Ballooning in the Bristol region, 1784 to 1786

The Opening Chapter in the History of Local Manned Flight

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As home to Cameron's, one of the best known balloon manufacturers, and venue for a world renowned balloon fiesta, Bristol can justifiably be titled the "Balloon Capital of Britain". Although the sight of multi-coloured hot air balloons drifting serenely over the rooftops is today a common spectacle for Bristolians, many would be surprised to learn that it was in 1785 that the first manned ascent took place from the city. The following account, based almost exclusively on contemporary sources, attempts to chart the effect of the "Balloon Craze" of 1784 to 1786 on the Bristol Region, (defined for this purpose as a 50 kilometre radius of the city to the east of the Severn), and to describe some of the techniques employed by those early pioneers.

Early on the afternoon of November 21st 1783 Jean-François Pilâtre de Rozier, a Professor of Natural Philosophy, and Franâois Laurent, Marquis d'Arlandes, a Major in the Garde Royale, ascended from the Château La Muette in the Bois de Boulogne for a 25 minute flight over Paris. This ascent in a Montgolfier balloon filled with "Rarefied Air" opened a new chapter in the history of man, the two courageous adventurers becoming the first human beings to leave the earth's surface. Public imagination was fired and man's initial aerial voyage heralded the start of a period of intense enthusiasm for anything concerned with balloons and ballooning. Although this craze was to last only three years, that brief period saw the development of many techniques and traditions that still prevail in ballooning circles today.

Technology was at this time moving surprisingly quickly, for within only ten days Jacques Charles and Ainé Robert had successfully demonstrated and flown, from the gardens of the Tuileries in Paris, a full size balloon filled with "Inflammable Air" a much more effective lifting agent than the "Rarefied Air", (better known today as hot air), employed by the Montgolfiers. It was due to the use of the term "Air" for the gas used to fill these aerostats that, up until about 1790 when "Inflammable Air" was renamed hydrogen by the French chemist Lavosier, balloons of either type were generally refered to as "Air Balloons". The outstanding performance of hydrogen filled envelopes caused hot air machines to languish almost forgotten for the next 170 years, and the majority of the serious experimental balloons constructed during the remainder of the 18th century were filled with hydrogen.

Due to a certain amount of professional jealousy on the part of British scientists, and the apathetic attitude of the Royal Society, England at this time was lagging well behind the French in aeronautical developments. When at last demonstrations were carried out in this country it was Italians who lead the way, for they alone it seems had taken the trouble to acquaint themselves with details of the French discoveries during their travels across Europe. Probably the first flight of a small un-manned balloon in England took place on November 4th 1783 when Count Francesco Zambeccari, together with fellow Italian Michael Biaggini, an artificial flower maker, succeeded in launching a model balloon from Biaggini's roof in London's Cheapside (1).

The first report of any ballooning activity in the Bristol area is contained in "Felix Farley's Bristol Journal" early in December 1783 (2). "The Air Balloons are so much the prevailing fashion that we are assured, two gentlemen of this city, of great ingenuity and well skilled in philosophy, are busily engaged in preparing a machine of that kind, which will shortly be exhibited for the amusement of the inhabitants of this city". Just who these men were we may never know, as local newspapers provide no further mention of them, but small experimental balloons were soon to be demonstarted in the West. At Bristol, Michael Biaggini exhibited an air balloon at the Cooper's Hall in King Street for three days commencing Monday January 4th 1784, charging a 2s 6d entrance fee, and although never flown the balloon attracted much public interest. The envelope was some 30ft. in circumference and the proprietor permitted those who were interested, "to see the method and process of filling the balloon with inflammable air", upon the payment of an extra 2s 6d (3).

