December 20, 1839

AMERICAN PHILOSOPHICAL SOCIETY MEMORIAL TO JOEL R. POINSETT

Records of the United States House of Representatives, RG 233, National Archives[1]

Hall of the American
Philosophical Society
20th. December 1839.

The Honorable
Joel R Poinsett
Secretary of War
&c &c &c

Sir,

The undersigned have been appointed a Committee of the American Philosophical Society,[2] to call your attention to, and invite, through the medium of your Department co-operation in the extensive system of Magnetic and Meteorological Observations about to be made under the direction of the British Government, and in connexion with their Antarctic Expedition, particularly directed towards Magnetic investigation.

The Science of Terrestial Magnetism has of late years made great advances, through the instrumentality of Humbolt, Hansteen, Gauss and others, and has now reached that point, when a system of combined Observations at widely distant points over the surface of the Globe, appears to be necessary to its further progress; desultory effort has already done all that it is competent to effect. Such a series of systematic observations have now been set on foot, by the British Government, directed to a better determination of the Magnetic lines, for the use of the Navigators, and to the accurate investigation of the Magnetic elements for theoretical purposes. The objects embraced, are the measurement of the Magnetic intensity, dip, and variation, at different Stations, by a Nautical Expedition, and at fixed observatories, and especially the investigation of the variations of these elements at the latter points. As subsidiary to these objects, combined

[1] Filed with this memorial (Petitions and Memorials, Select Committees, 26th Congress, 1839–1841) is a letter from J. G. Totten to Poinsett of December 30, 1839, forwarding and endorsing the memorial, and one from Poinsett to John Quincy Adams of December 31 presenting the memorial to the House of Representatives. All three documents are printed (with corrections of spelling and punctuation) as *House Documents*, 26th Congress, 1st Session, 1839–1840, No. 86.

[2] The committee was appointed on November 15, 1839, in response to the July 1, 1839, circular of the Royal Society, printed above. Bache presented the memorial at the December 6, 1839, meeting of the American Philosophical Society. APS *Proceedings*, 1838–1840, *1*:148, 151–155.

Meteorological observations are to be made, which cannot fail to elucidate, some of the most important questions in this useful Science.

The Magnetic changes to be investigated are of three kinds, first; those which depending upon a cause not yet satisfactorily explained, take place slowly but regularly, causing a general displacement of the lines of equal variation and dip; secondly, those which depending upon the position of the Sun, run through their period of change in a year or day, producing different values in the Magnetic elements, according to the season, or to the hour of the day; and thirdly, the small disturbances which appear to be constantly taking place, and which require for their measurement, continued observation with the most accurate instruments.

The striking fact was proved in 1818, by the observations of Arago at Paris, and of M Kupffer at Kasan, that the large changes which take place in the position of the horizontal needle, during the day are simultaneous at these places so distant from each other; and a confirmation of the fact as applying to even more distant stations, resulted from the system of observations established by Humbolt and others in 1830, and extended through the influence of the Imperial Academy of Sciences of S^{t} Petersburgh, to the most remote parts of the Russian Empire and even to Pekin. In 1834 the celebrated German Philosopher Gauss, invented an Instrument, for measuring the variations of the needle, and its changes which introduced into these determinations, an accuracy similar to that attainable in Astronomical measurements. This Instrument was soon furnished to different Observatories, and the concerted system of observations of the minute changes of variation was introduced, which is now going on, at no less than twenty three places in Europe, the smaller and larger States having vied with each other, in providing the means of executing them; The Stations include, Altona, Augsburg, Berlin, Bonn, Brunswick, Breda, Breslau, Cassel, Copenhagen, Cracow, Dublin, Freyberg, Göttingen, Greenwich, Halle, Kasan, Leipsic, Marburg. Milan, Munich, Naples, S^{t} Petersburgh and Upsala.

The results already obtained and published, by the German Magnetic Association, have proved satisfactorily, that the minute changes, in the direction of the needle, as well as the larger ones, are simultaneous at the different Stations, varying however in amount, and the variation appearing to decrease in passing southward, but the influence of the position of the place, whether depending upon Geographical or Magnetic position, not having yet been fully determined, and being probably determinable only by observations, at places even more distant from each other than those now embraced in the German series.

