

My trip to Brooklands Museum April 2025

24 April 2025 On the 9 am Ferry, and after a difficult journey, I arrived at the museum at 12:45.

Very friendly staff, many of which were interested in my web page.

Some of the staff were a little short on the history, for instance, what I knew as the “Mock up” hanger (below) was known as the “Bellman Hangar”. I was surprised to know that it has been moved, to give access to the old track. Now known as the “Aircraft Factory”, it has excellent exhibits.

<https://www.brooklandsmuseum.com/explore/heritage-and-collection/our-collection/bellman-hangar>

When looking around the “Jackson Shed” I mentioned that I worked here 1964 to 67. And that it was in this building that Barnes Wallis had his wind tunnel. I was met with very puzzled looks. No I don't think so, you are wrong there.

Later on in the day I met another volunteer who was an apprentice in the main machine shop. He said that I was correct and the “Free flight” wind tunnel was here. This used radio controlled model aircraft to investigate the new “Swing Wing” concept.



The Clubhouse where I clocked in everyday



The entrance hall, smaller than I remember.






The stratosphere chamber, in my day, was out of bounds to me. A work area that sometimes had icicles hanging from the pipes and, I remember, a strong smell of ammonia.


<https://www.brooklandsmuseum.com/explore/heritage-and-collection/our-collection/stratosphere-chamber>

THE STRATOSPHERE CHAMBER

Barnes became Head of Research and Development for Vickers-Armstrong based at Brooklands. To push the **limits of technology** he needed to test his designs rigorously. His solution was this Stratosphere Chamber. Built between 1946 and 1947 it is the largest of its kind ever known.



'NOW ONE THING I WILL NOT DO, IN EVOLVING ANY NEW AEROPLANE IS TO RISK ANOTHER MAN'S LIFE.'
BARNES WALLIS

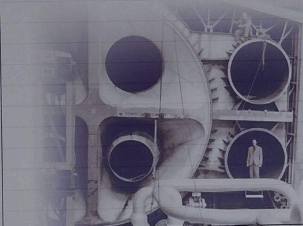
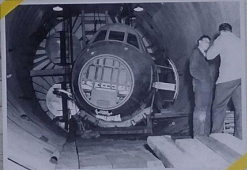



THE WORKINGS OF THE STRATOSPHERE CHAMBER

The sheer **ambition** was extraordinary. The chamber could simulate most atmospheric or climatic conditions. Vacuum pumps extracted air from the chamber, reducing the pressure inside and recreating conditions of altitudes up to 70,000 feet (21,000 metres). It could bring temperatures up to **55c to -65c**. They could even create snow or ice by spraying water into the air over the test objects. No aircraft were ever lost to structural issues after having been tested here.

A UNIQUE TESTING ENVIRONMENT

As well as testing whole aircraft or sections of large aircraft, the Stratosphere Chamber was used for other experiments. Clothing for Antarctic exploration was tested here, and even buses, to make sure that their engines would start high up in the Andes. Through tests done in the Chamber in the 1950s, scientists were able to investigate the way ice formed on the rigging of fishing trawlers and find ways to stop them sinking.



A CHAMBER THAT COULD TEST AIRCRAFT WITHOUT RISKING LIVES!

TIMELINE

1887	1913	1914-18	1923-29	1929-39	1939-45	1945-60	1968	1971	1975	1979
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BARNES WALLIS LIVES HERE

STRATOSPHERE CHAMBER 1947 Created the Stratosphere Chamber that you see today

Wow, my first time seeing this.



Below is a picture, I have from a Vickers publication about tests, made in the chamber, to simulate the fate of two trawlers: the "Lorella" on 26th January 1955 and the "Roderigo" on the same day.



A report in Hansard about the tests can be found here

<https://api.parliament.uk/historic-hansard/commons/1956/may/16/tractors-arctic-ice-conditions>

An extract follows

“There have been reconstructed in the stratosphere chamber of Vickers-Armstrong at Weybridge conditions which would be likely to obtain in gale circumstances in the Arctic winds of upwards of 60 m.p.h. spray blown at a giant model one-twelfth of the size of a real trawler in a huge tank filled with water at the temperature of the Arctic seas. In fact, Arctic gale conditions generally have been simulated.

