 Polar Record 47 (243): 310–326 (2011). *doi:10.1017/S0032247410000549*

'To unbar the gates of the South': Maury's 1860–1861 proposals for Antarctic cooperation

Rip Bulkeley
38 Lonsdale Road, Oxford, OX2 7EW (rip@igy50.net)

Received February 2010

ABSTRACT. In 1860 and 1861 Commander Matthew Fontaine Maury USN, (1806–1873), put forward the first ever proposal for international cooperation in polar research. Maury's initiative also prompted the first ever international correspondence about polar cooperation, fourteen years before Carl Weyprecht launched his better known proposal. For several reasons however, including the outbreak of the American Civil War, Maury's Antarctic project did not succeed. Maury's proposal was published in three languages, but the better known of its two English versions was prepared from text that had already been copied once or twice by hand. It suffered numerous minor errors and extensive editorial changes. To mark its 150th anniversary, Maury's autograph manuscript, now in the British National Archives, has been transcribed as accurately as possible, with his original wording, spellings and (lack of) punctuation. A commentary explains the origins and outcome of the project.

Introduction

The present article forms part of a larger investigation into the advocacy of international cooperation in polar science both before the first decision was taken to hold a polar year, and during the intervals between later successful polar year initiatives. After this introduction there are three main sections. The first tells the story of Maury's actions in respect of Antarctic research from 1860 down to the issuing of his circular in April 1861. The next presents the circular itself and two covering documents. The following section tells what became of the circular and assesses why it was ineffective.

Just as it would be inappropriate to reproduce a single document, and provide it with detailed commentary, within an overall study of polar cooperation, so is it only possible, here, to provide a brief sketch of the scientific, political, social and personal factors which led the 55 year old Commander Matthew Fontaine Maury USN, (1806–1873), director of the US Naval Observatory in Washington (Fig. 1), to put forward the first proposal for exploration of 'the South Pole by coöperation among the different nations concerned' (Maury 1861a reproduced as document A below).

As of 1860 Maury had unfinished personal business with Antarctica. Had he not been obliged to resign the post of astronomer with the United States Exploring Expedition, destined for the Antarctic, or had he not misunderstood, or perhaps been daunted by, a tacit offer to command it himself (Williams 1963: 115–118), he would have been on the high seas in October 1839 instead of suffering a road accident near Somerville, Ohio, which barred him from any further service at sea. All human lives are at the mercy of contingency, but Maury probably never forgot that one.

There were also deeper personal sources to his Antarctic project. Anyone who studies Maury soon grows familiar with his restless self-importance, so typical of high achievers. No sooner was one project fairly under way than he began to look for, or reveal, the next. Naval reform, a national system of maritime observations, the establishment of the Amazon as an international waterway, and the internationalisation of his data gathering system had followed one another thick and fast. By 1859 the international system was well established and Maury was completing a major revision to his masterpiece, *The physical geography of the sea* (Maury 1860a). It would have been completely in character, therefore, to begin casting about for 'the next big thing'.

Next, mid-19th century earth scientists were aware of the implications of electric telegraphy and steam powered transport and other machinery for their work, and several of them, such as Adolf Kupfer (1799–1865) at St Petersburg, were busy developing new observational networks. New scientific organisations and publications were also springing up, based on cheaper and more reliable forms of travel and communication. But some of those actual or foreseeable changes were of particular concern for Maury's system.

Maury had always understood that just as the system would produce steadily more reliable information, based on ever larger amounts of data, for sea areas regularly visited by shipping, so it would tend to leave increasingly less well charted 'white spaces' in unfrequented sea areas. For example, in the early, national phase of his scheme, he pointed out that the US Navy had few occasions to cross the North Atlantic, an area of major interest (Maury 1851: 24). By 1860 the problem was about to be exacerbated, first by the transition from sail to steam, especially for naval vessels, Maury's most reliable data source; next by the Suez Canal, on which work began in 1859; and thirdly, perhaps, by a Panama Canal, a project which Maury opposed. The combined effect of all this would be to alter and above all to reduce the visited parts of the world's oceans. Shipping along the new, narrower sea lanes would continue to benefit from the type of data exchanges which had been pioneered by Maury's system, but science, the endeavour to describe and understand the nature of the oceans as a whole,

Fig. 1. Matthew Fontaine Maury, c 1854 – artist unknown. From: Duyckinck, E.A., and G.L. Duyckinck. 1855. *Cyclopaedia of American Literature* vol 2.

would gradually lose some of the coverage that had been achieved during the age of sail. In 1865 an Australian newspaper explained this problem at some length, with respect to the South Pacific (*Sydney Morning Herald* 9 June 1865: 2, 30 June 1865: 2). Maury would certainly have seen it coming well before that.

The international political and cultural situation was fairly propitious for an Antarctic initiative. There was, for a brief interval (1859–1864), no international war in Europe. The spate of Arctic expeditions hoping first to rescue, then merely to trace the lost Franklin expedition, and simultaneously to resolve the question of the northwest passage, had recently drawn to a close. One of the last scientific circumnavigations under sail had just been completed by the Austrian Navy with *SMS Novara*. They had taken magnetic observations at many of the same tropical and temperate stations, but not the polar ones, as the British expedition led by James Clark Ross (1800–1862) a few years earlier. The fourth International Statistical Congress had taken place at London in July 1860. And of course Maury's own system of maritime observations had recently been adopted by several countries.

Maury's new project was also motivated by a particular scientific interest. By the late 1840s he thought he had discovered better scientific grounds for the centuries old notion known as 'the open polar sea' than, perhaps, that hypothesis had previously enjoyed (De Haven 1851: 498–499). Briefed and in the first case trained in advance by Maury, two US Arctic expeditions then reported evidence that supported the prediction. In the 1850s leading European scientists, such as August Petermann (1822–1878) and Adolf Mühry (1810–1888), joined in the attempt to confirm the idea. At some point Maury, typically, conceived an ambition to outdo all his predecessors and contemporaries by developing a similar theory in respect of the Antarctic. By 1860 he was ready to publish it.

The project

1860

Maury first circulated his ideas about the climate of Antarctica and the desirability of a new Antarctic expedition to scientific colleagues around the end of the year 1859 (Fiske 1860: 11–12). On 31 March 1860 he wrote to the Secretary of the Navy, Isaac Toucey (1792–1869), whom he despised as incompetent, to the same effect. He explained why he believed that the climate of Antarctica was little more severe in winter than in summer, so that 'the climate of those unknown regions render them inhabitable' (Williams 1963: 350; for Maury's full argument, see document A below). On 11 and 20 May he sent two short papers on the subject to his friend Lord Wrottesley (1798–1867), who was both president of the Royal Society and about to succeed Prince Albert as president of the British Association for the Advancement of Science (BAAS). In Maury's absence (*pace* Williams 1963: 351, 600), his papers were presented on 5 July at the 30th annual meeting of the BAAS in Oxford, perhaps by Rear Admiral Robert FitzRoy (1805–1865), the previous speaker (Maury 1861b).

In June 1860 Maury also prepared a map showing a route that might be followed from Melbourne into the Ross Sea (Williams 1963: 350–351). Confusingly, however, no such route appears either on the map supplied by Maury to the BAAS meeting, dated 8 June 1860 and now in their archives, or on the different map, taken from *The physical geography of the sea*, that was used to illustrate his 1860 papers when they were published (Maury 1861b).

In public, Maury's perspective at this point was still national: either Britain or the United States should take the initiative. But it was natural for him also to mention the international system for collating maritime observations. And at one point in the 1860 BAAS materials he made a, still indirect and vague, suggestion that the Antarctic exploration itself might be conducted on some sort of international basis (Maury 1861b: 48).

A few months later Maury received a summons from his new London publishers on a matter of copyright.

https://doi.org/10.1017/S0032247410000549 Published online by Cambridge University Press

He sailed from New York on 28 October 1860 to reach Southampton in mid-November. The book in question, which he had been writing for a year or more, was the eighth edition, much revised and expanded, of *The physical geography of the sea*. It went on sale on 22 November, during Maury's short visit to London, and included two new chapters setting out his arguments about climate in the southern hemisphere and his expeditionary proposals for Antarctica (Maury 1860a: 442–479). Fittingly, it was there that Maury first published an explicit but still vague appeal for 'the great nations of the earth' to extend their system of 'observations ... made by fellow-labourers under all flags' and for 'antarctic exploration' to receive 'favourable consideration among all nations' (Maury 1860a: 478–479).