The invention of an Instrument by Gauss, for determining changes in horizontal magnetic intensity, with the same accuracy, as those of the direc-

tion of the needle, will give rise to interesting developments in regard to them, and the changes of the three elements of horizontal direction, and horizontal and vertical intensity are all included, by the two instruments before referred to, and a third invented by Professor Lloyd, of Dublin. It is the object of the series now projected to embrace these three elements, to extend the number of Stations, with special reference to their distribution, at points of the earth, interesting in their magnetic relations, to keep up a constant series of simultaneous observations for three years, and thus to effect on an expanded scale, what the German Association has so well begun. The execution of this plan with observations of an appropriate kind, directed also to Magnetic research by a Naval Expedition was recommended to the British Government, by the Members of the British Association including [. . .][3] men of Science from different Countries, in 1838, it subsequently received the sanction of the Royal Society of London, was adopted by the Government, and is now in the course of execution. It may be considered therefore to have been approved by the highest Scientific Authorities of all quarters. In pursuance of this plan stationary Observatories are to be established, and regular observations made for the next three years at Toronto in Upper Canada, at S^{t} Helena, at the Cape of Good Hope, and at a Station in Van Diemans Land. The East India Company have also undertaken to furnish the means of observation, at nine points in their Dominions. European Governments, who have not hitherto joined in the German system, with which this will be in connection have also promised similar aid. It is this extended scheme to which our attention has been specially invited, by a Circular from the Royal Society of London, and in which the American Philosophical Society, desires that our Country should co-operate. It is on a broad scale, worthy of all encouragement, and the magnitude of the scheme, the objects for which it is undertaken, and the possibility of its execution, all mark the character of the period in which we live.

The Society would propose in furtherance of this plan, that five Magnetic Observatories should be established, in the NE, NW, SE, SW, and at some central point of the United States, furnished with the Instruments, and observers necessary, fully to carry out the proper plan of combined Magnetic and Meteorological observations. Should the proposition to make this co-operation truly national, be acceded to, the detail in relation to it can easily be arranged, and the Society will, the undersigned confidently believe feel proud to lend any aid in their power, in planning or executing them. It may perhaps be more satisfactory however to state, briefly before-

[3] A space occurs here in the original but not in the *House Documents* version.

hand, the nature of the observations to be made, and the means required for their execution.

The Magnetic observations to be undertaken at the fixed observatories are first, of the variation (declination) absolute horizontal intensity and dip; second, of the changes of the variation of the horizontal intensity, and of the vertical intensity. The regular observations for changes in these elements, are to be made every two hours, every day, (with the exception of Sundays) for the next three years, beginning as soon as the several observatories can be arranged. To these are to be added, more frequent observations, on one day of each month, and at the terms, four times during the year, fixed by the German Magnetic Association. At each Station, a Building of Stone, or Wood, will be required, in the construction of which no Iron must be employed. The instruments adopted by the British observers are the following. A Magnetometer for the declination, one for the horizontal force, one for the vertical force, a dipping needle, azimuthal transit, two reading Telescopes, two Chronometers. The estimated Cost of each set of these, is about fourteen hundred Dollars. The Cost of the Observatory, must vary with the place at which it is erected, and the material chosen for it, but may be estimated at from one thousand to fifteen hundred Dollars. One Principal, and three Assistants will suffice for making and reducing the observations at each Station, and for carrying on a supplementary series, of Meteorological observations.

The Meteorological observations proposed are, on the pressure, temperature, and moisture of the Air, on the direction and force of the wind, on the quantity of rain, on the temperature of the ground, at different depths, on Solar and Terrestrial radiation, besides a few miscellaneous, and occasional observations, not necessary to be here stated. Regular observations are to be made on these points, four times every day, and every hour, on one day in each month. The Instruments required at each Station are, a Barometer, a Standard Thermometer, a Maximum and Minimum Thermometer, a Hygrometer, an Anemometer, several extra Thermometers, an Actinometer, and an Apparatus for atmospheric electricity. The probable Cost of each set of these, would not exceed two hundred and fifty Dollars. The value of the results, would be much increased by providing a self registering Anemometer and rain gauge, instead of the common ones, which would increase the cost of each set of Instruments to five hundred and seventy Dollars. The whole cost of erecting the five observatories and providing them with excellent Instruments, will probably not exceed sixteen thousand Dollars, and if the Observatory, already existing at Philadelphia,[4]

[4] i.e., Bache's Girard College Observatory.

and provided with the necessary Instruments, should be adopted as one of the five, and four others be erected and furnished, the expense to the United States would not exceed twelve thousand Dollars.