In these experiments, ice was formed on the mast and standing rigging and there was a continuous wall of ice from forestay to deck, acting as a sail hauled amidships.

In time, inevitably the model capsized in the tank.”

The whole area, within the chamber building, is now about the work of Barnes Wallis

THE 'DAM BUSTERS RAID.'
(16/17 MAY 1943)

Operation Chastise (known as the 'Dam Busters raid') took place on the night of the 16/17 May 1943. Its objective was to destroy German dams, with the Eder and Möhne as the primary targets, with the intent of seriously damaging their industrial production and war effort. Barnes Wallis' Upkeep or 'bouncing bomb' was the chosen weapon.

OPERATION CHASTISE: THE 'BOUNCING BOMB' IN SERVICE

The Möhne and Eder dams were destroyed, and the military objective of Operation CHASTISE achieved. Barnes' daughter Mary wrote to him from her boarding school to congratulate him once news of the raid became public, but her father did not feel proud. During the operation, 53 of the 133 crew were killed and 8 out of 19 Avro Lancaster bombers were lost. Hundreds of people were killed on the ground. Barnes had delivered what had been required of him during war time, but the human cost weighed heavily on him, particularly as a devout Christian. Later, Barnes refused to apply for an inventors' award for his Upkeep bomb saying that the prize felt like blood money.

He was eventually persuaded when he was told that he could give the money to charity and used it to set up places for RAF orphans at his old school **Christ's Hospital**.

THE TALLBOY & THE GRAND SLAM

After the military success of Operation CHASTISE, Barnes' original proposal for huge 10-ton bombs was revived to meet the threat of German flying bombs and fortifications. He developed the 12,000lbs **Tallboy** bomb (and later the 22,000lbs **Grand Slam** bomb) which was used in the capsizing of the German battleship, 'Tirpitz' in 1944.

You can see The Tallboy as you leave the Stratosphere Chamber.

THE TALL BOY

BOUNCING BOMB

'I THOUGHT OF WHAT WOULD BE AN ENGINEER'S WAY OF STOPPING THE WAR.'
BARNES WALLIS

The Dambusters Raid & the 'Bouncing Bomb'

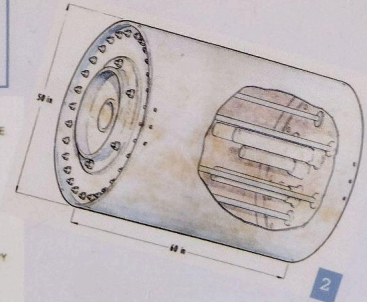
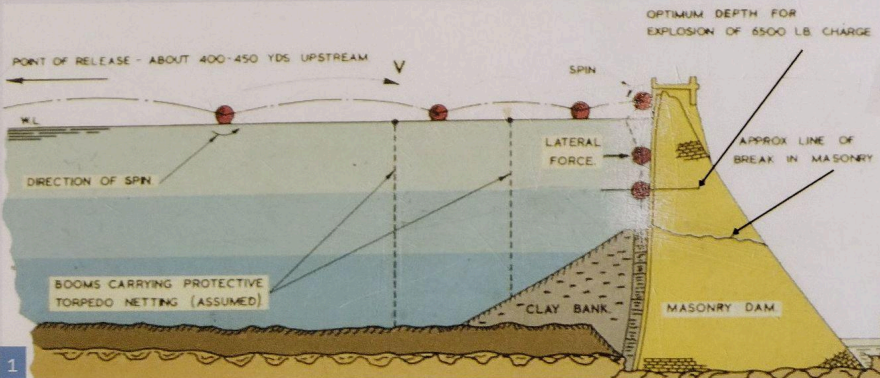
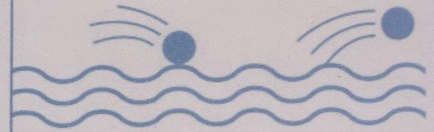


This Vickers type 464 Upkeep mine or 'bouncing bomb' is an example of those used during the Dambusters raid on the night of 16th & 17th May 1943.

