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8. Barnard was the incoming president of the AAAS. The nominating committee had chosen Nashville, Tennessee, as the site for the 1861 annual meeting, which was scheduled for April. The meeting was postponed, however, due to the Civil War. The AAAS would not meet again until 1866. Kohlstedt, *AAAS*, pp. 226-227.

9. In 1852, the AAAS had planned to hold its annual meeting in Cleveland, but the meeting was postponed until the following year due to the threat of cholera. Kohlstedt, *AAAS*, pp. 174-175.

10. Margaret McMurray, *ANB*, s.v. "Barnard, Frederick Augustus Porter."

11. Lincoln was scheduled to arrive in Washington on the afternoon of February 23. But

concerns over his safety while traveling through pro-Southern Baltimore led to a last-minute revision of his itinerary. He secretly boarded a night train and arrived in Washington at 6 A.M. Long, *Civil War Day by Day*, p. 41; Margaret Leech, *Reveille in Washington, 1860-1865* (New York and London, 1941), pp. 35-36.

12. Davis had been elected president of the Confederacy on February 9, 1861. Henry greatly respected Davis, who had served as a Smithsonian regent from 1847 to 1851 and had later consulted Henry on various scientific matters while Davis served as secretary of war during the Pierce administration. Long, *Civil War Day by Day*, p. 33.

106. TO THADDEUS SOBIESKI CONSTANTINE LOWE¹

Smithsonian Institution

Washington D.C. [March]^A 11th 1861.

Dear Sir,

In reply to your letter² of Feb. 25th requesting that I would give you my views in regard to the currents of the atmosphere and the possibility of an application of a knowledge of them to aerial navigation, I present you with the following statement, to be used as you may think fit.

I have never had faith in any of the plans proposed for navigating the atmosphere, by artificial propulsion, or of steering a balloon in a direction different from that of the current in which the vehicle is floating.

The resistance to a current of air, offered by several thousand feet of surface, is far too great to be overcome by any motive power at present known which can be applied by machinery of sufficient lightness.

The only method of aerial navigation which in the present state of knowledge appears to afford any possibility of practical application is that of sailing with the currents of the atmosphere. The question therefore occurs as to whether the aerial currents of the earth are of such a character that they can be rendered subservient to aerial locomotion.

In answering this question I think I hazard little in asserting ↑that↓ the great currents of the atmosphere have been sufficiently studied to enable us to say with certainty, that they follow definite courses, and that they may be rendered subservient to aerial navigation, provided the balloon itself can be so improved as to render it a safe vehicle of locomotion.

It has been established by observations now extending over 200 years, that at the surface of the earth, within the tropics, there is a belt along which the wind constantly blows from an easterly direction, and from the

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combined meteorological observations made in different parts of the world within the last few years, that north of this belt between the latitudes of 30° and 60° around the whole earth the resultant wind is from a westerly direction.

The primary motive power which gives rise to these currents, is the constant heating of the air in the equatorial and the cooling of it, in and toward the polar regions; the eastern and western deflections of these currents being due to the rotation of the earth on its axis.

The easterly current in the equatorial regions is always at the surface, and has long been known as the trade winds, while the current from the west is constantly flowing in the upper portion of the atmosphere, and only reaches the surface of the earth at intervals after the occurrence of a storm.

Altho' the wind even at the surface over the U.S. and around the whole earth between the same parallels, appears to be exceedingly fitful, yet when the average movement is accurately recorded for a number of years, it is found that a large resultant remains, of a westerly current. This is well established by the fact that on an average of many years, packet ships sailing from N.Y. to Great Britain, occupy nearly double the time in returning, that they did in going.

It has been fully established by continuous observations collected at this Institution for 10-years from every part of the U.S. that as a general rule, all the meteorological phenomena advance from west to east, and that the higher clouds always move eastwardly. We are therefore from abundant observation, as well as from theoretical considerations enabled to state with confidence that on a given day whatever may be the direction of the wind at the surface of the earth, a balloon elevated sufficiently high would be carried eastwardly by the prevailing current in the upper or rather middle middle region of the atmosphere.

