payload package.

The last ballast to be dropped was the anti-personnel bombs. Then onboard explosive devices were ignited to destroy the carrying gondola and envelope.

The result

Japanese military scientists estimated that about ten per cent of the balloon bombs would

reach North America, and records reveal that around 300 are known to have landed on the continent. However, it is believed that as many as 1,000 balloons may have successfully completed the ocean crossing.

In total, 80 landings were recorded in Canada between November 1944 and June 1945, 57 of those in British Columbia. Several balloon bombs are known to have landed in southern Alberta, one flew as far east as Oxford House, Manitoba, and one landed at Minton, Saskatchewan. Three balloons were shot down by RCAF aircraft. However, it is highly likely that many more of the balloons landed in mountainous areas of BC and north-western USA, and may still pose a threat to hikers etc.



MAP BY MAGGIE NELSON © 2010

ABOVE Japan's balloon-launching sites and flight-following stations. The latter were radio direction-finding installations set up by the 5th Army Technical Research Institute.



The RCAF's balloon-busters

FORMED AT LETHBRIDGE, Alberta, on June 3, 1942, No 133 Sqn RCAF flew an assortment of Hurricanes, de Havilland Mosquitoes and Curtiss Kittyhawk Mk Is in defence of the Canadian west coast, and had some success in shooting the fire balloons down. On February 21, 1945, Plt Off E.E. Maxwell took off from the unit's base at Patricia Bay, British Columbia, in Kittyhawk "866", and, after managing to get to 25,000ft, succeeded in destroying a balloon. A few weeks later, on March 10, 1945, Plt Off J.G. Patten bagged another at 13,500ft while flying Kittyhawk "858". Indeed, the unit's very last sortie of the war was an unsuccessful bid to bring a balloon down by Mosquito KA132.

Another unit, No 6 Sqn RCAF, also encountered the fire balloon on one occasion. Formed as a torpedo bomber unit in March 1936, the squadron operated Consolidated Canso A amphibians from March 1944. On March 12, 1945, Flt Lt Moodie and crew were returning from a routine patrol in Canso "9702" when they sighted a semi-deflated balloon drifting in an easterly direction at 500ft. Moodie was able to force it down on to the south side of Rupert Arm, where it was recovered and sent to Western Air Command for examination.

