



WATERBIRD PUTTING THE RECORD STRAIGHT

Ian Gee relates the fascinating history of the world's first
aeroplane to fly with a stepped float, and it was British!

Numerous texts credit American flying pioneer Glenn Curtiss with the invention of the stepped float, the surface tension-breaking concept which enables aircraft to take off from water, for which he's been dubbed 'Father of US Naval Aviation'.

However, I've accumulated documentation from the early days of mechanical flight which proves that, in fact, the stepped float was first developed and used by a British team, working at Windermere, in the Lake District.

Over the past seven years, I've served as a Trustee of the The Lakes Flying Company Limited, a charity which has been involved in building a working replica of *Waterbird*, the pre-WW1 floatplane which first successfully featured the stepped float, in order to highlight the achievements of the Windermere team.

Waterbird was the first aircraft outside France and the US to make a successful

(Above) **Wakefield's *Waterbird* in flight at Windermere in 1911. The longest flight achieved was of twenty miles at a maximum altitude of 800ft.**

(Photo: The Lakes Flying Company Limited)

flight from water when she took off from and landed on Windermere on 25 November 1911.

The replica, built at Wickenby Aerodrome near Lincoln, has so far achieved land-based straight hops, reaching an altitude of ten feet, but the plan is to fly her from Windermere, for which permission has already been granted by the Lake District National Park Authority.

THE BACK STORY

I've held a PPL since 1979, but only when I started studying for a seaplane rating did I discover that the US claimed credit for the important invention of the stepped float. I was

told by the instructor to study various text books, which were all authored in the US, and I read that Glenn Curtiss came up with the idea of the stepped float for use on seaplanes.

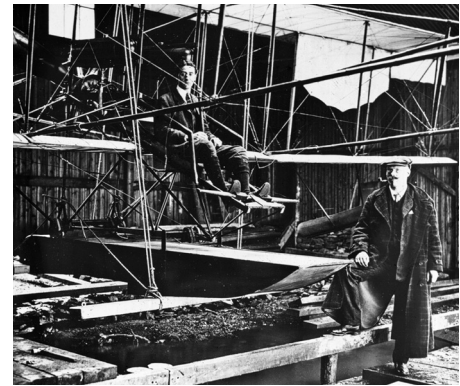
The introduction to ER Johnson's *American Flying Boats and Amphibious Aircraft* was typical of these texts, and it states, 'Glen Curtiss built a flying boat during the summer of 1912... the solution he finally hit upon was to incorporate a transverse step. Every flying boat, amphibian and seaplane that has flown since, is an heir to his efforts.'

Comparing the dates with other books, magazines and original documents, I realised that, in fact, the Windermere team had first successfully used the step for floatplanes and flew with it before Curtiss.

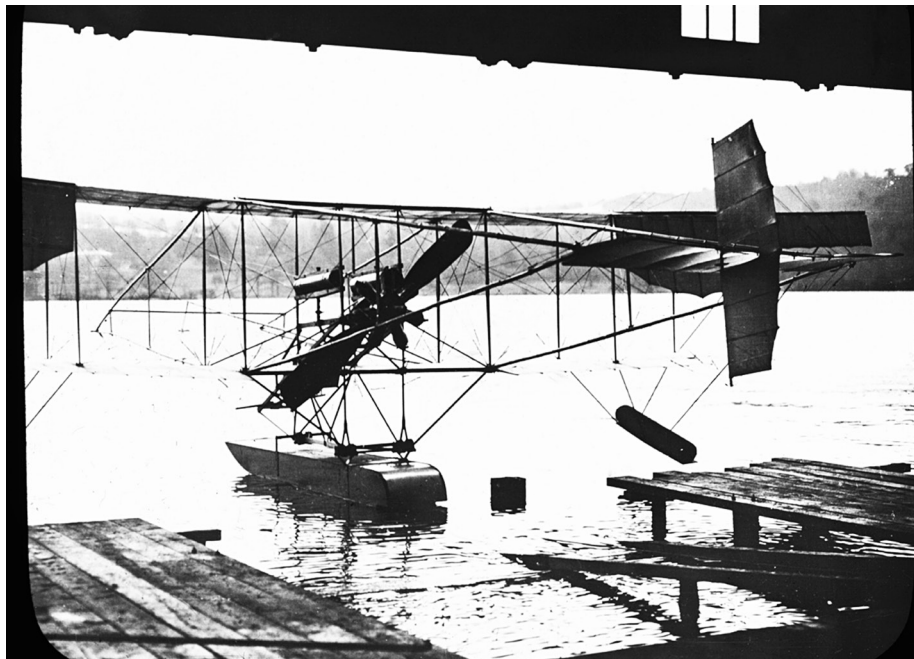
One of Britain's most important aviation pioneers, Captain Edward Wakefield of Kendal, applied for UK *Patents* for the stepped float on 11 December 1911,