On 26 November Maury addressed the Royal Geographical Society (RGS) on the subject. But on that occasion he chose to appeal to John Bull in John Bull's language:

> Here was a field for exploration lying within eight or ten days' steaming of an important British possession (Victoria), and which was yet as little known as the interior of the moon. He trusted the Royal Geographical Society would do something towards removing this stigma on British enterprise.... If the British nation neglected this duty, it would be a reproach to them in after ages that they had neglected so fair an opportunity of adding to their maritime laurels, and to the high reputation they had already attained for ocean discovery and research in high latitudes. (Maury 1860b: 24).

In 1860 Maury's private appeals for international cooperation in Antarctic research foreshadowed his 1861 circular (document A) more closely than did his publications. John Locke of Dublin (flourished 1855) was a member of the BAAS but did not attend the Oxford meeting. On 19 November 1860 he read a paper to the Royal Dublin Society which responded both to Maury's BAAS papers and to proof sheets of his forthcoming book. Locke showed his audience a version of the map by Maury which included the proposed expeditionary route (Locke 1861: plate VI). Thus his paper proves that at least one copy of the latter was sent to Europe. He urged, however, that Maury's invitation for 'the British Government to join the great republic of the West in an expedition to scale the barriers ...' etc. (the same: 97) be declined:

> ... [S]hould our gracious monarch ever be proclaimed Queen of the Terra Antarctica, I most devoutly trust, that no persuasion of her Majesty's ministers, nor loyal addresses from her Antarctic subjects, will induce her Majesty ... to visit that remotest portion of "the outer Britannic Empire". (Locke 1861: 104).

But during 1860 Maury had made no explicit appeal for bilateral cooperation in his public pronouncements. He must, therefore, have been floating the idea in his private correspondence with Locke and others (see also Williams 1963: 351–352; Smirnov 2005: 113).

Locke's was not the only rebuff that Maury received in Britain. A week later, at the RGS meeting, Captain John Washington (1800–1863), Hydrographer to the Royal Navy, also rejected Maury's request for a British expedition, but softened the blow with conventional expressions of support for anything the United States might choose to do (Maury 1860b; *The Times* (London) 29 November 1860: 6; see also Treskovskii 1861). Doubtless Maury's increasingly shaky position back home had not escaped his audience.

1861

Maury arrived back in New York on 14 December 1860; six days later South Carolina seceded from the Union. The prospects facing his proposal for an Antarctic research expedition were bleak. First, it was no more likely to be taken up by Palmerston's government in Britain than it had been by the outgoing Buchanan administration. Next, he had small chance of making headway with Abraham Lincoln's new administration in the middle of a crisis which threatened the very existence of the United States. And then there was the personal question, which like many others Maury, a Virginian, had been wrestling with for several months, of how much longer the United States would *be* his country and its Naval Observatory 'his' Observatory.

If he persisted with the Antarctic project, it was not for lack of other work. In February he completed a monograph on *The barometer at sea* (Maury 1861c), and in March he wrote another on *The southeast trade-winds of the Atlantic* (Maury 1861d), the proofs of which he would be prevented by circumstances from correcting (Williams 1963: 359–360). In March he also re-drafted and expanded his Antarctic proposal in the form of a letter to the British ambassador, or minister resident to use the contemporary term, in Washington, Richard Lyons, 2nd Baron Lyons (1817–1887) (Maury 1861a). On 10 April, after copies and covering letters had been prepared for the ministers of about nine other countries, the circular was delivered to its addressees. Copies of *The barometer at sea*, which is referred to in the circular, had been sent to Lyons and presumably also to his colleagues some time earlier.

In the circular Maury stated that he intended 'to lay the matter before ... *my own Government and* others equally interested and concerned' (emphasis added). His wording may have been disingenuous. There is at least room to doubt whether he consulted or briefed anyone in the Lincoln administration, particularly over the international framing of his project. Although he is reliably reported to have deposited copies of the circular and its covering letters in the files of the Naval Observatory, that is not quite the same thing (Williams 1963: 603; see also Corbin 1888: 196). However he did meet the

new Secretary of the Navy Gideon Welles (1802–1878) in March 1861, and may have mentioned the subject in conversation (Williams 1963: 359).

On 13 April Fort Sumter surrendered to Confederate forces; on 17 April Virginia left the Union; and on Saturday, 20 April 1861, Maury resigned his commission in the US Navy and left the Naval Observatory for the last time. Within days he had accepted a commission from Virginia and in May that was replaced with one from the Confederacy.

Maury's resignation was not as precipitate as may appear from this summary. He had long believed in the 'states' rights' argument for Southern institutions, including slavery. (Maury and his wife owned one slave, their cook (Williams 1963: 596).) During 1860 he lobbied for the formation of a commission that should attempt to resolve the issues between North and South within the Union. But by the end of the year he had begun to accept that war was imminent. His priorities, as between the political crisis and Antarctic exploration, were made plain in a letter to his friend William Hasbrouck (1800–1870), written on the same day that the Antarctic circular (document A) was distributed. The main subject was the advisability of moving Maury's savings, which Hasbrouck had invested for him in New York, before the country was irretrievably divided. There followed some pessimistic remarks about the political situation. And he finished by mentioning briefly that: 'I am trying to get up an expedition to the South Pole, and getting nautical monograph No. 3 ready for the press.' (Corbin 1888: 187).

Fig. 2. The ministers. In August 1863 Secretary of State William Seward took a group of diplomats on a tour of New York State, during which they were photographed by William J. Baker, of Utica, NY, at Trenton Falls. From left to right, known or probable recipients of Maury's circular (see text) are identified in bold type: James Donaldson, State Department messenger; ?**Tassara**?; Count Alexander de Bodisco, Secretary of Russian Legation; **Piper**; **Bertinatti**; Luis Molina, Nicaraguan Minister (seated); **Schleiden**; **Mercier**; William H. Seward, Secretary of State (seated); **Lyons**; **Stoeckel** (seated); and George Sheffield, British attaché (seated). Courtesy of the US National Archives.

The ministers

Besides Lord Lyons, three other ministers in Washington are known to have received copies of the circular. They and their countries were: Edouard Henri Mercier (1816–1886) of France; Baron Friedrich von Gerolt (1797–1879) of Prussia; and Eduard Andreyevich Stoeckl (1804–1892) of Russia. Published sources have not identified Maury's other addressees. From the list of countries in his first paragraph we can infer: General Valdemar Rudolph von Raasloff (1815–1883) of Denmark; Chevalier Giuseppe Bertinatti (1808–1881) of Italy; Theodorus Marinus Roest van Limburg (1806–1887) of the Netherlands; Chevalier Joaquim César de Figanière e Morão (1813–1887) of Portugal; Gabriel García y Tassara (1817–1875) of Spain; and Count Carl Edward Wilhelm Piper (1820–1891) of Sweden and Norway. Most of these men lived in one small district of the small town of Washington, where they were in constant social and diplomatic contact with each other (Fig. 2). So Maury may have felt obliged to include other envoys from maritime nations, such as Chevalier Johann Georg Hülsemann (1799–c 1880) of Austria-Hungary, and Rudolph Matthias Schleiden (1815–1895) of Bremen in the distribution. But the complete list is impossible to reconstruct by indirect methods.

Lyons, Mercier, Stoeckl and Hülsemann, in particular, played significant parts in international affairs before and during the civil war. But little is known about any characteristics of these men that may have influenced them with regard to Maury's project. Stoeckl and Bertinatti were married to Americans. Von Raasloff must have had scientific qualifications, since he spent six years in the United States as an engineer before he became the envoy for Denmark in 1857. He was also a member of the American Geographical and Statistical Society, of which Maury was an honorary member. Tassara was a well-known poet, Bertinatti had taken a prominent part in an unofficial peace congress at Brussels in 1848, and Hülsemann had published a condescending critique of the United States in 1823, but none of that takes us very far. Only Mercier's attitude to the project, rather than just to Maury's work in general, has been mentioned by an archival historian:

> Mercier had known him in Washington and had waxed enthusiastic about his scientific ideas which notably included an international expedition to the Antarctic. (Carroll 1971: 158)

