

What is a Powered Flight?

PUTTING HISTORICAL CLAIMS INTO PERSPECTIVE

By CHARLES H. GIBBS-SMITH, M.A.(Harvard), F.R.S.A., F.M.A., Comp.R.Ae.S.

TO qualify for having made a powered and sustained flight, a conventional aeroplane should have sustained itself freely in a horizontal or upward flight-path—without loss of air-speed—beyond a point where it could be influenced by any momentum built up before it left the ground; otherwise it will only rate a powered take-off, leap or glide—i.e., it will not have made a fully self-propelled flight, but will have merely followed a ballistic trajectory modified by aerodynamic factors. Furthermore, it must be shown that the machine can be kept in satisfactory equilibrium. Simple sustained flight obviously need not include full controllability, but the maintenance of adequate equilibrium in flight is part and parcel of sustentation.

Before any performance can be accepted as a powered and sustained flight, a number of possibilities should be well and truly ruled out, the influence of any of which would be disqualifying: they are (a) that the machine might have had a mechanically assisted take-off; or (b) that it might have run downhill before take-off; or (c) that it might have accelerated along the ground and then been made to "jump" into the air by the sudden action of its elevator; or (d) that it might, after propulsion along the ground, be launched into the air suddenly by meeting a rise or declivity of the ground. Two or more of these happenings could easily have been combined.

If any of these possibilities cannot be ruled out from a claim, the alleged flight cannot be accepted as sustained, and a "flight" which is not sustained cannot be called a flight in this context, as it denies the purpose of the engine. Even totally unflyable aeroplanes—as well as many objects which are not flying machines at all—can be made to leap through the air for considerable distances, and may not deserve any more credit than an automobile which rides through the air after meeting a hump-back bridge at speed. Wilbur Wright once wrote:—

"From our knowledge of the subject we estimate that it is possible to jump about 250 feet, with a machine which has not made the first steps toward controllability and which is quite unable to maintain the motive force necessary for flight. By getting up good speed a machine can be made to rise with very little power, and can proceed several hundred feet before its momentum is exhausted. . . . There is all the difference in the world between jumping and flying."

Where equilibrium is concerned, the machine should have been demonstrably maintained in equilibrium for longer than the few seconds during which it might have survived in the air fortuitously.

Finally, quite apart from the physical possibilities involved in claims to powered flying, there are important psychological possibilities to be taken into account, such as wishful thinking on the part of both experimenters and onlookers at the time, and in later years; lapses of integrity under stress of pride, jealousy, etc.; lapses and telescoping of memory, etc. Particularly suspect, for obvious reasons, are those claims advanced long after the alleged events. Also, of course, there is the overall question of assessing the reliability of the evidence being examined.

From what has been said above, it is clear that the imponderables may be formidable; but in practice they appear formidable only if we allow ourselves to become involved in hair-splitting and fruitless arguments about events which were relatively slight. I would emphasize the word *relatively*, as the efforts to fly were often of absorbing interest, and remarkable for their ingenuity and "guts." But unless we distinguish clearly between tentative efforts and true and manifest accomplishments, we are in danger of making nonsense out of history.

It was to help clarify the historical perspective on claims to powered flying that I recently suggested—and the Director of the R.A.E. agreed—that a minimum distance of *about* a quarter of a mile (1,320ft) through the air should stand as a modest criterion of a simple powered and sustained flight by an apparatus which, after all, was built to "navigate the air." I cannot believe that anyone who is truly concerned with aviation history can ever seriously accept as powered flights those passages through the air of a hundred or two feet, lasting some four to five seconds, and measuring at most about ten times the length of the aircraft.

Two claims to the very first powered flights may be ruled out at the start; those for the Mozhaiski machine in 1882, and the Maxim machine in 1894. The former took off down a "ski-jump" ramp, and the distance thereafter is not recorded; and Maxim had upper restraining rails, the absence of which would have been just as likely to have resulted in an immediate crash as in a sustained flight. A third claim—that of Jatho in 1903—has only recently been advanced, and may be ruled out owing to its

shadowy nature: in any case the maximum distance claimed was only some 197ft.

