

## [Back Cover - Bell and Baldwin's HD-4](#)

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'Bell & Baldwin's Hydrofoil: HD-4 Above is a full-size model of the Hp-4, constructed and now on display at the Alexander Graham Bell National Historic Park in Baddeck. While the cigar-shaped craft itself is impressive, the important elements are the hydrofoils. The hydrofoils are the ladder-like sections under the craft (seen best in this photo under the stern • left). Once moving through water, the HD-4 would rise up out of the water and ride on these foils. The foils in water lifted the body of the Hp-4 in the same way the wings of an airplane lift the airplane as it moves through the air. Elizabeth Quance, historian. Parks Canada: Bell first became interested in hydrofoils in 1906. At that time he was thinking mainly in terms of a boat which he could use as a hull for a tetrahedral aircraft. He was actively engaged in experiments with tetrahedral kites at that time. And that summer, Casey Baldwin, who was a friend of J. A. D. MacCurdy's, and who had just graduated from the University of Toronto in mechanical engineering, came down to Baddeck at MacCurdy's invitation and stayed with the Bells. Baldwin was very interested in the Bells' experiments and among other things they discussed the possibility of using hydrofoils on boat hulls. If you have the boat hull, there are a number of different conformations of hydrofoil that you can attach to them. The ones Bell and Baldwin used were generally rows of hydrofoils arranged in steps (like a ladder). And as the boat moves through the water the lifting action on the hydrofoils is similar to the lifting action on an airplane wing: it is produced by the stream of water moving over the surfaces. And as the speed of the boat increases, the lift generated by the hydrofoils increases, so that the hull is actually lifted out of the water and the boat just rides on the foils. You can see this quite clearly in pictures of the HD-4, the hull of the HD-4 is entirely out of the water and the boat is riding on these foils. The foils remain in the water but as the boat moves the lift generated on the foils is proportional to the speed at which the boat is moving, among other things, so as the boat is moving some of the uppermost foils will themselves rise out of the water. So the boat is then riding on the lower foils • and the resistance is thereby reduced. HD-4

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