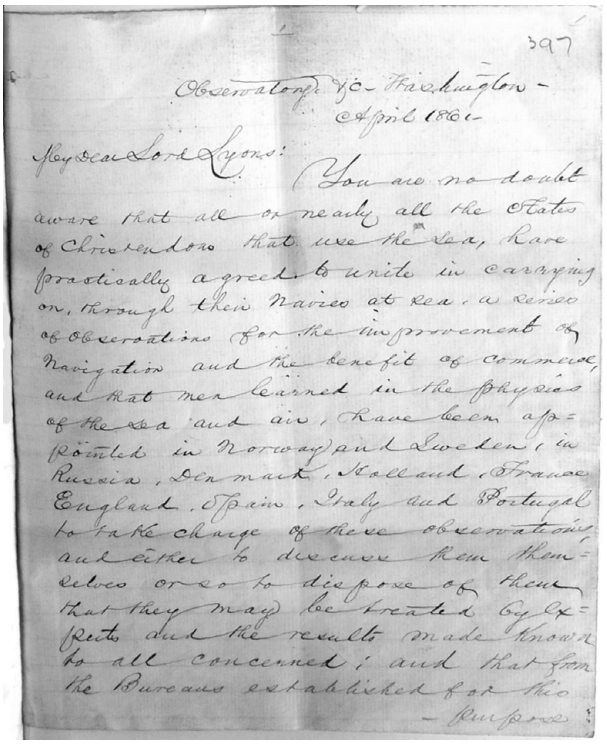
Maury was not on terms of close personal friendship with these men. He dined with some of them

https://doi.org/10.1017/S0032247410000549 Published online by Cambridge University Press

occasionally, but he tended to shy away from social engagements, as too did Lyons. It is also relevant that Mercier and Piper had only just arrived in Washington and that Lyons had been there for less than two years. About half of them had been in post since the mid–1850s and a few for slightly longer.

Nor had Maury done quite this sort of thing before. The internationalisation of his famous scheme for collecting and reducing maritime data had come about in response to a British initiative and had proceeded through official channels. Governments had talked to their own scientists and to other governments. Only then did officially instructed scientists meet at Brussels in 1853. Maury was now departing from that established procedure.

He was, however, following a more ancient model. Time and again religious and social prophets, including Popes, had addressed themselves to 'the kings (or nations) of the earth'. Maury simply added a new twist. It did not matter greatly what the diplomats thought of his scheme, or whether they even read it. He was merely using them, together with his own reputation for valuable ideas, to give his message a chance of reaching those for whom it was intended.


397

Observatory &c. Washington –
April 1861.

My dear Lord Lyons:

You are no doubt aware that all or nearly all the States of Christendom that use the Sea, have practically agreed to unite in carrying on, through their Navies at Sea, a Series of Observations for the improvement of Navigation and the benefit of Commerce, and that men learned in the physics of the sea and air, have been appointed in Norway and Sweden, in Russia, Denmark, Holland, France, England, Spain, Italy and Portugal to take charge of these observations and either to discuss them themselves or so to dispose of them that they may be treated by Experts and the results made known to all concerned; and that from the Bureaus established for this purpose

Fig. 3. Maury's circular in manuscript. The first folio. Courtesy of the British National Archives.

The documents

The manuscript

The 'top copy' of Maury's circular, now in the British National Archives, is an autograph written on 48 approximately quarto sized, off white and feint lined folios (Fig. 3). It is addressed to 'My dear Lord Lyons' and dated simply 'April 1861', perhaps because it could not be delivered until copies for the other ministers had been prepared by Maury's staff. The folios are numbered in the centre at the top; a second, different number was later added at the top right during filing at the Foreign Office.

The transcription offered here (document A) follows Maury's autograph closely, down to such details as capitalisation after colons, inconsistent or idiosyncratic spellings, unpaired commas etc. The underlinings, single here, were doubled in the original. The original footnote indicators have been retained from Maury's shorter pages, except for the brackets which he placed around the two numerals in the series. Some elements in the manuscript were not easy for the author's untrained eye to decipher. Capitalisation tends to be shown by the combined size and ornateness of initial letters, but in some cases it may be signalled by one of those features only. Commas may sometimes be written with a continuing stroke extended from the preceding letter, making them hard to determine. A rightward displacement at the start of a line, to avoid a descending letter above, can resemble the indent for a paragraph break, which itself varies in depth. Full points are sometimes rendered with a short vertical or horizontal dash. And so on.

Considering the length of the text and the circumstances of its composition Maury made few mistakes himself. Once or twice the continuation word entered at the foot of a folio was not repeated at the beginning of the next one, as it should have been. Elsewhere he made one or two scriptory errors, such as 'west winds' for 'wet winds' and one outright blunder, which results in citing Canada as a marine climate alongside the British Isles. (Some such phrase as 'in continental, the converse' should have been inserted before the two, contrasting types were named.) Stylistic flaws, such as repetition and prolixity, may also have owed something to the pressure of circumstances. The spelling 'Billinghausen' was probably meant for 'Billingshausen', a respectable Russian alternative, used for example by that officer's sponsor Adam von Krusenshtern (1770–1846) (see also Maury 1860a: 478).

The covering letter by Lord Lyons (Lyons 1861–document B) was transcribed from the original, which immediately precedes the copy of Maury's circular in the archives of the Foreign Office. A later covering letter has been preserved only in the proceedings of the BAAS (Romaine 1862–document C).

https://doi.org/10.1017/S0032247410000549 Published online by Cambridge University Press

Document A

Observatory &c—Washington—
April 1861—

My Dear Lord Lyons:

You are no doubt aware that all or nearly all the States of Christendom that use the sea, have practically agreed to unite in carrying on, through their Navies at sea, a series of Observations for the improvement of Navigation and the benefit of commerce, and that men learned in the physics of the sea and air, have been appointed in Norway and Sweden, in Russia, Denmark, Holland, France, England, Spain, Italy and Portugal to take charge of these observations, and either to discuss them themselves or so to dispose of them, that they may be treated by experts and the results made known to all concerned; and that from the Bureaus established for this purpose in Holland, London and Paris, highly important results have been already obtained and given to the world as the common property of all. These results by rendering Navigation less dangerous and more speedy have conferred numerous benefits upon all those of every nation who follow the sea.

Thus a sort of maritime and scientific confederation of the principal commercial nations has been practically formed for the purpose of carrying on certain investigations concerning the physics of the sea in which all the world has a stake.

During these investigations, it has fallen to my lot to be led by the paths of induction thus opened to certain conclusions that are of general concern, not indeed to the people of any one nation alone, but to all who own ships—and which I beg to lay before you with the hope that you will deem them of sufficient consequence to be brought to the notice of the Government you so worthily Represent, to the end that such further steps may be taken in the premises as the increase of our knowledge concerning the planet we inhabit and the good of mankind may seem to require.

I may be permitted to remark that 'though this system of research upon which we are engaged presents the most extensive combination that has ever been formed among Navies, and 'though it gives employment to the largest corps of observers that has ever been known to unite in any one plan of physical research, yet it is almost literally without cost; at least the expenses are so divided between the observers and the public exchequers of the States concerned, that the chief expense consists in discussing and publishing the observations after they are made. In fact, the observers are quite willing to render their services upon the simple condition that they may have the free use of the results obtained. Thus all the great Nations have been brought to unite and coöperate in a uniform system of physical research at sea.

In the course of these investigations, facts and circumstances have been brought to light which afford grounds for the belief that the Antarctic winter is by no means as severe as that of the Arctic. This belief, connected with the fact that there is about the South Pole an unexplored area that in extent can compass Europe more than twice, induces me to lay the matter before yourself and others at this time, trusting that by bringing the subject to such notice, as well as to that of my own Government and others equally interested and concerned, measures looking to further examination and exploration of those unknown Regions in the South, may be set on foot.

Reasons for believing the Antarctic to be much less severe than the Arctic winter, have been stated at some length in a work on the "Physical Geography of the Sea and its Meteorology" recently published in London; but as that work may not have fallen under your notice, I beg leave to call your attention to the Tables, Diagrams and Plates in the accompanying Nautical Monograph N° 2. on the Barometer at Sea still more recently issued by this Office. Our observations on the Barometer at sea are numerous and abundant. They reach from the parallel of 60° S to the ice-bound seas of the North; they are for all seasons, months and days of the year. They have been made over and over again—Some by German, some by Russian, some by English, Dutch, French, Spanish, Danish, Swedish, Portuguese, Italian, Austrian, Chilian, Siamese, Sandwich Island, Brazilian and American Navigators. They have been repeated and multiplied by so many, by such factors, and so often, that they leave but little room for doubt as to the approximate mean pressure of the atmosphere on every square foot of ocean surface within the range of Modern Navigation. They enable us for the first time literally to guage and weigh the atmosphere that rests upon the sea; they also afford us data for computing its pressure upon every square foot of sea-surface from pole to pole. A patient discussion of these observations has revealed a wonderful degree of atmospherical attenuation within the Antarctic circle. They indicate that the average quantity of air superincumbent upon a square foot of the earth's surface there does not weigh as much, by about 130 lbs, as that which is superincumbent upon a square foot here.