We now come to Ader's *Eole* in 1890. The airborne distance claimed was "about 50 metres" (164ft) which was some ten times its own length (about 16½ft). Ader himself said the machine had "insufficient stability," and described the test as "*cette tentative*." Charles Dollfus, who has made the most exhaustive study of Ader, says that the test was not a sustained flight, and only claims it as the first powered take-off. As for the claim of 300 metres (984ft) made for Ader's *Avion III* in 1897, Dollfus points out that it was not until nine years after the event—despite "claimless" published descriptions by Ader in the meantime—that Ader and his friends made this claim, when they heard of Santos-Dumont's early trials in 1906: whereas we have the detailed and scrupulous official eye-witness report by General Mensier (who was friendly to Ader) which indicates that at no time were more than one of the three wheels clear of the ground, as shown by their tracks. Incidentally, the *Avion* had no elevator control at all, and an inadequate rudder, among its many defects.

Of the claim that in May 1908 Cody's machine left the ground for 150ft—less than five times its own length (36ft)—it may be said that this claim also was not put forward until many years after the event; in any case I have already written enough about this, and Cody flew a good 1,390ft in October.

The claim that A. V. Roe's biplane flew 150ft (his own maximum claim) in June 1908—less than seven times its own length (about 23ft)—was not put forward until long afterwards, although brief "hops" seem certainly to have been made. But Roe himself, his son says, "considered flights up to 1,500ft failures," thus aligning himself with my quarter-mile criterion: the plaque at Brooklands unveiled by Roe in 1954 refers only to "flight trials," and Capt. Pritchard to "the first time a British-designed and British-built aeroplane had got off the ground."

Santos-Dumont, in 1906, "flew" about 200ft in October and 722ft in 21 sec in November, in his highly unpractical "*14-bis*," i.e., some 20 times its own length (about 37½ft). These efforts were hailed by the French, who had been actively struggling to get off the ground since 1903; and in that frustrated atmosphere of non-existent standards, they were—and are still (grudgingly)—accepted as the first powered flights in Europe.

Lastly, the Wrights. On December 17, 1903, against a stiff wind—unlike the others—they were airborne for 12 sec at the first take-off, and covered some 470–600ft through the air (approximately 120ft over the ground): the fourth flight that morning lasted 59 sec and covered about half a mile through the air (852ft over the ground), the equivalent of flying in calm air—which the others had—the length of Regent Street, from Oxford Circus to Piccadilly Circus. If they had achieved only their first test of 12 sec, history would probably have denied them any honour: as they went on to fly for 59 sec the same morning, history rightly acclaims them. By September 1904 they were turning and making circuits, and flying for over five minutes at a time. By October 1905 they could bank, turn, circuit, make figures-of-eight—all with ease—and remain in the air for over half an hour at a time. It was not until November 1907 that the flight-time of 59 seconds was equalled by a European, and not until the winter of 1909 that it was equalled in England.

FORTY SHELL FILMS

A NEW catalogue of Shell loan films has recently been issued, and it is interesting to find, first, that the aviation section now lists 40 titles and, secondly, that the whole of the famous series of S.B.A.C. Show films is still available.

Newest film, in the technical series, is *Transonic Flight*. This starts with an analysis of the flow past an aerofoil between M. Crit and Mach 1.3, and goes on to define the subsonic, transonic and supersonic ranges and to study the difficulties and remedies.

Indicative, incidentally, of the wide field in which Shell have interests—and in case any aeronautical body would like a *real* change of subject for a film evening—are some of the other titles: *Raspberry Beetle*, *Breakneck Speeds at Goepang Trials*, *The Chairborders*.

The catalogue is available to representatives of organizations, who should write to Film Section, Public Relations Department, Shell Petroleum Co., Ltd., Kingsway, London, W.C.2.