Aerial photography pioneer Frank Herbert's shot of *Waterbird* landing, after its second flight on Windermere, on 25 November 1911.
(Photo: The Lakes Flying Company Limited)



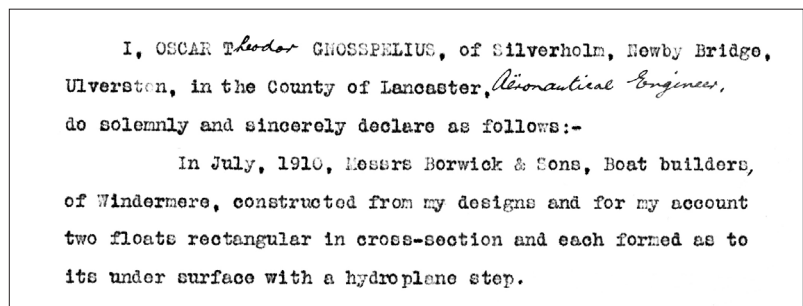
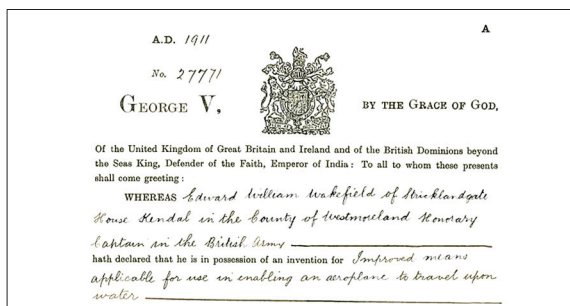
(Above) *Waterbird* suspended from the roof of her Windermere hangar, as the floor had yet to be completed. Unfortunately, the hangar ultimately collapsed during a storm and wrote her off.
(Photo: The Lakes Flying Company Limited)



(Left) *Waterbird* moored by her hangar.
(Photo: The Lakes Flying Company Limited)

(Below left & right) On 11 December 1911, Edward Wakefield successfully applied for *Patents* to cover stepped floats and their method of attachment.

The second image is Gnosspelius's *Objection Declaration* to Wakefield's *Patent* which, ironically, helped to prove that the latter was ahead of Curtiss.
(Photos: The Lakes Flying Company Limited)



which were granted on 12 September 1912, and 24 October 1912, with amendment on 18 March 1913. Curtiss, however, applied for a US *Patent* on 4 June 1913, which was granted on 8 June 1915.

Wakefield had commissioned *Waterbird*, an Avro Curtiss-type, from AV Roe & Co and undertook two years of almost constant experiments to develop the float.

The aircraft was converted to a floatplane at Wakefield's base at Hill of Oaks, on the shores of Windermere and, from there, carried out numerous flights including one of twenty miles which achieved an altitude of 800ft.

The base at Hill of Oaks soon became a key Admiralty training centre and by the beginning of WWI was a major facility for Naval pilots, before their deployment to the Western and Mediterranean Fronts. This activity led to the establishment of a Royal Naval Air Station at Windermere in 1916.

Sadly, *Waterbird* was rendered beyond repair in March 1912, when her hangar collapsed during a storm. Her life was short, but very productive and provided the vital springboard to establishing a twin centre of technical innovation and flying expertise. This combination drove the development of more sophisticated aircraft at such a pace that, by the end of 1914, just three years later, viable carrier-borne naval aircraft were in action against Germany. In 1918, a Felixstowe flying boat, piloted by Captain Cooper Pattinson from Windermere, shot down a Zeppelin, which earned him the DFC.

NO DISRESPECT INTENDED...

I don't mean to disrespect the remarkable genius of Glenn Curtiss, who was a pioneer of both motorcycle and aviation development. In fact, the Windermere team had a great deal to be grateful to him for, as they used Curtiss's

aeroplane designs for *Waterbird*, including the float. However, initially, the Curtiss float was flat-bottomed, as he was taking off from the sea, where the natural chop of the water breaks the surface tension.

The world's first actual design and test of a stepped float was by Oscar Gnosspelius at Windermere, in July 1910. But Gnosspelius didn't protect his invention and later objected to Wakefield's *Patent Application*. It's ironic that, decades later, I read Gnosspelius's *Objection Declaration*, which helped to prove that Wakefield was ahead of Curtiss.

Although Curtiss should be acknowledged for all his wonderful achievements, and given thanks for the technological development of the aeroplane and the float, what popular history has claimed as his most important contribution wasn't actually his.

It was a clergyman, the Rev Charles Meade Ramus, who first suggested the

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hydroplane in 1872, and he drew the Admiralty's attention to the results of his experiments, which utilised models, but the scheme as a whole was abandoned.