The unexplored regions environing the south Pole embrace in round numbers an area of Eight millions of square miles. The quantity of atmosphere that rests upon these eight millions lacks then, according to these observations and this computation, no less than 12,943,500,000,000 tons in weight, of being as much as usually rests upon an area of like extent in these Northern latitudes.

This is an inconceivably great mass, whether we attempt to comprehend it by its weight or its volume.

The force of gravity, if left free to act, would distribute the air in equal quantities and alike, about both Poles, and make the barometric pressure nearly the same for all latitudes. There must therefore be some force exerted upon the

air or in the air of these unknown Austral Regions, which counteracts gravity to that enormous extent, and prevents such equal distribution.

What the nature of this force may be is matter of conjecture; but we think it may surely be traced to heat. 'What'—I almost hear you say—'heat enough in perpetual development about the South Pole to exert a ceaseless lifting force of 130 lbs upon every square foot of surface within an area of 8.000,000 square miles!

Be not startled; but freeing your mind from all bias, give me, I pray you, your attention while I endeavor to show that in this theory of a constant play of heat about the South Pole, there is nothing either very startling or paradoxical.

Under the Equatorial cloud ring the mean barometric pressure is 20 lbs less to the square foot than it is in the calm belt of Cancer. This fact is familiar to seamen and well-known to meteorologists. To this diminished pressure we owe the trade-winds, as Captain Sir James Ross and others have already remarked. More than this: In the centre of the cyclone, the atmosphere is so attenuated that its pressure is sometimes diminished below the mean pressure of the place by more than 200 lbs to the square foot.

To what, if not chiefly to heat shall we attribute this? But whence comes the heat at such times and places? Clearly it is not direct heat impressed upon the air then and there by the rays of the Sun.

The Equatorial Cloud Ring overhangs a region of constant precipitation, and the low barometer in the vortex of a tornado is always attended by deluges of rain. Here then we have a condition that accompanies the place of low barometer both in the Calm belt and the Vortex. During this heavy precipitation that takes place in the centre of the storm, immense volumes of heat that is always latent in aqueous vapor, are set free among the clouds; it warms and expands and drives off the upper air.

Thus, that below is made to rush in at the surface either, as the case may be, with the constancy of the gentle trades, or the violence of the hurricane, according to the extent and manner of the rarefaction. Moreover the vapor, before it is formed into rain, being lighter than the air, also assists to drive it away; so that the Barometer would stand higher under air that is dry, than under air that is damp, even were there no vapor condensed.

Now then survey, if you please, on a chart or globe, the Austral Regions on the Polar side of 40° S, and tell me, what do you see? Why all the way around between that parallel and the Antarctic Circle, you see an almost uninterrupted expanse of water. Indeed with the exception of Patagonia and a few comparatively small islands here and there and far between, we have nothing but one continuous evaporating surface. Throughout this entire expanse the prevailing winds are from the North[d] and West[d]. These are the "brave west winds" of the Southern hemisphere. They are strong winds; they suck up from the sea moisture as they go; they waft immense clouds of it over into the unexplored regions that encircle the pole. This vapor is to the winds what fuel is to the Steamer; the latent heat contained in it being developed, is at once the source of power in the air, and the means of locomotion for the blast. Thus loaded, these winds impinge with their vapor and its latent heat upon the icy barrier or upon the mountains there, where it is condensed and its heat set free to become sensible heat. Thus the severity of the Antarctic winter is mitigated by heat that is rendered latent by the processes of evaporation in warm latitudes and conveyed to the South by invisible couriers through the air. This heat being thus conveyed and liberated, warms and expands and causes the polar air to ascend as the same kind of heat causes the air in the centre of the cyclone to ascend and flow off, creating like a huge stack to some immense furnace, a draught and an inrush of air on the surface from the distance of miles around. This draught into the Antarctic unknown extends from the South Pole all around to the distance of 3,000 miles towards the Equator.

About the North Pole, we have no such expanse of water, no such wafting of vapor, no such low barometer, no such inrush of "brave west winds", and consequently no such mildness of climate.

Behold all the Rivers of Arctic America, Europe and Asia! The rains that feed them are but occasional and gentle showers in comparison with those for which the great expanse of Southern waters affords the vapors; and yet, in the condensation of the vapor for the Rains to feed these rivers, heat enough is set free in the clouds to raise from the freezing to the boiling point, and as fast as it flows, more than five times the volume of water that said rivers discharge into the sea.

But how the latent heat of vapor when set free in the clouds may reach down and warm the earth, may perhaps be understood by referring to a meteorological necessity which requires, when the windward side of the mountain is rainy, the lee side to be warm.

To illustrate this, let us suppose a gossamer sack, capable of being hermetically sealed;—that it is impervious to heat and elastic as the air itself;—that with the barometer at 30 [in], the temperature at 60°, and the dew point the same, this sack be filled with air; that then it be attached to a balloon and sent up in the sky to a height where the barometric pressure is only 15 [in], and where the temperature of the air in the sack, by reason of this diminished pressure and by virtue of the expansion of the air within and its consequent cooling, is reduced to zero. By this process the vapor with which the air was loaded when it was admitted into the sack has, let it be assumed, been condensed, and consequently its latent heat set free in the sack.

Suppose now the sack be hauled down to the surface again where the barometric pressure is 30 [in] as before, and what have we? The sack is reduced to its former dimensions, you will perceive, but instead of damp air, we now have

it filled with dry; moreover, there is at the bottom a measure of water,—the condensed vapor. This dry air instead of being at the temperature of 60°, has a temperature of 60°, plus the quantity of heat that it would require to raise 5 1/2 such measures of water from the freezing to the boiling point. In other words, we have but illustrated a natural process that is continually going on and well understood, by which heat is bottled away in vapors, wafted by the winds from clime to clime, liberated, and finally, in the processes of vertical circulation, drawn down from the crystal reservoirs of the Sky to temper and warm the surface of the earth.

When the vapor-laden west winds of the South Pacific strike against the windward side of the Patagonian Andes, are they not by nature herself subjected to a process precisely analogous to that of vapor-laden air in the hypothetical sack? Striking against the western slopes of the mountain, they are forced up to the top of the snow-capped range. Here condensation of vapor and the liberation of its latent heat take place; and though the cold be extreme at the top in consequence of the State of aerial rarefaction there, yet the winds, having received the heat liberated from their vapors, are, before it can be dispersed by radiation, forced over from the Eastern slopes. Here descending into the valleys, and being again compressed by the full weight of the barometric column, the heat they have received is fully developed, and they are felt as warm winds, just as the air brought down in the sack was warm. The mild climate of Eastern Patagonia and the Falkland Islands is due to caloric thus conveyed, developed and dispersed.

To appreciate the amount of heat thus conveyed and distributed, let us compare the climate of Eastern Patagonia, between the parallels of 50° and 52° South, with the climate of Labrador between the corresponding parallels North: Those who would judge of climate, as philosophers formerly did, Viz: according to latitude, would say these two climates are duplicates of each other, for the two places are equidistant from the Equator; and in both countries west winds are the prevailing winds; they both also have a continent to windward, an ocean to leeward; flowing in from each and along their Eastern shores there is likewise an ice-bearing current. But what do modern researches show? They show that the winter climate of Labrador is ice-bound bitter in the extreme and incapable of affording vegetable subsistence for man and beast; that that of Patagonia in the corresponding latitude South is, on the other hand, quite open and mild, affording grasses for cattle all the winter through.

How is this? The two places though on opposite sides of the Equator are, let it be repeated, equidistant from it. They are on the same side of the Continent, and the same shore of the ocean, then why should there be such a difference in their winter climate? Investigation answers: Simply because of the difference in the quantity of moisture which the prevailing winds which also are the same—bring near the two places for condensation. The West winds of Labrador, as they cross the Rocky Mountains, are robbed of their moisture which they sucked up from the Pacific, and the heat set free in the process is dispersed by conduction and radiation long before the winds can convey it to Labrador. But in East Patagonia and the Falkland Islands, the air, charged with heat received from the heavy precipitation on the top of the Andes, is brought directly thence to the plains below, and before it has had time to grow cold.

The influences to which is due this great difference between the winter climate of Labrador and of Patagonia, are even more marked in their effect upon the Arctic as contrasted with the Antarctic winter.

