

## Pocklington's part in testing (very) early flying machines

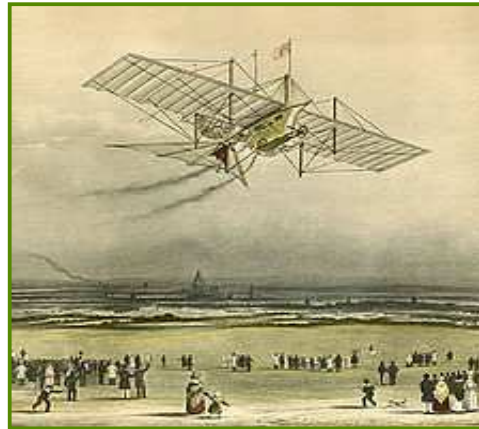
by John Nottingham and Jeff Peck

*Acknowledgements:* Some illustrations in this article are taken from a joint UKTV and BBC North programme entitled "The man who invented flying" © New Ventures Ltd 2003.

If asked "Who invented flying?", many people are likely to reply "The Wright brothers". But while the American siblings Orville and Wilbur did indeed greatly advance the science and practice of aeronautics in the early 20<sup>th</sup> century, it must be acknowledged that many pioneers had previously been applying much thought and experimentation to the fundamental problems of flying heavier-than-air machines, including Leonardo da Vinci's designs as far back as c. 1485 and with significant successes by others in the 19<sup>th</sup> century.

Nevertheless, [Orville and Wilbur Wright](#) are justly credited for achieving the first *powered*, controlled, heavier-than-air, human flight, at Kittyhawk in 1903. They patented their basic system of flight control, still in use today, and went on to develop practical flying machines.

However, we should also recognise that two Englishmen, [John Stringfellow](#) of Sheffield and [William Henson](#) of Nottingham, worked together on practical designs in the mid-1800s. The engraving shows their plans for an 'Aerial Steam Carriage' which, although not developed beyond the drawing board, clearly bears many of the hallmarks of aircraft flying in the early 1900s. Indeed, in 1848, they pre-dated the Wright brothers' achievements by inducing a 10 ft long, steam-powered machine to fly, albeit indoors and over a very limited distance.



Even closer to home, all these early pioneers fully acknowledged the prolific inventor, [Sir George Cayley](#) of Brompton Hall near Scarborough. Thanks to bags of Good Old Yorkshire gumption, coupled with Cayley's extensive experimental testing of his designs from the late-1700s, he is credited with achieving the first *unpowered* flights with heavier-than-air, man-carrying machines, in 1853, a full 50 years before the Wright brothers' exploits.

Furthermore, Sir George not only correctly sussed out the primary lift and drag forces acting on an aircraft, plus the importance of wing incidence, stability and the centre of gravity, but also deduced the basic principles of efficient wing design, all of which continue to apply today. So we believe Cayley is quite rightly considered to be the father of aviation and, arguably, "The man who invented flying". And where better than in Yorkshire?

With Sir George aged almost 80 in 1853, he sensibly delegated the task of flying his 'governable parachute' (the word 'aircraft' not having been invented back then). Two names have been suggested: either his grandson George John Cayley, or Sir George's 20-year-old coachman John Appleby. We prefer the latter as the (possibly apocryphal) story has it that, following a heavy landing, Appleby promptly handed in his notice to Sir George on the grounds that "I was hired to drive, not to fly"! This may well fit as Appleby appears in the 1851 census as a groom at Brompton Hall but, by 1861, had returned to his parents' home at his birthplace of Pickering, as a domestic gardener. Wise lad...

But whoever was the first 'test pilot', the 1853 flights are recorded as taking place at Brompton Dale, to the north of Sir George's home at the Hall. The Dale is a shallow valley, running north-south and, with rising ground on the east side, allowing the machine to be 'launched' westwards by burly farmhands pulling ropes. Although this was such a momentous event in the history of aviation, little other detail survives.