The first outdoor demonstration of a small balloon in the area was performed a few days later at Bath, where the noted local physician Caleb Hillier Parry M.D. F.R.S. (1755 - 1822) released a small hydrogen filled aerostat from the Crescent Gardens at midday on Saturday, January 10th. A successful 19 mile flight was achieved before it came to earth just west of Wells, where it was discovered by one Thomas Urch who subsequently inflated the envelope with a pair of bellows, "and exhibited it in that state to the populace of Wells and Shepton Mallet at 2d each" (4). This would appear to have been Parry's one and only aeronautical experiment although the doctor, who hardly quitted Bath for a day after settling there as a physician in 1779, later became famous for his independent researches in medical and scientific matters (5).

Dr.Parry subsequently provided the "Bath Chronicle" with a detailed technical description of the balloon and its inflation, and the following article appeared on January 15th (6). "It consisted of two hollow cones, joined together at at their bases: The circumference of the common base was upwards of 17ft; the height of the upper cone three feet and of the lower five and a half. The materials of which it was made were taffety and sarsnet, of which it took about 18 yards of yard wide; it was varnished with the common drying oil of the painters, which is nothing more than linseed oil boiled with litharge. From the dimensions specified above it appears, that this balloon was capable of containing something more than 72cu.ft. of air, without making any allowance for its approach to a spherical form on distention, which in reality, seemed to increase its solid contents at least one fourth. The inflammable air with which it was filled was supplied from iron shavings and concentrated vitriolic acid, of the former which were employed 17 pounds and the latter 36 pounds, with a proportionable quantity of water. It was 8 hours and a half in the filling with air to such a degree as to float, which it did when it was less than two-thirds full".

By a strange coincidence another gentleman also released his demonstration balloon from Bath on January 10th, but unlike Parry he had no local connections, and was infact a native of Tinwald, near Dumfries in Scotland, who had recently been residing in Ireland. As an itinerant lecturer in experimental philosophy James Dinwiddie L.L.D. (1746 - 1815) (7) had already launched an air balloon from the Bowling Green Tavern, near London's Buckingham Gate on December 18th 1783 (8), and this demonstration was to be the first performance of his tour of Southern England. Dinwiddie's small craft was next exhibited for over a week at the Old Rooms, Bath, "admittance to the balloon and other apparatus, 2s" (9), before the announcement was made that it was to be launched from Mrs.Scarce's

Riding School at 2 o'clock on January 10th (10) . In fact it lifted off six minutes early on its ten mile flight (11), being discovered about an hour later on high ground in the parish of St.George, near Bristol, a location still known as Air Balloon Hill (12).

In order to satisfy those citizens of Bath who for one reason or another had failed to attend either launching Dinwiddie performed a second demonstration at the Riding School (now the site of the Camden Works Museum) at about 1p.m. on January 20th (13), and its subsequent descent caused quite a stir in rural Dorset, as this letter, probably from William Ball of Shaftesbury, describes. "Tuesday afternoon last, about four o'clock, an air balloon ticketed from Bath, fell in a field in the parish of Farrington, near Sturminster Newton in this county, to the no small constenation of the neighbouring villages, which it passed over at a height of about 40 yards. It fell in a field among a parcel of cows who gathered round it hideous bellowing. The farmer and his men agreed to attack it; seeing it bounding on the ground, they concluded it to be some monster come to carry off the cattle; one of his men, more courageous than the rest, went to it, and sucured it by tying it to the railings of a rick. The curiosity of the country for six or eight miles round was never more raised than to see the air balloon" (14).

Dinwiddie's next stop was Bristol where on Saturday January 24th at eighteen minutes past one, he launched a 15ft. circumference air balloon from the Backfields, near Stokes Croft, "amid a vast concourse of people" (15). On this occasion a flight of some 20 miles was achieved before the aerostat was taken into military custody by Lt.Ogle of the 61st (South Gloucestershire) Regiment of Foot, who, with a party of soldiers was on a recruiting drive at Hilperton, near Trowbridge, where it descended at two o'clock in the afternoon (16). At that time a cluster of cottages then being built in Wilder Street, on the edge of Backfields, was christened Balloon Court (17), and although they survived until fairly recent times the buildings have now been demolished to make way for the modern office blocks known as Wilder House and Kenham House.