The Patagonian-like climate of the South is repeated in the North along the Eastern base of the Rocky Mountains. On their western slopes, the vapors from the Pacific are condensed into rains for the Columbia, and Frazer, and other rivers. The heat that is there liberated in this process, is sufficient to raise from the freezing to the boiling point all the water that could be supplied by a quintuple set of such rivers. This heat makes green pastures on the Eastern slopes of the Rocky Mountains where the buffalo in herds of countless numbers finds winter pasturage. Now, along the same parallels in Labrador, it is simply impossible, on account of the extreme cold, for a buffalo or any other graminivorous animal to find other winter subsistence than mosses and lichens.

A still more striking instance of the climatological influence of continental in comparison with oceanic winds upon countries in high latitudes, is afforded by Ireland and Labrador between the parallels of 51° and 55° N. In both countries the prevailing winds are also from the West. But those for Ireland come laden from an open sea with vapors which being condensed upon the hill sides, liberated their heat and disperse warmth which gives to that "Gem of the Ocean" its name of "Emerald". The same difference of climate, owing to wet winds from the sea, and dry winds from the land prevailing at places having the same latitude, is repeated upon the N W coast of America and the N E coast of Asia.

The unexplored Regions of the South Pole are surrounded by open water; those of the North for the most part by land. The winds that blow into the frozen ocean of the North are continental winds. The climate there like that of Labrador and Siberia is proportionably severe.

The winds that blow in upon the unknown South therefore being oceanic winds, there is probably as much difference of winter climate between the two polar regions as there is between the winters of Labrador and of Ireland, or the Falkland Islands.

Now then with these facts and suggestions impressed upon our mind, let us once again turn to the unknown Regions of the Antarctic. They are fringed with icy-barriers abutting, as far as exploration has reached, up against lofty peaks and mountain ranges. The air that strikes upon their Northern face is heavily laden with vapor. Traversing that immense waste of waters, it impinges upon those slopes completely saturated with moisture. Here all that moisture is wrung out

of it. The heat that is liberated by the process is sufficient to attenuate the air in the Remarkable Manner indicated by the barometer, exhibited by observations, and repeated in the tables and plates of this Monograph. If we would know how heavy this precipitation is—how high the mountains, steep the declivities, and great the development of latent heat there, let us consult the ice burgs: They afford unmistakable indications upon the subject. The Antarctic ice burgs are of fresh, not of salt water. Towering two or three hundred feet above the sea, and reaching 600 or 800 feet below*, as many of them do, they literally dot with their huge masses an extent of ocean that embraces no less than 17.000,000, square miles in its superficial area. As much heat as it takes to melt and convert into vapor again all those immense masses of ice is set free on those unknown hill sides when the water to form them of was wrung out of the clouds.

Doubtless this vapor with its heat impresses characteristic features upon the winter climate of the South Pole; and thus we are impelled by the winds, persuaded by the barometer,—nay, urged by the longings of the human heart, and encouraged by the great laws of nature herself, to venture and explore.

To sum up: The physical features of the Northern hemisphere indicate that the climate of the Arctic Regions is continental; for they are surrounded by land. Exploration confirms it. On the contrary, those of the Southern hemisphere indicate that the climate of the Antarctic is marine, for those regions are surrounded by water. No explorer has spent a winter there to prove it; but all the known facts and circumstances seem to confirm it. An example or two will make it plain that it must be so. Labrador is the type of a continental climate; Ireland of a marine, in the same latitude. As the summer of Ireland is cooler than that of Labrador, so may the Antarctic summer climate be cooler than that of the Arctic.

The average mid-winter temperature of Iceland is but 13° colder than its average July temperature; whereas, the difference between the mean winter and summer temperature of Fort Simpson is 70°. But this fort, as great as is this contrast of climate, is situated within the sweep of the S.W. winds from the N. Pacific and therefore its climate is only semi-continental. Nevertheless, its summer temperature is 15° warmer than that of Iceland. Now these two places are in about the same latitude North; but with this striking difference: One is surrounded by water, as the Antarctic is; the other by land as the Arctic.

The islands of the sea, and the interior of continents throughout the world in high latitudes, abound in such climatic contrasts.

The difference between the mean winter and summer temperature of the marine climates of the South is probably, and for obvious reasons, not so great as it is in corresponding latitudes North. The lowest point reached by a self-registering thermometer, not for a season or a month, but in the coldest day during a period of several years at the South Shetland Islands in 63° S, was—5° Fah^{r}. At Yakoutsk on the other hand, which in Asia is about as far from the North as the South Shetlands are from the South Pole, and in a truly continental climate, the thermometer goes down in winter to—70° Fah^{r} *, while for July its mean temperature is +60°[2]. Thus though 10° of Lat. further to the North, it receives the same amount of heat in summer that is felt at Dublin[3]; one place being near to and surrounded by sea, the other far removed from open water and the influences of the copious discharge of latent heat which attends the heavy condensation of aqueous vapor.

In winter, however, and owing to the same influences, the thermometer at Yakoutsk annually, for about two weeks, sinks full 100° below the mean winter temperature in Iceland. The difference between continental and marine climates becomes more marked, not only as we approach the Pole, but as the places are more or less contiguous to the open sea and exposed to west winds from the ocean, or dry winds from the land.

Indeed, the summers of Yakoutsk are warm enough to grow vegetables, ripen fruits, and afford grass for cattle.

The climates of all the lands which have been visited in high southern latitudes are eminently marine. In marine climates the summer is cool, the winters warm; take for types the British Isles and Canada. There is not during the Antarctic summer warmth enough in the solar ray to call into play any vegetable forces beyond the feeble energies of mosses and lichens. There, as in Iceland and all other marine places, there is comparatively but little difference between the summer and winter climates. The mean difference between the average winter and average summer temperature in the Antarctic, as indicated by the South Shetland observations, is less than the change often experienced with us here between the temperature of the evening and the morning of the same day.

Cool summers, warm winters, and evenness of temperature the year round, being the characteristics of marine climates, we should look for great uniformity in those high southern latitudes. It is their extraordinarily cool summers, as reported by Navigators, which have created the impression in Nautical circles that the cold of the Antarctic winter is far more extreme than that of the Arctic. This was the impression made upon the mind of Cook, the bravest of the brave. He was a close observer, and there is no authority which to this day has more weight in seafaring circles, and none which requires more stubborn facts to set aside.

* Sir Jas Ross estimated an icy barrier that he saw to be a thousand feet thick.

* Erman.

[2] Dove. The mean temperature for January is —40°.

[3] Col Sir Henry James. Ordnanse Survey.

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On the 14th of January, eighty-odd years ago, that accomplished Navigator discovered—it being then mid-summer of the Southern hemisphere—an island in Lat. 54° & 5° S, which corresponds in Lat with Ireland. On the 17th he landed to take possession of it. He called it Georgia, but did not think "any one would ever be benefitted by this discovery", for its "valleys lay covered with everlasting snow", and "not a tree was to be seen, not a shrub even big enough to make a tooth-pick"

Contemplating, to him, this strange climate, he remarks, "who would have thought that an island of no greater extent than this, situated between the latitude of 54° and 55°, should in the very height of summer be in a manner wholly covered many fathoms deep with frozen snow."

But pushing on still farther, with that prowess and intrepidity which make his history so romantic and himself the picturesque man of the sea, he discovered Sandwich Land in Lat. 59°–60° S, when he made "bold enough to say" that no man would ever venture farther; that the lands to the south would never be explored, for they were "doomed by nature to perpetual frigidness, never to feel the warmth of the Sun's Rays; whose horrible and savage aspect" he had not words to describe.

In all these speculations however he was mistaken. For other explorers have gone further south; and the very islands that in his opinion—for in facts he never erred—were never to benefit any one, have afforded to commerce sealskins and oil to the value of many millions of dollars, and with the island that he named 'Desolation' from its aspect, still give employment Annually or did a few years ago,+ to 2000 tons of shipping and 200 or 300 Seamen.

No explorer has yet tried the Antarctic winter. There is, my investigations lead me to believe no great difference between it and the Antarctic summer, and the erroneous impression that has fastened itself upon the public mind as to the extreme severity of winter about the South Pole has no doubt its root in the low summer temperatures that prevail there.