It was designed to be rotated by a hydraulic motor and 'V' belt to a backspin of 500rpm. The target release was a height of 60 feet, ideally at ground speed of 232mph and a range of 450-400 yards from the dam (the actual speeds recorded were 217-228mph).

On release, the Upkeep would skip across the water avoiding any defensive measures such as torpedo nets, until it hit the dam face. It would then slide below the surface clinging to the dam wall (due to the backspin) before detonating at a depth of 30 ft.

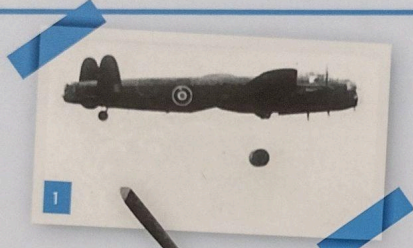
The bomb was relatively 'compact', as it used the incompressibility of the water to increase its explosive effect while in contact with the dam face.



1: Diagram from 'A method of Attacking Axis Powers' by Barnes Wallis, 1940
2: Cross-section diagram of the 'bouncing bomb'

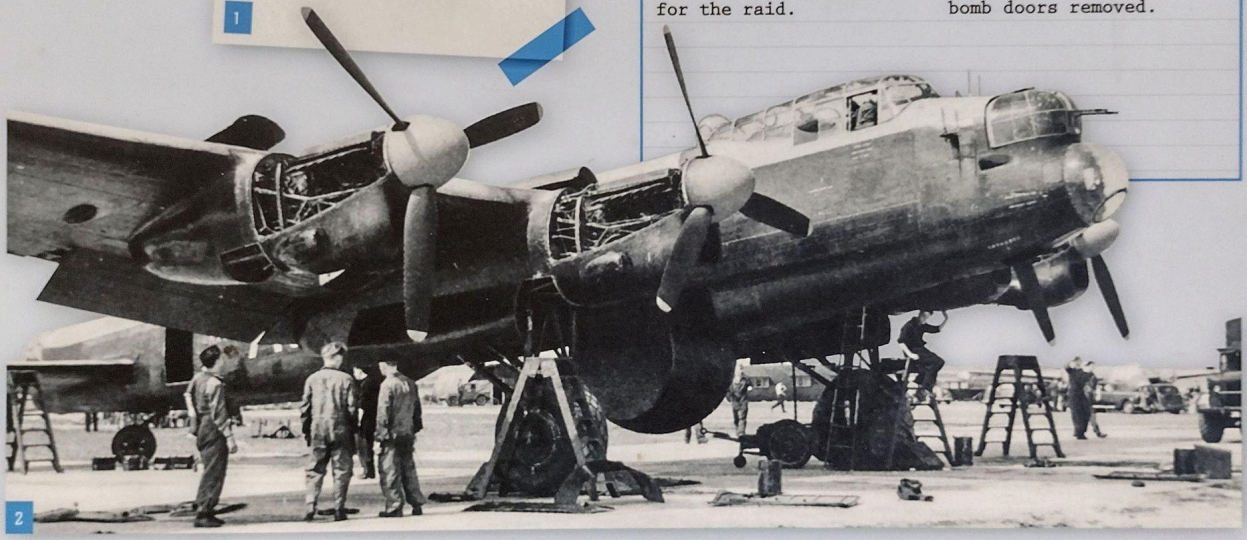
1943, UPKEEP 'BOUNCING BOMB' TEST SPECIMEN

