DID BENJAMIN FRANKLIN FLY HIS ELECTRICAL KITE BEFORE HE INVENTED THE LIGHTNING ROD?

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One of the best known events in the life of Franklin is the story of his electrical kite and how, from this experiment, he deduced the identity of lightning and artificial electricity which led to the invention of the lightning-rod. Not only is this taught in our schools, through the popular biographies of Franklin, but many scientific treatises contain the same statement. I shall endeavor to show in this paper:

(1) That the kite-experiment was probably performed later than has been supposed; (2) that even before this experiment certain buildings in Philadelphia were provided with 'points,' probably as lightning-conductors; and (3) that prior to Franklin's first account of the kite-experiment he had drawn up precise directions for placing lightning-rods upon all kinds of buildings.

As is well known, Franklin's early electrical experiments are described in letters to his friend, Peter Collinson of London, who, because the Royal Society refused to include them in its *Transactions*, had them published in London under the title: *Experiments and Observations on Electricity, made at Philadelphia by Mr. Benjamin Franklin and communicated to P. Collinson.* The first edition, in two parts, appeared at London in 1751 and 1753, and the four subsequent editions contain also the later papers reprinted from the *Philosophical Transactions*, as well as other matter. This work was

soon translated into foreign languages and I possess the first French[1] and German[2] editions.

Already in his letter entitled: "Opinions and Conjectures, concerning the Properties and Effects of the electrical Matter arising from Experiments and Observations, made at Philadelphia 1749," written to Collinson, on July 29, 1750, Franklin had proposed to test the electricity of thunder-clouds by erecting pointed rods on high buildings and had suggested their use to disperse lightning-strokes. This and Franklin's other letters on electricity, which had been translated into French, excited great interest in France and the experiment proposed by Franklin, in the letter above cited, was executed at Marly, near Paris, on May 10, 1752, by M. Dalibard and at Paris eight days later by M. Delor.

Franklin's classic experiment in which, by means of a kite, he brought down the electricity from the thunder-cloud itself, was performed near Philadelphia within the next four months. The exact date is unknown, that of June which is usually assigned, being due, so far as I can ascertain, to Joseph Priestley,[3] but, as I shall presently show, there is good reason to believe that the experiment was not performed until later in the summer. De Romas, assessor of Nérac in southern France, who claimed to have had the first idea of the electrical kite in July, 1752, although he did not put it in practice until the following year, wrote to Franklin declaring his priority which had been denied by Priestley. Since Franklin's reply seems never to have been published except in the scarce French tract which I possess,[4] I give the letter here.

Philadelphia, July 29, 1754.

SIR,

Your most obliging Favour of October 19 with your two very ingenious Memoirs on the subject of Electricity came not

[1] *Expériences et Observations sur l'électricité faites à Philadelphie en Amérique* . par M. Benjamin Franklin et communiquées dans plusieurs lettres à M. P. Collinson. Paris, 1752.

[2] *Des Herrn Benjamin Franklins Esq. Briefe von der Electricität.* Aus dem Engländischen übersetzt . . . von J. C. Wilcke. Leipzig, 1758.

[3] *History of Electricity,* Fifth Edition, London, 1794, page 160.

[4] *Mémoire sur les Moyens de se garantir de la Foudre dans les Maisons,* Bordeaux, 1776.

to hand till yesterday. By this Vessel, which is just departing for London, I can only acknowledge the Receipt of them, and assure you that the Correspondence so kindly offer'd will be extreamly agreeable to me. A more particular answer I must defer till the next Opportunity; in the mean time I send you a late Paper of mine on Lightning, which perhaps may not be published before this reaches your Hands. I am very respectfully, Sir, your most obedient humble servt,

B. FRANKLIN.

M. ROMAS.

In the same work De Romas maintains that if, as he assumes to be the case, Franklin knew of the success of the French physicists, it would have been impossible for him to have got the news from Europe and to have confirmed their results with his kite within thirty days, that is to say during the month of June. This view is supported by the fact that a letter from Paris, dated May 26, N. S., 1752, and published in the *London Magazine* for May, was not reprinted in the *Pennsylvania Gazette* until August 27 of the same year. Authorities differ as to whether Franklin knew of the French experiments, Priestley asserting that he did not[1] and Park Benjamin saying that he desired to extend them to greater heights.[2] If we accept the latter statement we are forced, with De Romas, to assign a date later than June to the kite experiment. While this must have taken place during the summer or early autumn of 1752, no mention of it can be found until an account was published in the *Pennsylvania Gazette* of October 19, 1752, which is the same as that in the London *Gentleman's Magazine* for December, 1752. On the first of October, probably, Franklin wrote to Collinson in London, a similar account but this letter, which was read to the Royal Society on December 21, 1752, has suffered inexplicable alterations. It was first published in the *Philosophical Transactions* for 1752[3] where it bears the date October 1, 1752. It was reprinted, with slight verbal

[1] *History of Electricity*, page 152.
[2] *The Intellectual Rise in Electricity*, New York, 1898, page 589.
[3] Volume XLVII, page 595.

changes, in the five editions of Franklin's *Experiments and Observations on Electricity*, first appearing in the second part of the first edition, published at London in 1753. Here the letter is dated October 19, but what is more singular, as was pointed out by Professor Hellmann, a German bibliographer,[1] the important paragraph, which concludes this communication in the *Philosophical Transactions*, is omitted from the letter when reprinted in the collected papers above mentioned, and, as I have ascertained, likewise in the several editions of Franklin's works edited by Sparks, Bigelow and Smyth. The passage in question is as follows:—

> I was pleased to hear of the success of my experiments in France, and that they there begin to erect points upon their buildings. We had before placed them upon our academy and statehouse spires.