I do not hesitate therefore to say that provided a balloon can be constructed of sufficient size and of sufficient impermeability to gas in order that it may maintain a high elevation for a sufficient length of time, it would be wafted across the Atlantic. I would not however advise that the first experiment of this character be made across the ocean, but that the feasibility of the project should be thoroughly tested, and experience accumulated by voyages over the interior of our continent. It is true that more eclat might be given to the enterprise, and more interest excited in the public mind generally, by the immediate attempt of a passage to Europe; but I do not think the sober sense of the more intelligent part of the community would be in favor of this plan which would be considered a premature, and foolhardy risk of life. It is not in human sagacity to foresee prior to experience what simple occurrence or neglect in an arrange-

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ment may interfere with the result of an experiment, and I think it will be impossible for you to secure the full confidence of those who are best able to render you assistance except by a practical demonstration, in the form of a successful voyages^B from some of the interior cities of the continent to the seaboard.³

Very respectfully
Your obed't serv't.
Joseph Henry
Secretary
S.I.

T. S. C. Lowe-Esq.
Philadelphia.
Pa.

Lowe Papers, Library of Congress.

In William Jones Rhees's hand, with some changes and signature in Henry's hand.

1. Lowe (1832-1913), a native of New Hampshire, was an inventor and meteorologist with a special interest in aeronautics and upper-air currents. He launched his first balloon voyage in 1858 from Ottawa, Canada, in celebration of the laying of the Atlantic cable. DAB; F. Stansbury Haydon, *Military Ballooning during the Early Civil War* (1941; Baltimore and London, 2000), pp. 154-155.

In December 1860, sixteen citizens of Philadelphia signed a letter to Henry seeking the aid and advice of the Smithsonian on behalf of Lowe for an attempt to cross the Atlantic Ocean. According to an account written nearly forty years later by William Jones Rhees, Henry's clerk in 1860, Lowe himself delivered the letter to Henry. Rhees also states that Lowe's Philadelphia supporters were mainly interested in finding a method of transmitting news across the Atlantic at a pace faster than that of mail steamers. The Smithsonian regents passed a resolution on February 16, 1861, requesting Henry to advise Lowe but also to reply that the regents "do not consider themselves at liberty to make any appropriation from the Smithsonian fund for the purpose." Rhees, "Reminiscences of Ballooning in the Civil War," *The Chautauquan*, 1898, 27:257-258; *Smithsonian Report for 1860*, pp. 111, 113 (quotation).

On March 8, Henry wrote a letter of reply to the Philadelphia citizens, quoting the resolution of the regents and explaining that because the regents were responsible for prudent expenditure of the Smithson bequest, they were not justified in spending funds on an experi-

ment that "in the minds of the majority of considerate and reflective persons, is of great hazard." *Smithsonian Report for 1860*, p. 117.

2. Not found.

3. Despite Henry's decision not to endorse Lowe's plans for a transatlantic flight, Lowe eagerly sought Henry's advice for the less ambitious overland flight. After a meeting with Henry that Lowe later called "one of the high-lights of my life," he traveled to Cincinnati to make a test flight in one of his balloons, the *Enterprise*. He launched the *Enterprise* on April 20, ascended to a height of between 11,000 and 18,000 feet (accounts vary), and made his first landing at the boundary of North and South Carolina. A second ascent took him some twenty miles further, and he made a final landing near Unionville, South Carolina. After being apprehended in Columbia, South Carolina, on the suspicion of spying for the North, he was released on the word of men who knew of Lowe's reputation. Upon returning to Cincinnati on April 26, he concluded that it would be "an easy matter to cross the Atlantic in less than two days." He had flown for about nine hours, borne as predicted on an easterly current while in the upper atmosphere. Although Lowe had meant to sail due east, he encountered southerly currents after descending just past the Cumberland Mountains to determine his position. Tom D. Crouch, *The Eagle Aloft: Two Centuries of the Balloon in America* (Washington, 1983), pp. 276-279 (quotations on pp. 276 and 279); Rhees, *Journals*, p. 259; Haydon, pp. 162-166.