This demonstration was only the fourth in a quite remarkable series that was to follow, for Dinwiddie was to carry on to launch balloons at a number of other locations in the South and West. Exeter was the first stop on February 7th, where the balloon disappeared out to sea (18), and this was followed by a demonstration at Plymouth on February 12th, where a similar fate befell the little aerostat (19). It was the turn of Salisbury on March 12th (20), the flight ending at Liphook, near Petersfield, in Hampshire (21), while Winchester was the venue on March 11th (22), the balloon travelling 9® miles south-east to Bishop's Waltham (23). Dinwiddie next visited Southampton, where on March 17th the balloon travelled inland as far as Westbury in Wiltshire, a distance of nearly 40 miles (24). Later, on the 29th, the launching took place from Portsmouth and on this occasion the balloon was blown out to sea, being recovered at Crab Niton on the Isle of Wight (25). The last ascent so far discovered in local newspapers was on April 15th 1784 at Chichester, from where Dinwiddie's balloon travelled some nine miles to Harting, some four miles south-east of Petersfield (26).

Before the end of the year Dinwiddie had returned to Ireland, and after further travels in Scotland and England, in 1792, sailed for China as part of the British Embassy to that country. Upon the completion of the Embassy's work in 1794 he moved to India, where he eventually became Professor of Mathematics, Natural Philosophy and Chemistry at the newly opened college of Fort William in Bengal. Here Dinwiddie prospered, and when he eventually retired to London in 1807 was worth about o10,000 (27).

By March 1784 ballooning activity had shifted north into Gloucestershire where at Cirencester two ingenious citizens, Mr.G.Clutterbuck and Mr.Thorn had constructed a 112cu.ft. air balloon which they launched at midday on Thursday, March 18th from Earl Bathurst's Home Park(28). These two local worthies must have been well pleased with their efforts for in just 45 minutes it covered the 32 miles to touch down in the sea near the Black Rock lying just off the Monmouthshire Coast, near Portskewett (29). The Mr.G.Clutterbuck was almost certainly George Clutterbuck (1752 - 1797) a joiner and cabinet maker, and the Mr.Thorne probably George Thorne, who was to marry Clutterbuck's sister Mary in June 1785 (30).

Not all of the advertised demonstrations, however, actually took place, even though the price of failure could be high, for it was not unknown for a luckless experimenter to be fortunate to escape with his life should his attempts prove to be in vain. A frustrated eighteenth century crowd was inclined to display little mercy, and on a number of occasions it proved expedient to release a balloon even before the inflation process had actually been completed. At Dursley we can find a good example of two over enthusiastic experimenters who were indeed lucky to escape physical injury.

Messrs. Sharpnell and Dyer it appears proposed to launch a balloon from Stinchcombe Hill at midday on August 3rd, and as details of the event had been carried in the "Gloucester Journal" (31) it was not surprising that a large crowd had gathered in anticipation. They were, however, to be disappointed and as "Felix Farley's Bristol Journal" subsequently reported (32) "after waiting many hours in anticipation behold! nothing but a child's paper kite was exhibited. After some altercation with the company assembled, the artists thought proper to take to their heels, and so escape the lashes of the spectators whips". The exact identity of Sharpnell and Dyer is not known, but it is possible that one of them was William F.Shrapnell, surgeon to the South Gloucestershire Militia who was a close friend of the famous Edward Jenner M.D. L.L.D. F.R.S. of Berkeley (1749 - 1823), remembered with affection the world over for his discovery of vaccination as a preventative of smallpox (33).