From the last statement it may be inferred that Franklin wished to assert his priority in the use of pointed rods as lightning-conductors and that he might possibly have anticipated the experiments of Dalibard and Delor in France, although, if he did, no account of this exists. In September, 1752, that is soon after the kite experiment probably, Franklin erected on his house in Philadelphia an insulated iron rod connected at its lower end with a pair of bells, which by ringing would show when the rod was electrified. In April, 1753, he charged one Leyden jar from this rod and another jar with positive electricity from a frictional machine, concluding from this and subsequent experiments:

> That the clouds of a thunder-gust are most commonly in a negative state of electricity, but sometimes in a positive state.

The first definite announcement of the lightning-rod is generally thought to be contained in a letter written at Philadelphia in September, 1753,[2] in which, after describing the foregoing experiments, Franklin says:

> Metalline rods, therefore, of sufficient thickness, and extending from the highest part of an edifice to the ground, being of the best material and compleat conductors, will, I think, secure the building from damage,

[1] *Neudrucke von Schriften und Karten über Meteorologie und Erdmagnetismus*, No. 11, Berlin, 1898, page 7.

[2] *Experiments and Observations on Electricity*, London, 1769, Letter xii.

either by restoring the equilibrium so fast as to prevent a stroke, or by conducting it in the substance of the rod so far as the rod goes, so that there shall be no explosion but what is above its point, between that and the clouds.

Were this Franklin's first announcement of the invention there might be grounds for the claim of the German physicist, Poggendorff,[1] that his countryman, J. H. Winkler of Leipzig, was entitled to share with Franklin the honor, because in the year 1753 he also had recommended the use of lightning-conductors and had given directions for their erection,[2] in consequence of which, probably, according to Poggendorff, they were introduced into Germany in 1754. It appears, however, from examining the history of lightning-rods that these experiments with multiple points were made by Procopius Divisch in an open field and that the first lightning-rods on houses, according to Franklin's method, were not installed in Hamburg until 1769.

But Franklin's priority is definitely assured by a remarkable article, which seems to have escaped the notice of all Franklin's biographers, and of writers upon the history of electricity, with one exception, and it is chiefly with the object of making the article known that I present this paper to the Society. It is true that Richard Anderson, in his *Lightning Conductors* (London and New York, third edition, 1885), does quote "an advertisement" which he says appeared in several of the editions of Franklin's almanac, "notably the Poor Richard for the year 1758." As this is not the case and since the lightning-rod was well known in America in the year 1758, the quotation, which I am about to give, contributed little to the history of the subject when cited by Mr. Anderson. The article in question was printed only once and then with the reading-matter near the end of *Poor Richard's (Improved) Almanac* for 1753, published in Philadelphia by B. Franklin and D. Hall. It is known that the matter for these almanacs was prepared by Franklin under the *nom-de-plume* of Richard Saunders, and the copy for the present issue must have been ready for the printer

[1] *Geschichte der Physik*, Leipzig, 1879, page 864.

[2] *Programma avertendi fulminis artificio*, Lipsiae, 1753.

early in October, 1752, because an advertisement in the *Pennyslvania Gazette* of October 19 states that the almanac was then in press and would be published shortly.

The article is as follows:—

How to secure Houses, &c. from LIGHTNING. It has pleased God in his Goodness to Mankind, at length to discover to them the Means of securing their Habitations and other Buildings from Mischief by Thunder and Lightning. The Method is this: Provide a small Iron Rod (it may be made of the Rod-iron used by the Nailers) but of such a Length, that one End being three or four Feet in the moist Ground the other may be six or eight Feet above the Highest part of the Building. To the upper End of the Rod fasten about a Foot of Brass Wire, the size of a common Knitting-needle, sharpened to a fine Point; the Rod may be secured to the House by a few small Staples. If the House or Barn be long, there may be a Rod and Point at each End, and a middling Wire along the Ridge from one to the other. A House thus furnished will not be damaged by Lightning, it being attracted by the Points and passing thro the Metal into the Ground without hurting any Thing. Vessels also, having a sharp pointed Rod fix'd on the Top of their Masts, with a Wire from the Foot of the Rod reaching down, round one of the Shrouds, to the Water, will not be hurt by Lightning.

It is admitted that Franklin suggested the possibility of the lightning-rod is early as 1750; it is here shown, I believe for the first time, that Franklin prepared definite directions for putting rods upon buildings in 1752, or about a year earlier than he has been credited with their invention. Moreover, from the concluding paragraph in the letter describing the electrical kite, which was nearly contemporaneous with his directions to secure houses from lightning, it appears that edifices in Philadelphia were already equipped with metal rods, though I cannot say certainly whether these were intended to protect the buildings from lightning-strokes or for further experiments on 'the power of points' to collect the electricity in the air.