If, in pleading the cause of Antarctic exploration, I be required to answer first the question of Cui bono?, which is so apt to be put; I reply:—it is enough for me, when contemplating the vast extent of that unknown region to know that it is a part of the surface of our Planet; and to remember that the Earth was made for man; that all knowledge is profitable; and that no discoveries have conferred more honor and glory upon the age in which they were made, or been more beneficial to the world, than geographical discoveries; and that never were nations so well prepared to undertake Antarctic Exploration as are those that I now solicit. The last who essayed it reached farthest; they were Billinghausen of Russia, forty years ago,—Admiral D'Urville of France, Ross of England, and Wilkes of America—all about the same time and nearly a quarter of a Century ago. But since that time, the world has grown in Knowledge and man has gained wonderfully in his power for conquest in this field of Research. We have now the sea Steamer, which former Arctic Explorers had not. The experience acquired since their day, in Polar Exploration about the Arctic Regions, enables us to overcome many an obstacle that loomed up before them in truly formidable proportions: The gold of Australia has built up among the antipodes of Europe one of the most extensive shipping ports of the world:- By Steam, it is within less than a weeks sailing distance of the Antarctic Circle; and thus those unknown regions of the South, instead of being far remote, as in the time of all previous explorers they were, have since Exploration was last attempted there, been actually brought within a few days sail of a great commercial mart with its Stores, its supplies, and resources of all kinds. The advantages and facilities for Antarctic exploration are inconceivably greater now than in the days of Cook and others. They are greatly enhanced by the joint system of national coöperation for the purpose of searching out the mysteries of the sea, now recognized and practiced by all maritime nations. In this beautiful and beneficial coöperation, officers of the different nations have learned to pull and work together for a common good and a common glory. This habit would be carried to the South Pole by coöperation among the different nations concerned, in sending out vessels for exploration there.

Nay, that great unexplored area lies at the very doors of one of the Powers that is most renowned in this field of discovery. She too, has taken a prominent part in the joint system of philosophical research which has converted our ships of war into temples of science as well, and literally studded the sea with floating Observatories. France, also renowned for the achievements won by her Navy in peace as well as in war, is also with her colonies but a little farther off; and the hardy Dutch are hard by. They, too, as well as the Portuguese, Spaniards, Russians and Italians, have won renown in the field of maritime exploration. Their traditions now help me to plead the cause of Antarctic Exploration. For them, with all the facilities with which we are now surrounded, with their accomplished Officers and daring seamen who have given lustre to their flags, both in peace and in war, it would be an easy task now to unbar the gates of the South. But in this, Men and Officers in other Navies will also claim the privilege to join; and since all flags are alike interested and concerned in developing the physics of the sea and in bringing to light its hidden things, it is but fair that all who are coöperating in this system of research should have "chance and opportunity" for the laurels that are to be gathered there.

+ Weddell.

https://doi.org/10.1017/S0032247410000549 Published online by Cambridge University Press

Therefore, instead of confining my appeals upon this subject to my own or any one Government, I venture respectfully to bring it to the attention of all.

The first step, I submit, should be to send a steamer down from Australia to search for one or more ports or places where the Exploring vessels that are to follow may find shelter, and whence they might dispatch boat or land or ice parties, according to circumstances. This reconnaissance alone would occupy one season.

The next season vessels suitably equipped for two or three years might be sent to take up their position, where at the return of summer they might be visited from Melbourne again, and arrangements made for the next season.

For many reasons this exploration should be a joint one among the nations that are most concerned in maritime pursuits. The advantages are manifold: Each one of the coöperating powers instead of equipping a squadron at its own expense, would furnish only one or two steamers; and these should not be large nor should their cost be extravagant. Thus the expenses of a thorough Antarctic exploration, like those for carrying on the "Wind and Current Charts" may be so subdivided among the Nations concerned as literally to be "almost nothing". It would also be attended by this further and great advantage: Such an Expedition could have several centres of exploration. The Officers and men under each flag would naturally be incited by the most zealous and active emulation. They would strive so much the more earnestly not to be outdone in pushing on the glorious conquest.

Now the question is, what mode of procedure is best calculated successfully to bring this subject to the notice of the proper authorities in your Country?

I leave that to you and other friends, trusting to them to invoke such means and to take such steps, as, to them, the importance of the subject and the interests of the joint system of Research, in which we and our flags are enlisted for the increase of Knowledge among men, may seem to require.

Very truly, Yours, &c,
M. F. Maury

His Excellency
The Lord Lyons,
Envoy Ex^{t} & Min: Plen: of Great Britain
Washington

Document B

N° 148. Washington
April 22^{d} 1861.

1 *From Com^{r} Maury*
April 1861

My Lord,

I have the honour to inclose, in original, a letter, in which Commander Maury has requested me to draw the attention of Her Majesty's Government to the importance of undertaking an exploration of the Antarctic Regions. The high reputation of Commander Maury, no less than the interest of the subject, will, I am confident recommend the letter to the serious attention of Her Majesty's Government.

2 *Monograph*
Other copies sent with Lord Lyons No. 135 of 1861.

I have the honour to be, with the highest respect,
My Lord,
Your Lordship's
Most obedient,
Humble servant
Lyons

Document C

Letter from Captain Maury. (Communicated by the Lords Commissioners of the Admiralty).

Admiralty, September, 1861.

Sir, I am commanded by My Lords Commissioners of the Admiralty to transmit to you herewith copy of a letter, dated April, 1861, from Commander Maury, of the United States, which has been referred to their Lordships by Her Majesty's Under Secretary of State for Foreign Affairs, urging the importance of an Expedition to the Antarctic Regions, for meteorological and other scientific purposes; and I am to request that you will lay the same before the proper Section of the British Association, at its Annual Meeting at Manchester.

I am, Sir, your obedient Servant,
W. G. Romaine

The General Secretary of the British Association

https://doi.org/10.1017/S0032247410000549 Published online by Cambridge University Press

The outcome

Disposal

The copy of the circular sent to Lyons was forwarded to the British Foreign Secretary, Lord John Russell (1792–1878), on 22 April 1861 with covering dispatch No. 148 (document B). The delay suggests that Lyons may have read it. Non-urgent communications between Washington and London (that is those not telegraphed to Cape Race, Newfoundland) took between two and three weeks. On 10 May Lyons received a message from London instructing him to thank Maury for four copies of *The barometer at sea* which had been forwarded on 8 April. Lyons responded that in view of Maury's altered status, which meant that he was now viewed by the United States government as being in rebellion, he had not complied with this request. The Foreign Office may therefore never have acknowledged the circular itself, even to Lyons, and the date of its arrival in London is not known.

At some point between May and August 1861, approximately, the Foreign Office sent a copy of the circular to the Admiralty, possibly on the initiative of John Kimberley, 3rd Baron Wodehouse (1826–1902), who served as Under Secretary of State for Foreign Affairs until 15 August 1861. In September it was forwarded or re-copied to the British Association for the Advancement of Science (BAAS) by the Second Secretary to the Admiralty, William Govett Romaine (1815–1893) (document C).

The General Secretary of the BAAS at the time was Revd Robert Walker (1793–1866), who lived at Culham in Oxfordshire. That is to say, he had tendered his resignation on 24 August 1861 but it was not formally accepted until the General Committee and Council of the Association met for business at Manchester from 4 September onwards. In practice, owing to Walker's ill health, the affairs of the Association had been handled for some time by the Assistant General Secretary, John Phillips (1800–1870), who also resigned at the Manchester meeting. Perhaps all parties were reading *The Times* conscientiously, and perhaps the Admiralty was thereby apprised both of these arrangements and of the actual date of the Association's imminent annual meeting. In that case, thanks to the efficiency of the post office, the Admiralty could just have managed to forward Maury's circular to Phillips on or after 1 September, as implied by Romaine, and before (though scarcely in reasonable time for) the meeting. If Romaine's dating was anticipatory like Maury's, his clerks may even have got the package away at the end of August. Phillips' conference address from at least 3 September, the eve of the meeting, and probably a few days earlier, was the Town Hall, Manchester. So in a less benign scenario the package could have been misdirected either to Kings College, London, where Phillips held the chair of geology, or to the Yorkshire Museum in York, of which he was keeper, or even to Walker at Culham. Whatever actually happened, Maury's 1861 circular was not even mentioned, let alone discussed, at Manchester (Anon. 1861).

Fig. 4. Grand Duke Konstantin Nikolayevich of Russia, Maury's leading European supporter. Courtesy of Wikimedia Commons.

As noted above, Maury sent four copies of his barometer monograph to Lyons. Since four are now held in British libraries it is reasonable to suppose that one or more may have accompanied the circular when it eventually reached the British Association.

Publication

Previous commentators believed that Maury's Antarctic proposal was barely noticed at the time (Wexler 1962; Bertrand 1971). However their sources were apparently confined to the English-speaking world.