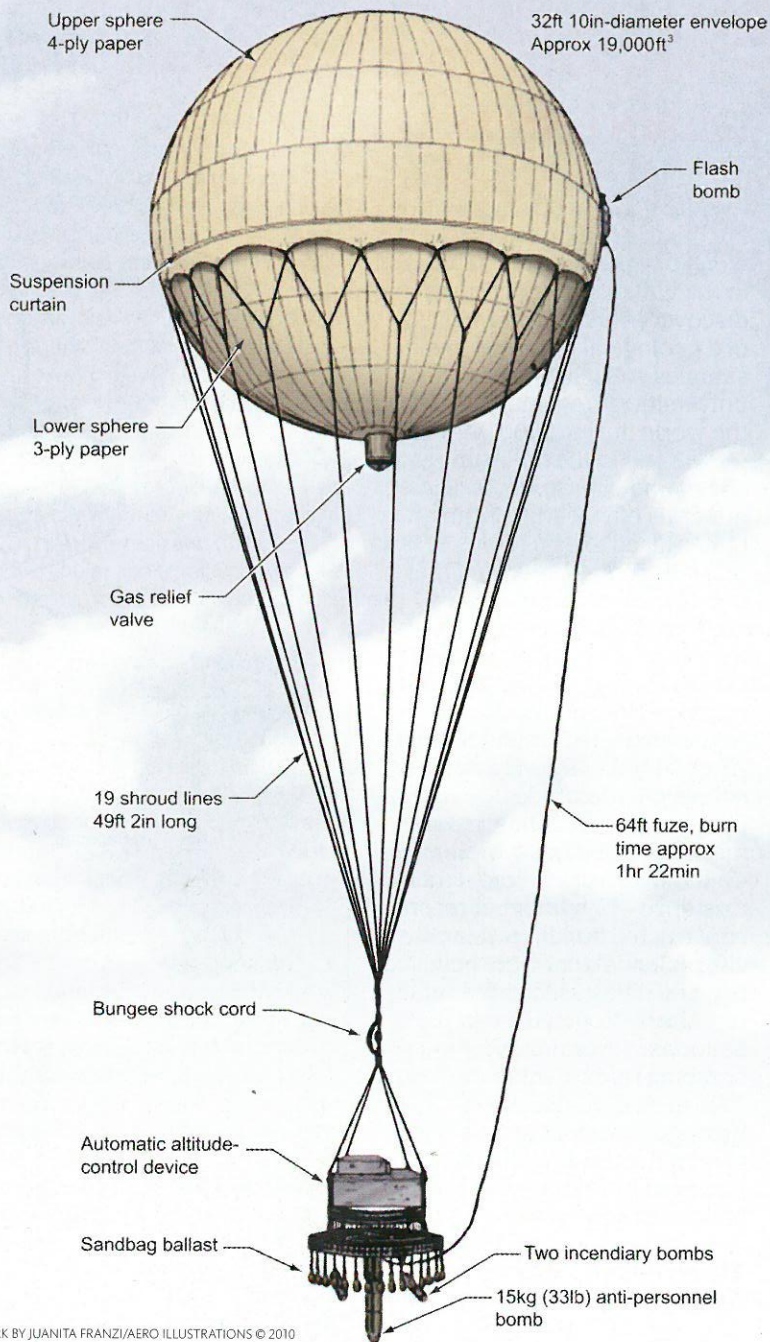


Most of the 220 other known landings were in Oregon, Washington and California. The only known fatalities occurred in Oregon where six people were killed when they disturbed a bomb found while hiking.

Although the Japanese balloon bombs were not a great hazard to life and property on the west coast of North America, the governments of Canada and the USA organised monitoring stations along the coast, and the American government made a considerable effort to locate the precise launching site in Japan.

Some of the units landed in North America with the sandbags still attached and the bombs unexploded, enabling the American and Canadian authorities to begin the process of

ABOVE A photo taken by the author of a pair of Hurricanes at Moose Jaw in the spring of 1945, both with instructional airframe numbers. The nearest is A369, ex-5449. A418 was 5628.



ARTWORK BY JUANITA FRANZI/AERO ILLUSTRATIONS © 2010

determining the launching sites. At first it was thought that the balloons were being launched by personnel from Japanese submarines landed ashore on beaches along the west coast of the North American continent. The Military Geology Unit of the US Geological Survey was tasked with determining the origin of the sand recovered from ballast bags. It was quickly discovered that the sand in the

ballast did not originate from North American beaches, and although it was inconceivable that the balloons could have originated in Japan, a search was put into action, to see if the sand might have come from a beach in the Japanese home islands.

A shocking discovery

During the spring of 1945 American military intelligence traced the launch site of the

ABOVE LEFT The author as an Air Cadet in 1944. **BELOW** RCAF Curtiss Kittyhawk Is lined up for a photograph while on Western Coastal defence duties. The RCAF operated a total of 134 Kittyhawks, mainly Mk Is, but also Mk IAs, Mk IIIs and Mk IVs.

THE ALPHA ARCHIVE



HIDDEN HISTORY

incendiary balloons by identifying the beaches in Japan which were the source of the sand used in the ballast bags. This amazing discovery was possible because of a geological record of sand samples collected by American universities from beaches all over the world during 1900–40.

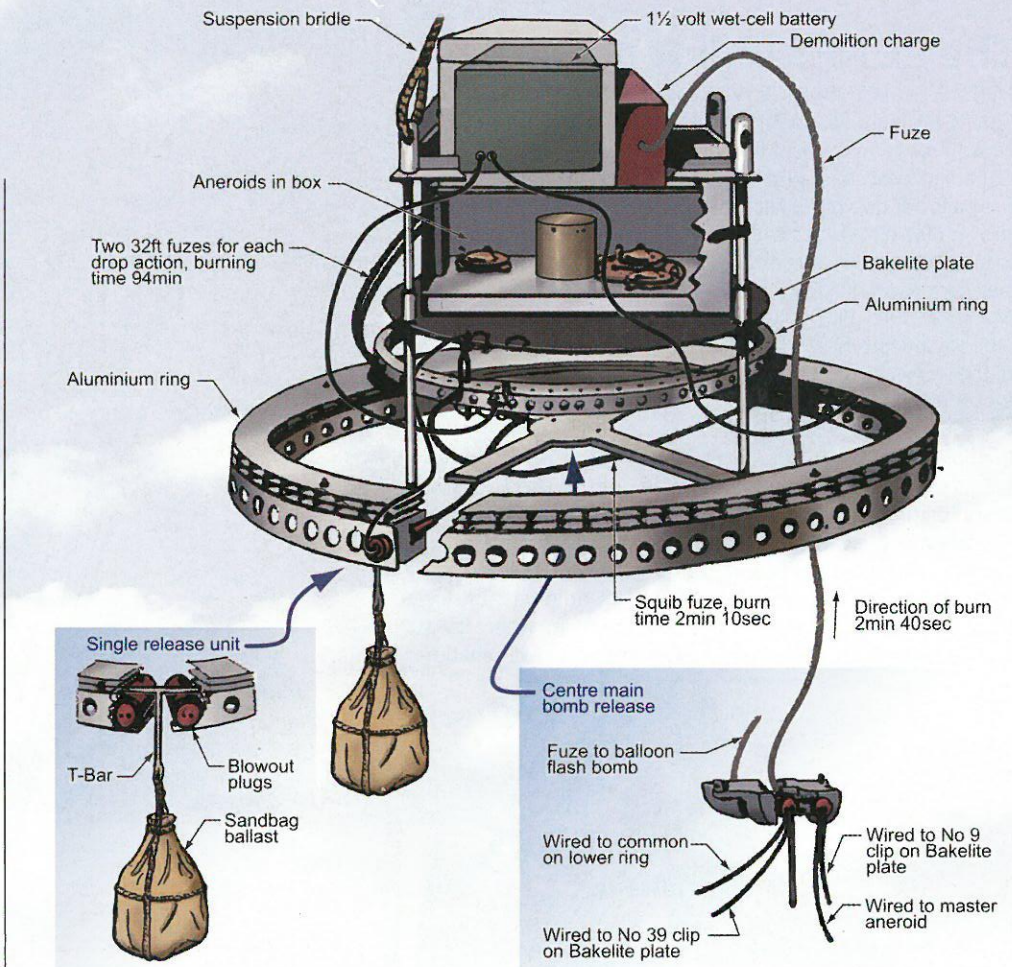
The sand in the ballast bags, consisting of granite particles, minerals of volcanic origin and mineralised exoskeletons of tiny marine animals, revealed that it had come from a beach along the coast of Chiba Prefecture, near the city of Shioyama, north-west of Tokyo, on the main Japanese island of Honshu.