UK Patent No 17,360, which was applied for by Albert Edward Knight on 2 August 1906 and granted on 10 January 1907, is the first on record relating to stepped hydroplanes, albeit for boats. The flying boat and the waterplane with stepped floats were originated on paper by Knight in 1909, in a document sent to the Admiralty.

On 28 March 1910, Frenchman Henri Fabre made the first successful flight from water. However, his float wasn't stepped but had a flat part underneath, with a curved upper surface, so as to generate a lifting force when moving on water or in the air.

The world's first actual design and test of floats with steps was by the aforementioned Oscar Gnosspelius at Windermere in July 1910. In November 1910, having designed another stepped float, Gnosspelius' 'No 1' aircraft made a few 'hops', however, its 20hp engine generated insufficient power for sustained flight.

Glenn Curtiss flew from water on 26 January 1911 at San Diego Bay, California, and this is regarded as the world's first practical hydro-aeroplane flight. *Waterbird's* float was of a Curtiss type, but the American's had been designed to ride through waves of the sea, shaped so that it'd tend to rise on the surface, and was flat-bottomed, not stepped.

On 18 November 1911, at Cavendish Dock, Barrow-in-Furness, an Avro D fitted with a pair of stepped floats was flown by Commander Oliver Schwann for fifty or sixty yards, but he was unprepared for the climb to a height of 20ft. The aeroplane fell back into the water, damaging a float and wing. However, it did successfully fly on 2 April 1912, piloted by Sydney Sippe.

On 25 November 1911, Gnosspelius' 'No 2' aircraft had been airborne for a just one minute when an untoward gust of wind caused him to lose control. He overcorrected, causing a rapid bank to the right then to the left, following which the port wing tip was damaged and the propeller splintered upon striking the water, resulting in the aeroplane turning onto its back.

However, Gnosspelius No 2 did successfully fly on 14 February 1912, again piloted by its designer.



The wheeled *Waterbird* replica awaits flight on the grass at Wickenby.
(Photo: The Lakes Flying Company Limited)



The replica during one of its successful 'hops' – the plan is to fly it as a floatplane from Windermere. (Photo: The Lakes Flying Company Limited)

On 25 November 1911, piloted by Herbert Stanley Adams, *Waterbird* took off from Windermere and safely alighted, thus becoming the world's first successful flight to use a stepped float, a feat only achieved when a second step was added at the stern.

On 11 December 1911, Wakefield applied for *UK Patents No 27,770* and *No 27,771*, for stepped floats and their method of attachment, which were respectively granted on 12 September 1912 and 24 October 1912, with amendment on 18 March 1913. The object was, 'To provide an aeroplane with means for enabling it to alight, float and travel along the surface of water and to rise again therefrom.' Wakefield had combined the features of float construction in a novel way.

On 14 March 1912, Wakefield entered into a contract with the Admiralty for stepped floats and undercarriages, or royalties, and to convert an Deperdussin M1 into a hydro-aeroplane, which was first flown by Adams at Windermere on 11 July 1912.

The original *Waterbird* float has actually survived and is now held in the RAF Museum Reserve Collection.

On 30 April 1912, *Waterhen*, the immediate successor to *Waterbird*, was first flown by Adams. The float, with a single step, had been made larger so as to support the additional weight of a passenger.

In July 1912, at Hammondsport, New York, Glenn Curtiss first incorporated a step into a flying boat, the Curtiss Model E (Flying Boat No 2).

THE REPLICA

It was perhaps inevitable that changes had to be made when constructing a replica of an aircraft which was built over a hundred years earlier. This certainly applied to The Lakes Flying Company Limited's replica of *Waterbird*, although the build team did restrict the changes made to those demanded by modern safety standards and practicality.

Wakefield's aircraft had a 50hp Gnome rotary engine, but the replica boasts a Rotec 110hp R2800 radial, which has a conventional throttle control rather than the original's ignition 'blip switch'. It's fitted with a purpose-built Hercules propeller.

On the original, the outer ailerons were pulled down by the control stick into the airflow, whereas on the replica a closed aileron circuit has been incorporated.

Construction-wise, the original's wing spars were made of spruce, but this has been substituted with Douglas fir, which is stronger. And the copper nails and ruffs (collars to prevent end-wise motion) used on the original's spar webs have been superseded by screws and glue.

In addition to using modern glues and dope to attach the fabric, rather than tacks, the replica benefits from certified wire, certified turnbuckles and load-testing of specimens of the bamboo used. And finally, the replica has the benefit of John Tempest's analysis of the best trim angle for its horizontal tail.

For more information about The Lakes Flying Company Limited's replica *Waterbird*, and to keep up with all the latest news about the project, please visit www.waterbird.org.uk ■



(Above, from top)
Wakefield's original float, built by Borwick & Sons, of Bowness-on-Windermere, and the replica, by Richard and James Pierce of Ambleside.
(Photos: The Lakes Flying Company Limited)