Nevertheless, this fiasco at Dursley did nothing to dampen enthusiasm for ballooning in the southern part of Gloucestershire, for the very next month Dr.Jenner himself carried out his first aeronautical experiment, although he was careful to keep the details from the public, fearing the result of another local failure. Jenner had also been a close friend of Dr.Caleb Parry since boyhood days, when they had both attended the Rev.Dr.Washbourne's school at Cirencester (34), so it was not surprising that he should try to emulate his friend's achievements, and Parry, it seems, was happy to provide details of balloon construction. Jenner subsequently wrote to him stating, "your directions respecting the Balloon are so clear and explicit, 'tis impossible for me to blunder; but to make it quite a certainty, I intend first to fill it and see if it will float in the Castle-Hall, before the public exhibition. Should it prove unwilling to mount and turn shy before a large assembly, don't you think I may make my escape under the cover of three or four dozen Squibs and Crackers?" (35).

Caution, it appears, prevailed for on Thursday September 2nd 1784, and in private, he finally launched his hydrogen filled balloon from the Inner Court of Berkeley Castle. It was released at two o'clock in the afternoon, and later that day was seen to descend into a meadow at Symond's Hall only a short distance from Kingscote Park, at that time the

residence of Anthony Kingscote Esq., father of three most eligible daughters. The balloon's arrival in the parish caused a great deal of excitement and, "the reapers were so much terrified that they could not for some time be prevailed to approached it" (36).

Jenner's ride over to retrieve his little aerostat resulted in his first meeting with Catherine Kingscote, a lady he subsequently married on March 6th, 1788, so there must have been little difficulty in persuading him to re-launch the balloon from Kingscote Park, for the benefit of the family and their friends. This was soon accomplished and in the best romantic traditions the balloon rose into the air carrying a poem, specially written by Jenner's friend Edward Gardner, and dedicated to Catherine, his new found love (37). No details have come to light regarding the balloon's fate, but it is just possible that it came to earth a little over 20 miles away on high ground near Birdlip Hill, where there still exists a public house bearing the title "Air Balloon Inn".

By this time small hot air balloons were starting to become something of a nuisance and these, which were simple and cheap to construct when compared with the hydrogen filled variety, were being launched all over the country. Typical of the problems they caused can be illustrated by a report which appeared in the "Gloucester Journal" on October 18th, 1784. "On Saturday evening a balloon came down in the court at the Bull Inn in this city, all on fire. Providentially it fell a few yards from the stable door, where some straw was lying, or the whole premises must have been in a blaze. From the accidents which have happened in Kent, the magistrates have thought it right to prohibit balloons" (38).

Meanwhile an important event had taken place in London, for on September 15th 1784 Vincenzo Lunardi, secretary to the Neopolitan Ambassador in London, at last lifted off in front of a crowd of 100,000 or so impatient spectators at the grounds of Honourable Artillery Company to become England's first aerial traveller. Overnight the young Italian became a popular hero, with the ballooning craze in this country reaching its peak soon after. Balloons were all the rage, with Lunardi's ascent being depicted on Bristol Delft bowls, and other items of crockery, while similar designs figured on glasses, handkerchiefs, fans, head dresses, and clock faces, as well as on copper tokens. A number of astute businessmen used the balloon's title to christen their commercial undertakings, and in Bristol John Weeks, the patriotic proprietor of the Bush Tavern in Corn Street, started a "Balloon Coach" to London, while others ran from the White Hart in Broad Street, and from Bath (39).

Lunardi was not the only foreigner to seek fame and fortune in England, for a Frenchman's sights were also set in that direction. After carrying out a few ascents in this country the climax of Jean-Pierre Blanchard's career came on January 17th 1785 when, in company with Dr.John Jeffries, his American sponsor, he accomplished the first aerial crossing of the Channel from England to France. During the preparations for this flight the little Frenchman had received help with the infaltion from an ingenious mechanic named James Deeker who sold small experimental balloons from his premises at 59 Berwick Street, Soho, London. Deeker went on to make a number of balloon ascents of his own, and soon after another member of the same family one Joseph Deeker, sometimes spelt Dicker or Decker, was ready to make his first ascent, and for the venue chose Bristol (40). The journey down from London was broken at Bath where on March 10th 1785 the 25ft diameter balloon advertised as "The incomparable Grand and Majestic Gold and Silver Air Balloon" was exhibited at Mr. Gyde's Assembly Room, admittance being one shilling (41).