As a result, the United States Army Air Forces conducted several high-altitude Boeing B-29 photographic-reconnaissance missions along the shoreline of Chiba, which brought to light the existence of a number of recently-constructed buildings near the city of Sendai that were believed to be facilities used to manufacture the hydrogen used in the balloons. Several B-29 bombing raids in June 1945 destroyed the hydrogen-producing plants, thus ending the Japanese incendiary balloon programme.

Effective or defective?

Because of the random nature of the Japanese balloon offensive, there was never any significant danger to military or civilian locations on the North American continent. One of the major Japanese objectives in undertaking the programme was to start as many fires in the forest of western North America as possible, thereby causing Canadian and American authorities as many distracting problems as possible. However, the months of November to June, during which the balloon assault was undertaken, are the wet, cold months on the west coast of North America, and very little damage was done.

It seems surprising that the Japanese military would undertake a technically ambitious and costly balloon attack programme during the period of the year when wet weather prevailed on the North American west coast.



ARTWORK BY JUANITA FRANZI/AERO ILLUSTRATIONS © 2010



ABOVE Extensive tests were undertaken with captured Japanese balloons by the US Navy at Chesapeake Bay and the US Army in New Jersey, as well as at the USA's main West Coast anti-submarine base at Moffett Field, California.

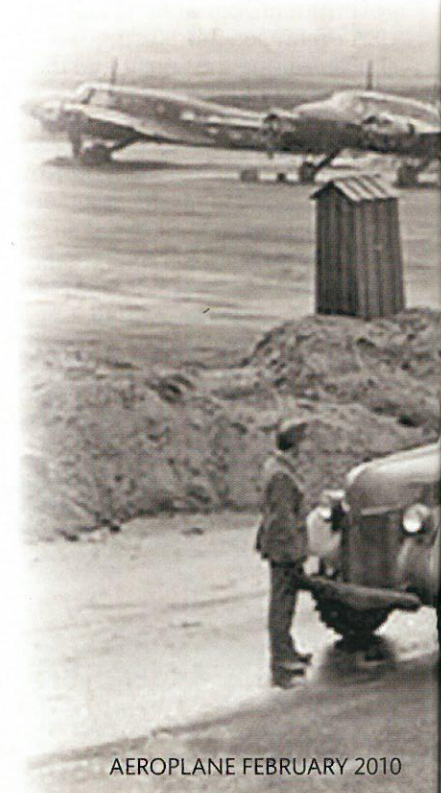
However, even though the science of upper air movements — and particularly the Jet Stream — was in its infancy in 1944, Japanese scientists were aware that it was only during the months of November through April that the high-speed west-to-east winds passed over Japan, across the Pacific Ocean and across North America along latitudes between 48°N and 53°N. This covered British Columbia, Washington and Oregon, the primary target areas.

Fighter interception

In late 1944 the USAAF and RCAF acted quickly to assign special high-altitude fighter units in strategic locations, in order to intercept and destroy the potentially lethal balloon bombs. The RCAF established interceptor units at various bases in British Columbia, using Hurricanes, Kittyhawks and Mosquitoes.