Soon after receiving Maury's proposal from Washington, Grand Duke Konstantin Nikolayevich of Russia (1827–1892) (Fig. 4), brother of Tsar Aleksandr II and the reforming General-Admiral of the Imperial Navy and head of its government department, gave instructions for the text to be published in English with a parallel Russian translation (Maury 1861e). (Contemporary references show that the booklet was available to the public, not merely to the navy and its advisers.) His purpose in doing so was to facilitate an extensive consultation process. Copies were sent to the Academy of Sciences, several universities, and more than thirty individual scientists and explorers.

The first responses arrived in October 1861. While broadly in favour of further scientific exploration in the Antarctic, several of those that have survived cast doubt on Maury's climate theory. One of the most critical,

https://doi.org/10.1017/S0032247410000549 Published online by Cambridge University Press

from zoologist Leopold Shrenk (1830–1894), questioned whether this would be an appropriate use of scarce national resources. Admiral Fyodor Litke (1797–1882) stressed that it would take a considerable length of time to prepare a suitable ship. The meteorologist Adolph Kupfer, director of the main physical observatory and one of Maury's earliest supporters in Europe, submitted a very guarded assessment. He cautioned that only the finest naval officers would be able to pull off such a multinational expedition, adding, interestingly, that the shortage of land masses at high southern latitudes would make it difficult to establish the necessary stations (Smirnov 2005: 98–114).

Perhaps the most significant element in Duke Konstantin's response was his modest attempt to launch a parallel process of international consultation, only five years after the end of the Crimean War. An approach was made to Alexandre Delamarche (1815–1884), director of the department of maps and plans in the French Depot de la Marine and one of Maury's many correspondents. The reply, received in January 1862, was that such an expedition was unlikely to attract much interest at present. Delamarche also dismissed the idea of coordinated expeditions by different countries as impractical. Only a few weeks earlier the Russians had also published the report of Maury's unsuccessful presentation to the Royal Geographical Society in 1860 (Treskovskii 1861). At that point Duke Konstantin accepted that the scheme was going nowhere (Smirnov 2005: 112–114).

Maury's Antarctic project was at least discussed in Russia, thanks to the wishes of a Romanov prince. Elsewhere it had no such sponsors. Turning now to the BAAS, there is no record in their archives either of the arrival of Maury's circular, or of their feelings about such generosity on the part of Whitehall. Even if they received it in time for their Manchester meeting in 1861, which is unlikely, Maury himself was once again not present and his new contribution was not that different to his previous one. Simple lateness, however, is enough to explain the Association's courteous decision quietly to publish the paper, even though it had not actually been presented or discussed at the meeting. Perhaps to make the situation clear for perceptive readers, they added Romaine's covering note (document C).

The chain of transmission Naval Observatory to British Embassy to Foreign Office to Admiralty to British Association to John Murray, during which the circular was copied at least once and probably more than once, led to several errors in the published version, including substitutions of words and the omission of value signs in front of temperatures (in addition to those which Maury omitted himself) (Maury 1862a). The largest mistake occurred in the discussion of Cook, where the phrase 'the very islands that in his opinion – for in facts he never erred – were never to benefit any one' was deprived of the parenthetical remark. At some unknown point the text was also subjected to numerous editorial interventions, from anglicisation of Maury's spellings to widespread additions and alterations to his admittedly trying punctuation.

The copy of the circular sent to Henri Mercier was translated into French and published in the *Annales hydrographiques* (Maury 1862b). Maury had introduced no changes himself and the text is more accurate than that in the BAAS *Report*.

Failure

After 1861 there were four further editions and two translations of *The physical geography of the sea* in Maury's lifetime, only one of them in the United States. But the 1861 circular was his last and most comprehensive treatment of the subject of Antarctic exploration. Its distinctive emphasis on international cooperation, offering governments a project that was supposed to cost them less money and less effort the more of them took part, may have been a reaction to the setbacks Maury encountered when he first mooted the idea in 1860.

As the reader will have seen above, most of the circular was devoted to a meteorological argument for the feasibility of overwintering, whether by a single expedition or by several. Putting that to one side, the project comprised two memorably early proposals for the internationalisation of polar research. They were, first, that there should be an internationally coordinated campaign of scientific exploration over two or three years, based on dispersed overwintering stations on the still somewhat conjectural mainland of Antarctica. And second, that data so collected should not only be disseminated internationally but also be collated and analysed at three leading meteorological institutes in Britain, France and Holland. With the first proposal, Maury was 14 years before his time; with the second, for *polar* data, nearly a century. But it should be noted that the Royal Meteorological Institute of the Netherlands had been cooperating with the US Naval Observatory in respect of *non-polar* marine data since the late 1850s (Fiske 1860: 6–7).

In July 1861 Duke Konstantin invited Maury to move to Russia and continue his research on his own terms. On 29 October Maury respectfully declined. Neither party referred to the Antarctic project (Corbin 1888: 190–193). In April 1862 the French diplomat Henri Mercier made Maury a similar offer while visiting the Confederate capital of Richmond (Carroll 1971: 158). In May 1866 the French offer was warmly renewed in Paris (Williams 1963: 442–443). Maury also mentioned that he had received 'the offer of an asylum from the Archduke Maximilian of Austria' (*The Times* (London) 6 June 1866: 11). Nothing more is known about the Austrian invitation, but Maury's reference to Maximilian as 'Archduke', rather than as the Emperor of Mexico whose service he had only just left, suggests that Maximilian made it before April 1864, while he was still commander-in-chief of the Austrian Navy.

Apart from its publication, described above, Maury's Antarctic project was unsuccessful. It was not even mentioned in the professional literature for over 40 years

(Mill 1905). There are several probable reasons for this, over and above the American Civil War, but as we have seen hardly anyone outside Russia assessed the project in detail.

First, Maury's procedure was novel and unorthodox. He had no grounds for expecting foreign governments to respond directly to a middle ranking official who had not obtained an endorsement from his own government before approaching them. Next, however honourable and understandable may have been his motives for resigning, he was no longer there for them to reply to. That aspect of the matter goes well beyond the civil war. After 1861, apart from editing further editions of his book, Maury never returned to original scientific work at the level of planetary geophysics. In particular, he never himself referred to the 1861 circular, let alone attempting to revive the project.

Instead of taking up a scientific post in Europe, Maury served the short-lived Confederacy as a weapons developer, purchasing agent and spy. In 1864, with the south defeated, he travelled to Vera Cruz to present a plan for a southern colony in Mexico to the newly established Emperor Maximilian. It was accepted, and Maury was able to set the scheme in motion, but by March 1866, owing to Mexican opposition and the increasingly hopeless position of the Emperor, he was once again unemployed, the third time in five years. Within weeks of arriving in London he had circulated his second message to governments through their legations, this time as a private citizen. It was an advertisement for a training course in electrically controlled mines and torpedoes for naval officers. The governments of France, Sweden, Denmark and the Netherlands paid him for this service before so much information about the new technology leaked out that it was no longer a viable commercial venture (Williams 1963: 442–443; Smirnov 2005: 154–156).

Maury returned to the United States in July 1868 with the support of a testimonial fund which had raised about 3,000 guineas. The Imperial Russian Navy had made by far the largest single donation, of £1,000 (Smirnov 2005: 164–168). In his closing years he gave frequent lectures on the desirability of a national and international land based network for meteorological observations and analysis. Some of the resulting texts were sent to and welcomed by colleagues in Europe who were working to establish such cooperation. Thus Maury helped indirectly to overcome another of the major obstacles to his Antarctic scheme, the absence at that time of permanent international scientific organisations. Without the International Meteorological Organisation (IMO), established in 1878, the polar year of 1882–1883 could not have happened.

The logistic aspects of Maury's scheme were seriously defective. Any competent official, such as Romaine at the Admiralty, would have seen through his assurance that the economies made by collecting data from ships that were already criss-crossing the oceans for their own purposes would easily be transferred to special and lengthy scientific expeditions. One has to wonder, also, whether Maury had made any enquiries about the price and scarcity of goods at Melbourne, with its primitive infrastructure overloaded by the ongoing gold rush, before directing several European expeditions to descend on it simultaneously. But doubtless, in his stressful personal circumstances of 1861, Maury had misled himself before he endeavoured, with scant success, to mislead others.