This balloon, which was probably constructed at the expense of George Cracknell a Birmingham publican (42), was the smallest man carrier yet built. Nevertheless, it was equipped with a net over the envelope, onto which was attached a ring from which was suspended a very ornate car, containing a seat for the aeronaut, and the oars with which it was hoped to steer the balloon. Its secret lay in the fact that it had the first full sized envelope ever to be constructed from Gold Beaters Skin, a light and very gas tight material made from the caecum, or blind gut of an ox. Although this was the most impenetratable of the flexible materials available, and was subsequently used by all late 19th century British military balloons, each animal was only able to provide about half a square foot of Gold Beaters Skin. It was possible to construct an almost spherical envelope using this material, adhesion of overlapping pieces being achieved by gentle pressing together while clean and wet, which in due course caused the tissues to 'grow' together providing a permanent hydrogen tight joint.

Building and launching a man carrying aerostat was an expensive business, and financial support through sponsorship or direct public subscription was the normal way of paying for such a demonstration. Deeker in fact estimated his costs at 200 guineas, with the majority of the money to be raised by a pre-flight exhibition of the balloon at the Cooper's Hall in Bristol's King Street from the middle of March. In addition subscription tickets were sold for a grandstand view of the ascent, these being available at 10s. 6d. for the front, and 5s. for the back places (43). When at last the necessary money had been raised the balloon was removed from the Cooper's Hall and installed in a field adjoining "Mr.Rawlings house in St.Philip's", from where it was to be launched on Monday, April 18th, 1785. This Mr.Rawlings was probably the John Rawlings, surgeon, listed at Little Avon Street in the 1795 Bristol Directory.

In the city vast crowds gathered in anticipation, but it was three in the afternoon before even a small pilot balloon was released to test the wind, and this was later reported to have come down near the Cross Hands public house at Old Sodbury. The 18 year old youth, sometimes described as Deeker junior, finally stepped into the basket at 3.45 p.m., and after some near disasters which threatened to pitch him out into the field, the balloon finally rose into the sky and was out of sight within 15 minutes. So strong was the wind that it took only 32 minutes to cover the 26 miles, the balloon eventually making a very rough landing 2® miles east of Chippenham, where Joseph Deeker, luckily none the worse for his experience, was escorted into the town, "amidst the acclamations of the assembled crowd" (44).

By the end of the month Cracknell had repaired the damage caused by the uncontrolled landing, and the little aerostat was put on display for a few days at the end of April, again at the Cooper's Hall, where Deeker was on hand from nine in the morning to eight at night to answer questions about his aerial voyage. The balloon was then removed to Birmingham where once again it was displayed to the public, this time at the theatre in King Street, but not enough money was subsequently raised to enable a planned ascent to take place by either Cracknell or Deeker (45).

No more is heard of Joseph Deeker's ballooning exploits in England, but on August 7th 1789 he launched a 24ft diameter balloon from Fort George on New York's Manhatten Island, the first serious demonstration that city had witnessed. This he followed, on August 15th, with the release of a 30ft diameter aerostat from Mr.Seaman's Racetrack in New York, which resulted in a 15 mile flight ending on a farm in Flushing. The climax of his

work in America, however, was to be his ascent in a 30ft. diameter balloon, again from Mr.Seaman's Racetrack, as part of the celebrations honouring George Washington's inauguration as first constitutional president of the United States. Sadly, on this occasion as the upper retainer was loosened, the gas failed, and the balloon fell and burst into flames, much to the great dismay of thousands of spectators. Deeker blamed this failure on the press of the crowd and the wind, but others were not so kind, going as far as to suggest that at least he had kept his promise of leaving the city right after the event, "but not before having dipped into the purses of the generous and disappointed spectators" (46).