However, in a 1973 Anglia TV programme, an accurate replica of the Cayley machine was flown by an experienced and intrepid glider pilot, [Derek Piggott](#) MBE, at the original test site at Brompton Dale. The exploit was repeated for an IMAX film in the 1980s, the photo showing the replica being similarly rope-launched from the east side of Brompton Dale.



This first replica is now on display at the [Yorkshire Air Museum](#) at Elvington, allowing close inspection of Cayley's wing aerofoil and stabiliser tail, plus the cruciform control surfaces at the rear, operated by the extraordinary tiller arrangement. Note also that, in the interests of minimising the machine's weight – and thus the lift needing to be generated by the wing aerofoil – Sir George dispensed with wooden spokes for the wheels and, instead, used wire tension spokes, invented by him in 1808 but not patented until 1826 (by Theodore Jones of London).



So far so good, but when does Pocklington come into the saga? In the run-up to the 150<sup>th</sup> anniversary of the 1853 flights, the Heritage Group of the aircraft manufacturer BAE Systems at Brough near Hull constructed a second prototype, based on Sir George's overall design but using an aluminium framework to reduce weight, and, for pilot safety, with conventional 3-axis flight controls pioneered by the Wright Brothers.

With BAE's own test airfield at Holme-on-Spalding Moor having been closed some 20 years previously (RIP) and returned to agriculture, the second prototype of the Cayley machine was test flown at Pocklington airfield in 2003. The photo overleaf shows Allan McWhirter of the Gliding Club being car-towed alongside the north-south runway. As a result of tweaks following a slight 'whoops' on a previous test flight, the replica machine showed itself to be nicely balanced and controllable in sustained flight – terminated only due to the approaching airfield boundary and busy A1079...



The machine was then transported to Brompton and, on the 150<sup>th</sup> anniversary itself, rope-launched across Brompton Dale and flown by none other than ‘test pilot’ Sir Richard Branson, dressed overall in contemporary rig but with some modern liberties (the rickshaw wheels and seat belts were still to be invented). True to form, the paparazzi chose to place themselves in harms way on the west side of the Dale and, deservedly, one was almost mown down.



Prompted and encouraged by these exploits, Colin Wigglesworth, a retired boat-builder from Scarborough, aided and abetted by Martin Lucas, an engineer/pilot from Slingsby Aircraft at Kirbymoorside, set out to design, build and test one of Sir George’s much earlier projects – dated 1808!

Cayley’s near-200-year-old outline drawings and calculations were very sketchy, but the two enthusiasts were able to derive and build a full-scale machine from Sir George’s notes and eventually put it to the test, once again at Pocklington airfield.

The photo shows the pilot attempting a car-towed take-off at Pocklington, alongside Barmby Road and on the very same strip reportedly used by Home Defence fighter aircraft during WW1, thus linking almost two centuries by this very early Cayley design of 1808, the presumed WW1 landing strip, the WW2 airfield and the experimental test flights of 2003.



Clearly the authentic Cayley aerofoil was generating lots of lift and the rear end of the machine was nicely airborne, unfortunately causing the nose to dig into the ground, suggesting the machine's centre-of-gravity was too far forward. Some 'empirical redesign' (moving the pilot's seat further back...) and further testing failed to achieve a sufficient improvement; the front end remained stubbornly grounded.

However, with time running out and nothing to lose, finally the machine was car-towed up to flying speed, this time *sans pilot* – and promptly took off! Inevitably, with no-one at the controls, this state lasted for no more than a few seconds before some yaw and wing-drop set in, resulting in a heavy landing and some structural damage. End of very brave attempts.



But what a superb effort by all concerned. The Cayley-designed 1808 aerofoil evidently performed near-perfectly and, had more time been available for further development and testing, the gut feel was that the machine could eventually have flown in controlled flight, putting Yorkshire – and Pocklington – very firmly on the earliest world aviation map. First the 'Flying Man' (1733) – failed. Then the very first design for a practical flying machine (outlined in 1808 and test flown at Pocklington in 2003). **Success** – if only for a few seconds, and albeit *sans pilot*...