His greatest logistic blunder, probably occasioned by enthusiasm for his scientific argument, lay in selecting the Antarctic rather than the Arctic for the first ever international polar cooperation. Whether Melbourne was or was not a second Hamburg or Portsmouth, there were few other major ports in the southern hemisphere that could have been added to the scheme. The Arctic, by contrast, was surrounded by maritime nations, scientific institutions, home ports and northerly islands at which to set up stations or advance bases. An Arctic scheme would intrinsically have afforded more effective deployment, easier and cheaper supply, greater safety, and a more direct and equitable distribution of prestige to all parties.

Maury's reasoning about a habitable Antarctic climate may seem premature to us today (Bertrand 1971: 201–202), but it would not in itself have been a handicap at the time. During the 1860s the doctrine of an open polar sea in the Arctic received perhaps its strongest ever scientific formulation from Mühry, Petermann and others, and Maury's similar theory about the Antarctic was entirely respectable.

That makes the final barrier to Maury's project particularly regrettable. By 1861 he was a scientific superstar. His honours included decorations and memberships which embraced among other places Austria, Bremen, Hanover and Prussia, one or more of which monarchies duly received the circular.

In the mid-nineteenth century a network of German speaking scientists spanned the world, from Boston to Melbourne and from Buenos Aires to St Petersburg. And for many people the international journal of record for everything to do with exploration and geography became *Petermann's geographische Mittheilungen*, founded in 1855. August Petermann had lived in Britain for several years and attended meetings of the BAAS. He read everything and published a comprehensive monthly survey of the field, within which he developed a predominant interest in polar developments. He liked Maury's Antarctic theory and his initial call for an Antarctic expedition, delivered to the BAAS in 1860, and he was the first to report them (Petermann 1860; Maury 1861b). But he never reported Maury's circular, with its innovative call for international cooperation (Maury 1861a). The conclusion is inescapable that Petermann ignored that aspect of Maury's thinking because he disliked it. After all, Petermann even regretted the fact that overland expeditions were dependent on cooperation with local people (Petermann 1863: 426).

As in several other countries in the nineteenth century, the geographical movement within the loosely knit

German confederation was bound up with patriotic feelings about sea power, colonisation, prestige and, in the German case, national unification (Krause 2001: 17). Petermann made his journal the scientific standard bearer for those aspirations, and he fixed on future German Arctic expeditions as their supreme embodiment. Cooperation to that end between German states was all very well (Petermann 1865: 443). But broader international polar cooperation would have negated the political aims of the project.

The strongest expression of German antipathy towards polar cooperation came from Otto Volger (1822–1897), who helped Petermann to organise the first national meeting to discuss polar research, held at Frankfurt in July 1865. In his opening address as chairman, Volger mocked the idea that 'humanity is a mutual society, and the goal of every endeavour should be the resolution of differences and the establishment of a global republic. I say this dream is idiotic!' (Anon. 1865: 22–23). When polar cooperation was first mentioned in Petermann's journal, it was presented as something that other countries might initiate and which might leave Germany further behind than ever (Mühry 1866). And when Carl Weyprecht (1838–1881) returned from the Austro-Hungarian Arctic Expedition of 1872–1874 and announced his new doctrine of international cooperation in 1875, the close and enthusiastic correspondence between him and Petermann quickly fell away. The final letter, from Weyprecht to Petermann on 17 January 1876, dealt with business matters and appears to have received no reply (Berger and others 2008: 420–458).

Maury's German problem after 1861 was exacerbated by the circumstance that the only German translations of *The physical geography of the sea* had been published in 1856 and 1859, before Maury developed his ideas about Antarctic climate and inserted a reference to international cooperation in the region.

The effect of all this was illustrated a few years later. To celebrate the safe return of the Austro-Hungarian expedition, the Austrian Geographical Society decided to publish a bibliography of polar literature (Chavanne and others 1878). Every scholarly periodical and many popular ones were consulted. Alongside works by the explorers themselves, leading theoreticians and 'projectors' in the field, such as John Barrow (1764–1848), Clements Markham (1830–1916), Mühry, Georg Neumayer (1826–1909) and of course Petermann, were meticulously documented. The resulting compilation contained 6,617 entries in the main European languages by authors from Aa to Zurla. But there was only one Maury in it, a Professor T.B. Maury of New York, who wrote articles on geographical subjects for *Appleton's Journal*, *Putnam's Magazine* and other periodicals in the 1870s.

Assessments

Two historical questions remain. Could Maury's project have succeeded if there had been no civil war? And did his advocacy of international polar cooperation influence those who began lobbying for it in 1874 and 1875?

The first question has been answered implicitly above. Let us suppose that 'no civil war' implies a more relaxed, procedurally correct and rigorous Maury, with his loyal staff about him, who draws up a more thorough, frank and even perhaps roughly costed exploration plan. And let us also suppose that he perseveres, and that within a year or two he convinces some US officials and some foreign colleagues. Perhaps they in turn manage to change his focus from the Antarctic to the Arctic. But there are still no international scientific organisations to lend official substance to the enterprise, so we had better bring forward the founding of the IMO by about fifteen years. And while we are in omnipotent mode, we had better relieve the tensions of German nationalism by advancing the Bismarckian unification from 1871 to 1861. We have only to cancel a few European wars, and the counterfactual job is done.

It will be obvious what is happening. For Maury's project to succeed, 1861 has to become 1875, and Maury himself has to become the logistics minded, resourceful, opportunistic, well supported and admirably persistent Weyprecht. In short, even without the civil war Maury's project as such was unlikely ever to succeed.

As for the question of its influence, once again Russia provides the only positive example. In 1880, while preparing for Russia's participation in the International Polar Year of 1882–1883, the secretary of the Geographical Society, Pyotr Petrovich Semenov-Tyan-Shanskii (1827–1914), wrote to Duke Konstantin to enquire about the files on Maury's project. The Duke gave instructions for Maury's circular to be located and copied for Semenov, after which the original was to be returned to himself (Smirnov 2005: 114).

Elsewhere, Petermann was not the only person who read the periodicals in which Maury's international scheme was published in 1862. Other protagonists, such as Mühry and Neumayer, also admired and followed Maury. But none of them acknowledged Maury's precedence on the particular point of international polar cooperation. The undocumented diffusion of an idea is notoriously hard to reconstruct. It behoves us to remember that these men were gripped and carried ever forward by laborious and fascinating scientific enterprises. They were not diarists, memoirists or historians. And even in scientific texts the practice of citation was still in its infancy.

That said, it is reasonably certain that Weyprecht read Mühry's 1866 remark about international cooperation, for what it was worth, but that does not mean he later remembered doing so. It is also possible that Mühry, Neumayer or Weyprecht read one of the published, English or French, versions of Maury's circular. The development of Weyprecht's thinking *before* the Austro-Hungarian expedition, in particular, remains to be studied.

Neumayer conceived his lifelong commitment to Antarctic research while a student at the University of

Munich. After sailing before the mast to South America and Australia in the early 1850s he obtained the generous support of King Maximilian II of Bavaria (1811–1864). He then established the Flagstaff Observatory in Melbourne and directed it from 1858 to 1864. Although he also set up a Maury-style system for the compilation of maritime observations taken by naval and commercial shipping, he was unable to initiate any Antarctic work as such (Neumayer 1901: 3–18). Soon after returning to Germany he became the founding director of the Marine Observatory at Hamburg.

Neumayer regularly cited Maury's advocacy of Antarctic research when arguing for the same thing himself, and he put forward his own international polar year proposal in February 1874, eleven months before Weyprecht did the same (Neumayer 1874: 80). But he was probably not directly influenced by Maury's call for international polar cooperation. The catalogue of the Melbourne Public Library suggests that a version of Maury's 1861 circular (Maury 1862a) would have reached that city about twelve months before Neumayer returned to Europe in June 1864. But at that time Neumayer was preoccupied with completing his magnetic survey of Victoria and with preparing the results of seven years of geophysical research in Australia for eventual publication in Europe. Meanwhile no one else active in the earth sciences had responded to Maury's ideas with any enthusiasm. The fact that Neumayer only ever cited Maury's 1860 papers (Neumayer 1885: 196, 1901: 268), when the 1861 circular would have supported his argument so much better, strongly suggests that he never encountered the latter until, perhaps, it was brought to his attention in the closing years of his life by Mill's book (Mill 1905: 337–339).

Acknowledgements

Maury's manuscript was discovered at the British Public Record Office about fifty years ago by Philip Van Doren Stern, who sent an abstract of it to Frances Williams. The author's debt to the latter's fine biography of Maury has been evident throughout. He would also like to thank Aleksandr Chekulayev, Reinhard Krause and the librarians of Chetham's Library, Manchester, and Magdalen College, Oxford, for their assistance with obtaining materials for this study.

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