Young Deeker's aerial voyage certainly fired the imagination of local people, and several put forward plans to construct not only bigger, but scientifically equipped balloons. In Bristol on April 23rd 1785, John Weeks of the Bush Tavern together with Joshua Springer, a mathematical, philosophical, optical, and musical instrument maker of Clare Street advertised a proposed scientific ascent in a 100ft circumference three man balloon, providing o300 could be raised by public subscription (47). These funds, however, were not forthcoming, inspite of two further advertisments in the local press, and the project never left the drawing board (48). Nevertheless, John Weeks did eventually succeed in making a small mark on the pages of local aeronautical history as his farm at Filton, named after his hero Lord Rodney, is the place which gave its name to the Rolls Royce Rodney Works that now occupies the site.

Over in Bath James West junior, a native of that city, proposed another 100ft circumference aerostat, and this version, designed to carry two men, was to be equipped with oars and a rudder with which it was hoped to steer the balloon. The single advertisment appeared in the "Bath Chronicle" on April 28th, but as with the Weeks venture in Bristol the public refused to sponsor the attempt (49). It is, however, of interest to note that a certain James West, an actor at New York's John Street Theatre who had boasted of having demonstrated balloons to George III, exhibited 12ft and 36ft diameter balloons at the theatre in June 1793, and appears to have successfully launched them soon after from the College Green (50).

Although a number of Englishmen had by now made balloon flights, the honour of being the first rests with the "Father of English Ballooning", James Sadler (1751 - 1828), who had made his first ascent from Oxford, his home town, on October 4th 1784 using a hot air balloon. From then on hydrogen was employed as his lifting agent, his next ascent being on November 12th, again at Oxford. On May 5th 1785 he flew from Moulsey Hurst on the Thames, and on May 12th and May 19th from Manchester, followed by another two ascents, this time at Worcester on August 25th and September 10th 1785, his sixth and seventh flights respectively (52). Sadler then travelled to the West, proposing to make his eighth ascent from Stroud, and by October 17th the balloon had arrived in the town where it was advertised as being on display at the George Inn, prior to the ascent which was to take place on Wednesday, October 19th (53).

Sadler generated the hydrogen gas in casks containing small pieces of iron with diluted sulphuric acid; and from there it was conducted by pipe into the balloon, round which the casks were ranged. This was a tedious process and due to leaks in the apparatus the inflation took much longer than had been expected. It was not surprising therefore that as the day progressed the crowd grew steadily more restless. Sadler next sent aloft a small pilot balloon to ascertain the wind direction, and knowing how dangerous so many

discontented spectators could be prudently decided to attempt the ascent even though the balloon was not fully inflated. At 2.30p.m. Sadler lifted off from Wallbridge Wharf on his 15 minute flight, but on account of the lack of gas a distance of only three miles to the south-west was achieved before the balloon touched down in a field called Ireland, near Stanley Park, seat of Thomas Pettat Esq. (54).

No details of any further balloon flights by Sadler during the 18th century have so far come to light, but between 1786 and 1810 his abilities found vent in at least three directions, as a chemist, engineer, and inventor, the latter chiefly in connection with improved types of ordnance and guns. In July 1810, however, he restarted his career as a balloonist, with a flight at Oxford, and unlike a number of his contemporaries, after a total of at least 47 ascents died of natural causes in 1828 (55).

In the flush of enthusiasm for ballooning that had spread across Europe in 1794 and early 1795 a number of manned ascents had been made and all of these, save for some bruises on landing, had been undertaken safely. However, in June 1795 this false illusion was spectacularly shattered with the death at Boulogne of PilŸtre de Rozier, the world's first aeronaut. This event, followed by the first fatal air accident in Britain, when Ralph Heron fell from Lunardi's balloon during a premature take off from Newcastle upon Tyne in August 1786, brought to an abrupt end ballooning the craze in Europe, while the French Revolution and the subsequent wars in Europe ensured that no balloons were demonstrated in the Bristol Region until 1802.

