

Still bouncing to victory: Engineers recreate daring Dambusters raid over Canadian lake

By [Daily Mail Reporter](#)

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A team of engineers has managed to recreate one of the greatest wartime raids in history – with a little help from a cricket bowling machine.

The bouncing bomb developed by scientist Barnes Wallis was used to breach key German dams in 1943, cutting off hydro-electric power and wrecking factories.

The raid was the subject of Paul Brickhill's 1951 book *The Dambusters* and the 1954 movie of the same name. But the science behind the successful operation, including the original calculations and designs, was lost in a flood in the 1960s.

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The oil drum-sized bomb is released from an aircraft over a lake in Canada as scientists and engineers try to recreate the Dambusters raid



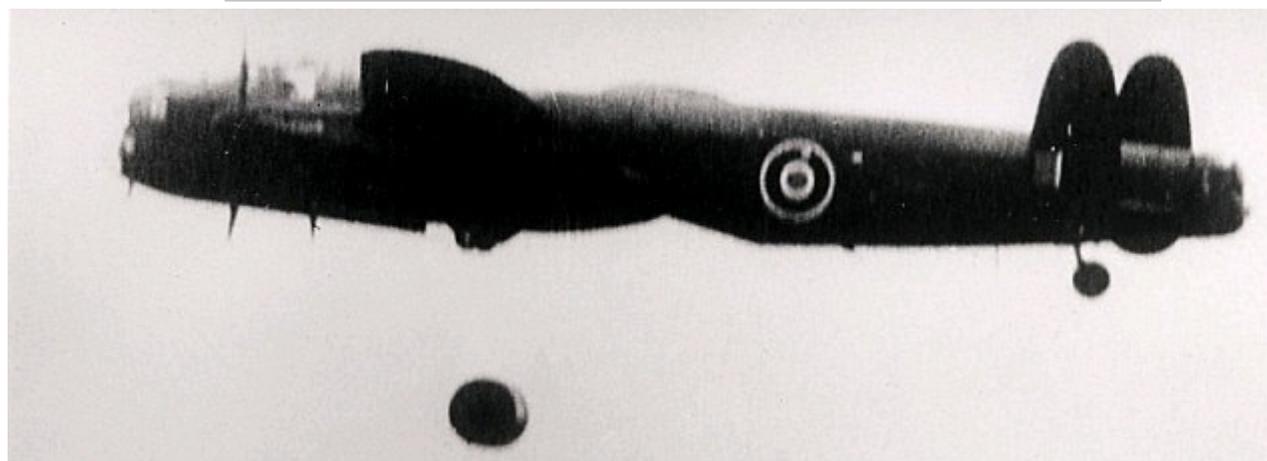
Bombs away! A cloud of water rises up behind the bomb after it is dropped



In this view from above, two white plumes of water rise up as the bomb heads towards the 'dam'



Moment of impact. The devastating power of the bomb is unleashed smashing the construction asunder



The original: A Lancaster bomb drop in 1943

Hugh Hunt, of Cambridge University's department of engineering, started the experiment by firing cricket balls from a bowling machine at an open-air swimming pool.

This was eventually scaled up to bigger devices. His team then headed for British Columbia, where a 30ft-high and 130ft-wide dam was built, then destroyed by a bomb dropped from a vintage DC4 – neither of the two surviving Lancaster bombers was available.

Dr Hunt said: 'Our pilots had no one shooting at them and the whole thing was only at one-third scale – and even then it was hard enough.'

'There's no massive mystery in a theoretical sense but the fact that no-one has been able to repeat the mission meant that there was no-one alive who knew whether it was difficult, easy, or indeed possible,' he added.

'The question was really finding out whether anyone could do it again.'



In this view from the side of the dam the moment of impact can be seen, proving the success of the experiment



Before: The make-shift dam was made of concrete and was 130ft wide and 30ft high

Pilot Guy Gibson led the raid by Lancasters from the RAF's 617 Squadron in May 1943 - attacking dams feeding Germany's industrial heartland with "bouncing bombs" created by scientist Barnes Wallis.

'While the mission itself has gone down as one of the most iconic episodes in Britain's wartime story, few details about how the bouncing bomb was built remain,' said a Cambridge University spokesman.

'Most of Barnes Wallis' original calculations, designs and results were lost; many of them in a flood in the

1960s. The physics of "ricochet" (the bouncing of objects on water) is quite well understood but actually doing it has been a different matter.

'Drawing heavily on a 1976 paper by his Cambridge colleague, Professor Ian Hutchings, which proposed a model for how the bouncing bomb was made, Hunt set to work trying to build one.

'He started by firing cricket balls from a bowling machine at the Jesus Green open air swimming pool in Cambridge to test Hutchings' theories.

'This was gradually scaled up, until much larger imitation bombs were being fired out of a compressed air cannon.



After: The water from the lake rushes through the gap in the scientists' construction

'The team of dam engineers, explosive experts, mechanics and pilots then headed for Mackenzie in British Columbia, Canada, where a 30ft high and 130ft-wide dam was specially built to see if the Dambusters raid could be reconstructed.

'Before that could happen, however, the group had to negotiate several engineering hurdles. A mechanism had to be designed to carry the bomb and the device itself had to be balanced so that it did not vibrate.