No estimate is made of the Cost of the Principal and Assistants for the proposed observatories. In the organization of the new British Stationary observations, these persons are taken in part, if not altogether from the Officers, Non Commissioned Officers, and Privates of the Artillery. The acquirements of the Graduates of our Military Academy admirably fit them for directing the Observatories, which might be appropriately placed at Military Posts, so as to provide the Officers and Men necessary for making the Observations, without additional expense. The direction thus given to the views of the Committee, and the fact that you have long been enrolled as a Member of the American Philosophical Society, and the interest which you have always manifested with us as an individual, and in a public capacity, in all enterprizes calculated to shed a lustre upon your Country, have induced the Society to direct us, to address ourselves particularly to you on this subject.[5]

[5] The memorial was referred to a select committee of nine, headed by John Quincy Adams, on February 5, 1840, and ordered to be immediately printed. On behalf of the select committee, Adams submitted a report on July 2, 1840. The committee resolved:

> That the sum of twenty thousand dollars ought to be appropriated for the establishment of five several stations, at suitable distances from each other, for making observations of terrestrial magnetism and meteorology, conformably to the invitation from the Royal Society of Great Britain to the American Philosophical Society, at Philadelphia, and to other learned societies in the United States; that the said sum should be placed under the direction and at the disposal of the Secretary of War, for the fulfillment of these purposes, he to account for the expenditures thus authorized to the Treasury of the United States.

House Reports, 26th Congress, 1st Session, 1839–1840, No. 630.

On July 18, 1840, Adams presented the resolution to the House, sitting as a committee of the whole, as an amendment to a bill appropriating money for the northeast boundary survey. The committee rose after rejecting the amendment and Adams presented the amendment again. *Niles National Register*, August 1, 1840, p. 350, reports that he "sustained it with his usual perseverance, referring, among other authorities, to a letter of the Secretary of War, approving and urging the plan, but in vain." The amendment was voted down, with only thirty-four members (almost all Whigs) voting for it and ninety-seven against. *Congressional Globe*; *House Journal*, 26th Congress, 1st Session, 1839–1840, pp. 1313–1315.

In a letter of July 21, 1841, Bache informed Sabine that the effort had failed: "Mr Adams met with such indifferent success in his first attempt to have a national co-operation in the magnetic scheme, that he has not renewed his efforts." (BJ3/25, Sabine Papers, Records of the Kew Observatory, Public Record Office, London.)

Although the effort for government support failed in the United States, individuals and institutions such as the Cambridge (Harvard College) Observatory and the observatory of the Depot of Charts and Instruments (later Naval Observatory) cooperated with the magnetic crusade. Bache regularly reported observations from the Girard College Observatory. He eventually received funding from the Topographical Bureau of the War Department in May 1843 and had the observations published by order of the Senate. See the preface to volume one of *Observations at the Magnetic and Meteorological Observatory, at the Girard College, Philadelphia . . . 1840 to 1845*, 3 vols. (Washington, 1847).

With the hope that your views may coincide with those of the Society, in regard to the plan, now presented for your consideration,

We are very respectfully
Yours
Alex. Dallas Bache
R. M. Patterson.
For & by request of Joseph Henry[6] Committee
J. K. Kane
Jos. G. Totten[7]

[6] Henry forgot to sign the document.

[7] Joseph Gilbert Totten (1788–1864), a member of the APS since 1836, was Chief of the Army Corps of Engineers. Henry later had frequent contacts with Totten, who was a Regent of the Smithsonian from 1846 until his death, an original member of the Light House Board, and an incorporator of the National Academy of Sciences. *DAB*.

TO JOHN TORREY

Torrey Papers, Library, New York Botanical Garden

Princeton Dec 31st 1839

My Dear Dr

Shortly after our conversation relative to Reed I spoke to Bache in his behalf and requested that an eye might be had to a situation. Also on the receipt of your letter I wrote to Bache on the same subject but as yet have not receved a reply.[1]

The carpenters are now busily engaged in seating the lower room:[2] the whole is to be finished by the middle of Feby. I have been occupied in part for a day or two past in adjusting the position of the benches so as to get in the pillars and produce the best appearance with the greatest amount of convenience to speaker and hearer. Since the begining of the present term my time has been almost exclusively given to my college duties. The anticipation of your course of Lectures before the Clinton Hall association[3] must of course interfere with your private studies. Engagements of the kind always cast their shadows a long way before.

I mentioned to you that I had attended a part of a popular course by Dr

[1] Torrey's letter has not been found. See, however, Henry's letter to Bache of October 28, 1839, above.

[2] Probably the lecture hall adjacent to Torrey's chemical laboratory on the second floor of Philosophical Hall.

[3] i.e. Mercantile Library Association. Torrey delivered a series of six lectures on the Chemistry of Nature in February 1840.