During the winter of 1944–45 RCAF Hurricane Mk XIIIs (probably two) were based at the former British Commonwealth Air Training Plan (BCATP) airport at Moose Jaw, Saskatchewan.

Training activity at the former BCATP base had ended on October 17, 1944, and the occasional flights of the Hurricanes were the only flying operations at Moose Jaw during that winter and spring. However, since the war was still raging in Europe and the Pacific, the Air Cadet movement in Canada continued unabated and cadets of No 40 Sqn were allowed on the base to watch the Hurricanes — to our great delight.

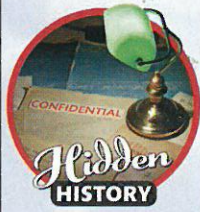


There appears to be no record of any RCAF units based at Moose Jaw during that winter of 1944–45. However, Nos 133 Sqn and 135 Sqn RCAF were based at Patricia Bay, BC, from August 1944 to September 1945. Four aircraft from each squadron were alternately based every four weeks at Tofino, BC, with the express purpose of intercepting the Japanese fire balloons. As these were the only two RCAF fighter units located in western Canada during the winter of 1944–45, it is possible that the two aircraft based at Moose Jaw were on detachment from one of those two units.

All extra weight was removed from the Hurricanes, including armour plate, propeller spinner and all but two wing-mounted machine guns, in an effort to make the aircraft light enough to climb to altitudes above 25,000ft. Personally, I was witness to only four instances during which the Hurricanes struggled slowly — and ultimately in vain — on their very-high-altitude sorties.

Strange but true

So, while it is technically correct to say that I saw RCAF fighters attacking Japanese bomb-carrying aircraft over Canada 65 years ago, that may not be quite as dramatic as it sounds. Nevertheless it was extremely exciting for us cadets thousands of miles from the action in Europe and the Pacific!



BELOW A Kittyhawk is refuelled opposite three Avro Ansons at Patricia Bay in January 1942. It was from this base in British Columbia that the Kittyhawks of 133 Sqn were based when the unit made its two balloon "kills" in February and March 1945.

THE ALPHA ARCHIVE

Japan: a WW2 nuclear threat?



PRESIDENT FRANKLIN D. Roosevelt's personal wartime physician, Vice-Admiral Ross McIntire, revealed in his 1946 book *White House Physician* that FDR agonised over reports that Nazi Germany intended to launch airborne biological — and even possibly atomic — weapons which would decimate Allied populations, livestock and agriculture. But Japan also played an important role in the Axis powers' "total war" strategy. Since 1932, the Imperial Japanese Army's (IJA) special germ and chemical warfare group, Unit 731 in Manchuria, had been lethally experimenting on hundreds of thousands of Korean and Chinese civilians and prisoners of war. With the right means of delivery, this could pose a serious problem for the Allies.

Gone with the wind

Soon after the IJA invaded the Aleutian Islands in June 1942 it began releasing low-altitude incendiary balloons into the choppy westerly winds. Most of the devices performed erratically, lost their helium lift and fell into the ocean. Some managed to land in Canada's western coastal region and a few reached Washington state in the USA.

This was no mere psychological warfare campaign, however. The IJA was trying to understand the Jet Stream and the necessary flight duration for a big balloon bomb to reach a major American city, Chicago being the main goal. Japanese industry, however, lacked the technology to manufacture high-altitude balloons that could reach the fast upper Jet Stream and survive an extended flight. Nevertheless, Japan continued to improve its balloon weapons programme, and in early 1944 the IJA's Special Balloon Regiment deployed more than 8,000 large-diameter paper balloons from Japan's



ABOVE Delicate and demanding work — teenage Japanese girls hard at work stitching the envelope for another balloon. The glue used for pasting the envelope was derived from the "devil's tongue" root, and was frequently eaten.

east coast (as described in this feature).

By late 1944, Japan's destructive ambitions had grown, and the IJA had managed to acquire the ideal vehicle to deliver a radio-detonated nuclear bomb deep inside the USA: a high-altitude super-balloon made in Germany. It was procured through an exchange programme between Germany and Japan, whereby advanced technology would be transported between the two Axis powers via submarine.

In early 1945 such a balloon was loaded aboard submarine U-234, along with a large cargo of fissionable material. Germany's atomic bomb effort was by then fairly advanced, but Japan also had two *Ni-Go* nuclear weapon research programmes under way. Fortunately, U-234 was intercepted crossing the Atlantic in March 1945 and brought to Portsmouth, New Hampshire.

Thus President Roosevelt's recurring nightmare about Axis weapons of mass destruction was indeed justified, and may explain why the Manhattan Project — the USA's atomic bomb programme — was fast-tracked from its inception. **"AMP"**