'The biggest challenge was making the bomb itself spin. Barnes Wallis' original device bounced cleanly and was stabilised because it was rotating at a rate of 500 revolutions per minute (RPM) when it hit the water.

'For the reconstruction team, to do the same thing meant either repeating the inventor's strategy of spinning it during the flight - which is logistically complex - or setting it spinning on the runway before take-off, which might lead to the RPM falling too low before the aircraft reached the drop zone.



Sir Barnes Wallis, left, the aeronautical engineer behind the 'bouncing bomb' and, right, Dr Hugh Hunt in a Lancaster bomber, the aircraft which carried out the Dam Busters raid

FACTFILE: THE DAMBUSTERS RAID

- The Mohne and Eder Dams in the industrial heart of Germany were attacked and breached by mines dropped from specially modified Lancasters of No. 617 Sqn.
- The Sorpe dam was also attacked by two aircraft and damaged.
- A fourth dam, the Ennepe was reported as being attacked by a single aircraft (O-Orange), but with no

damage.

- An estimated 1,294 people were killed by floodwaters and 8 of the 19 aircraft dispatched failed to return with the loss of 53 aircrew and 3 taken prisoner of war.
- Wg Cdr Guy Gibson, Officer Commanding No. 617 Sqn, is awarded the VC for his part in leading the attack.

'The group opted to set their bombs spinning before take off. To keep them turning, Hunt, who worked closely with his PhD student, Hilary Costello, designed a shield, rather like the windscreen on a vintage sports car.

'This was custom-designed to deflect air around one side of the device. The movement of the air kept the bomb spinning so effectively that it was still turning at 1,000 RPM when it was dropped.

'The shield was developed and optimised with the aid of the wind tunnel in the aerodynamics laboratory in Cambridge.'

He added: 'Not everything could be reconstructed faithfully. So few Lancaster bombers survive that the team had to use World War II vintage DC4 aircraft instead. The dam itself was also one third the scale of those attacked in Germany - although the rest of the project was scaled accordingly to make it realistic.'

Dr Hunt added: 'Our pilots had no-one shooting at them, the engineers could use things like bowling machines to test their theories, and the whole thing was only at one-third scale - and even then it was hard enough.

'You compare that with the original challenge - for Barnes Wallis and for the pilots - and you realise what an amazing achievement it was.'

- *Cambridge University said a Channel 4 documentary about the experiment - Dambusters: Building The Bouncing Bomb - would be shown at 8pm. May 2, Monday*



A Douglas DC4 aircraft, made in the 1940s, was used to drop the oil drum-sized bomb



A scene from the 1955 film 'The Dam Busters' which starred Richard Todd (left) as Wing Commander Guy Gibson and Michael Redgrave (right) as Dr Barnes Wallis



Real heroes: Guy Gibson, centre, with the air crews who took part in the raid on Germany. Gibson won the Victoria Cross for his bravery during the attack



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I don't think anyone was trying to celebrate/glorify any form of jingoism. Reading into the article it is trying to understand how engineers overcame the difficulties of the physics given the technology of the time. Just to balance it out a bit, Bob Toffee, (Land of Licorice Allsorts, 2/5/2011 14:53), and a little off topic I know, but by the end of the war the results of the German engineers to build the V2 rocket provide us with the ability to use rockets to get satellites into space (for communication and GPS...etc). Also every jet aircraft now flying uses the Axial flow version of the jet engine developed by the Austrian Dr. Anselm Franz for the Luftwaffe aircraft, not the centrifugal type Sir Frank Whittle is credited with. It shows some good can come from war (from all sides) depending on how we learn from our lessons.

- Micky Turbo, WiltsUK, 03/5/2011 12:16

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I read this book as a teenager and was fascinated. I watched it last night and it was great. Having worked on major marine & concrete projects as an adult, I was thrilled to see it done. The work they put into the original project (in such short time) combined with the determination and bravery of the pilots and crew is inspiring.

- Wandsworth, Way, 03/5/2011 12:15

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Bob Toffee, Land of Licorice Allsorts.....glad to see your nickname matches your comment, stupid irrelevant rubbish. Atrocities were carried out on both sides, this is unfortunately the nature of war and maybe this action helped shorten the course of the war thereby reducing the civilian casualties.

- Keith Tomlinson, Leeds, UK, 03/5/2011 09:58

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The recurrent jingoistic celebration of civilian slaughter is shameless idiocy. In the interest of truth I would welcome a German slant on allied bombing atrocities. The first casualty of war is truth and history is the propaganda of the victor.

- Bob Toffee, Land of Licorice Allsorts, 02/5/2011 14:53

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To all the liberal leftwing hand wringers, remember who started the war! Remember the dead in London, Liverpool, Cardiff, Swansea, etc, etc, etc, before you start crying about those who died whilst supporting a government Slaughtering millions in their concentration camps (and don't lie to me that they did not know), and in the occupied countries, you hand wringers and apologist make me sick!!!

- Old Git, The Bunker, 02/5/2011 14:14

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"The Canadian authorities would not allow the modern-day re-enactment to use a live incendiary." Exactly, there's no way a civil pilot would be allowed to fly around with a home-made bomb slung beneath his aircraft. Of course they had to use a pre-positioned charge to demolish the dam,

- Phil, Oxford, 02/5/2011 13:04

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