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NOTES

1) Rolt p 61; Hodgson - Hist. of Aviation in G.B. pp 100-104.
2) F.F.B.J. 6/12/1783 p3b.
3) B.& M.B.J. 3/1/1784 p3a.
4) B.C. 22/1/1784 p3c.
5) Lives of the British Physicians pp 275-304.
6) B.C. 15/1/1784 p3 c&d.
7) Hodgson Hist.of Aviation in G.B. pp 100-104.
8) Cook p 36, Proudfoot pp 17-18.
9) B.C. 1/1/1784 p3d.
10) B.C. 8/1/1784 p3c.
11) B.C. 15/1/1784 p3 c&d.
12) Sanigar pp 3-4.
13) B.C. 15/1/1784 p3d.
14) B.C. 29/1/1784 p3c; Proudfoot p129.
15) F.F.B.J. 31/1/1784 p3b.
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17) Sanigar p2.
18) E.F.P. 2/5/1784 p3a & 12/2/1784 p3d; S.& Y.M. 16/2/1784 p3d.
19) E.F.P. 12/2/1784 p3d; S.& W.J. 1/3/1784 p2b.
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28) G.J. 15/3/1784 p3d.
29) B.& M.B.J. 20/3/1784 p3d.
30) Edwin, Witchell & Huddleston p 148; Administration of George Clurtterbuck of Cirencester 1797 (Gloucester Record Office)
31) G.J. 2/8/1784 p3d.
32) F.F.B.J. 14/8/1784 p3d.
33) Fisk p110.
34) Lives of the British Physicians p275.
35) Miller p3.
36) G.J. 6/9/1784 p3c; Fisk pp 76-78.
37) Baron p72.
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39) F.F.B.J. 25/9/1784 p3d & 6/11/1784 p3a.
40) Crouch PP 100-103; Rolt p86; B.& M.B.J. 23/4/1785 p3d; J.O.J. 15/1/1785 p1c; (see also Hodgson - Hist. of Aviation in G.B.).
41) B.C. 3/10/1785 p3c; F.F.B.J. 12/3/1785 p3d; B.& M.B.J. 12/3/1785 p3d.
42) F.F.B.J. 30/4/1785 p3a.

43) F.F.B.J. 26/3/1785 p3a; 26/3/1785 p3d; 2/4/1785 p3b; 9/4/1785 p3a; B.& M.B.J. 9/4/1785 p3d.
44) F.F.B.J. 16/4/1785 p3d; B.C. 21/4/1785 p3d; F.F.B.J. 23/4/1785 p3d; S.F.B.J. 23/4/1785 p3d; B.& M.B.J. 23/4/1785 p3d.
45) F.F.B.J. 30/4/1785 p3a; A.B.C. 16/5/1785 p3d & 23/5/1785 p3e.
46) Crouch pp 100-103.
47) F.F.B.J. 23/4/1785 p3c.
48) F.F.B.J. 30/4/1785 p2c, 14/5/1785 p2c and 21/5/1785 p3d.
49) B.C. 28/4/1785 p3d.
50) Crouch p102.
51) Rolt pp 79-80; (see also Hodgson - Hist. of Aviation in G.B.).
52) J.O.J. 9/10/1784 p3b, 13/11/1784 p3b and 7/5/1785 p3a; W.M.C. 14/5/1785 p4d and 21/5/1785 p4d; B.W.J. 1/9/1785 p3c&d and 15/9/1785 p3d.
53) G.J. 10/10/1786 and 17/10/1786 p3b.
54) G.J. 24/10/1786 p3d and Fisher pp131-2
55) Hodgson - James Sadler of Oxford Aeronaut.