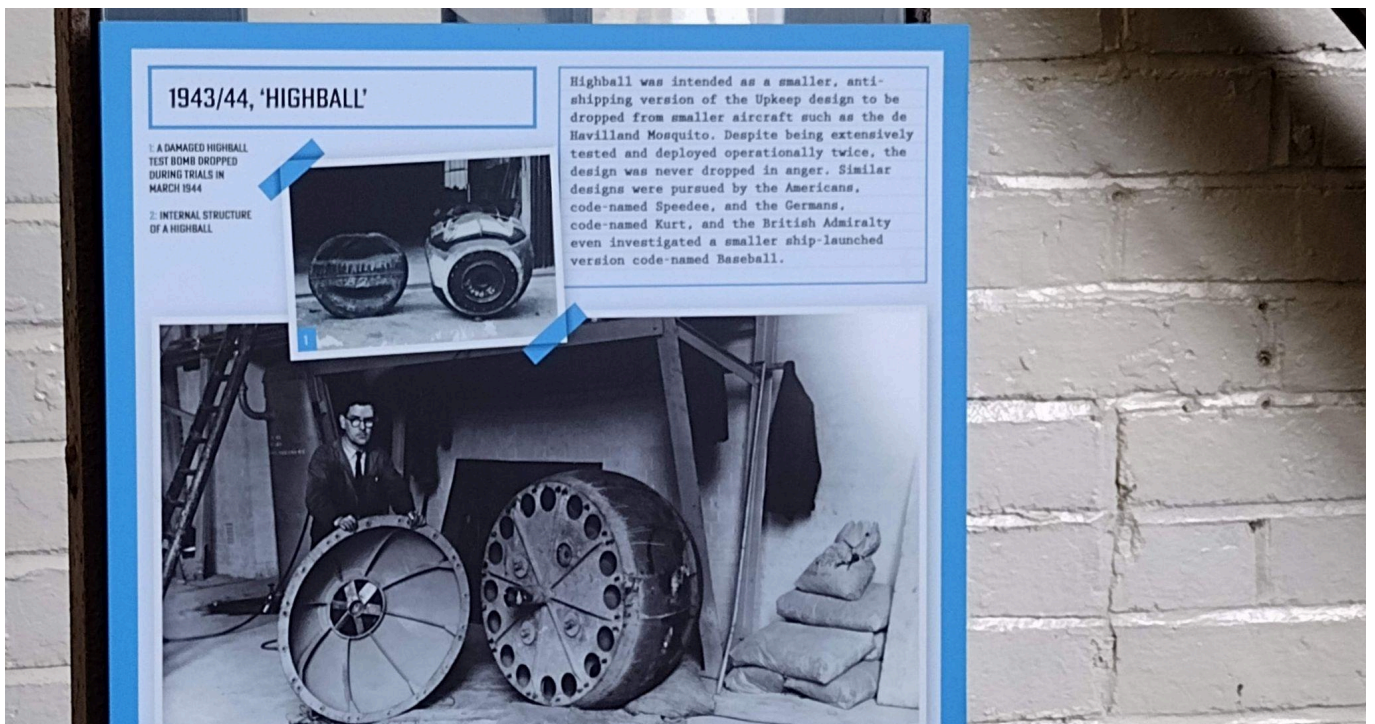
- 1: LANCASTER DROPPING THE UPKEEP
- 2: LOADING AN UPKEEP DURING 1955 DAMBUSTERS FILMING



This test specimen of a full-size Upkeep mine was one of a number filled with concrete and dropped off the north Kent coast, shortly before the Dams raid. Witnessed by Barnes Wallis, these final trials saw the Upkeep developed into the final production model used for the raid.

Upkeep was the code name used for the 'bouncing bomb' that Barnes had developed for the Dams raid. It weighed 9,250lbs and was around 59 inches long and 50 inches in diameter. The bombs were stored in the bomb bay of a modified Lancaster bomber, which had its bomb doors removed.





Barnes Wallis was a man of ideas. I worked in the R & D department from 1964 to 1967. The last project I worked on was to look into the concept of a Cargo Submarine, Liverpool to New York in three days. He imagined that if the skin of the submarine was heated it would travel through the water with less friction. I made part of the heating system for a model sub.

The department were also involved in new "Plastic Mirrors" mentioned in my website

<https://terryrawkins.x10.mx/brooklands/Plastic-mirrors.html>

For more about "My time at Brooklands" 1962 - 1971 <https://terryrawkins.x10.mx/brooklands/>

I ended my day there at about 14:30, too soon I am sure but I had a long journey back home.

Thinking back on that day. I had a wonderful day, saw many interesting things and spoke to many interesting and helpful people.

Thank you, Brooklands.

I owe you a great deal.