

# NEUMAYER'S AMBITIONS FOR POLAR RESEARCH AND HIS ROLE IN THE ESTABLISHMENT OF THE FIRST INTERNATIONAL POLAR YEAR 1882–1883

REINHARD A. KRAUSE

Alfred-Wegener-Institute for Polar- and Marine Research, Bremerhaven, Germany

KRAUSE, R.A., 2011. Neumayer's ambitions for polar research and his role in the establishment of the first International Polar Year 1882–1883. *Transactions of the Royal Society of Victoria* 123(1): 95-115. ISSN 0035-9211.

Remarks on the personal and historical background; the way to the International Polar Year (IPY)<sup>1</sup> — some reflections on its results; the first German Antarctic expedition as part of an international Antarctic campaign.

*Keywords:* polar research, Reichsinstitut Deutsche Seewarte, First International Polar Year 1882–83, first German Antarctic Expedition

Motto: Regard the Earth

(Ronald Fraser and Sir James Wordie, 1957)

HOW could Georg von Neumayer, who never saw polar regions with his own eyes in his lifetime, pave the way for polar research? (Fig. 1). Was he just a theorist who promoted polar research from his house and home in the Rhineland sitting in an armchair?

All who have heard the foregoing presentations of Pat Quilty and Doug Morrison know that this impression would be completely wrong. From early years to far beyond his 40th year of life Neumayer was occupied with the wish to contribute to the exploration of the planet with great commitment, and besides several intercontinental voyages he performed a lot of field research. It is important to understand what Rod Home already figured out and what was completed by Cornelia Lüdecke: Neumayer was a real disciple of Humboldt, Renell and Maury. His scientific ambitions were global and from this approach it is clear that theoretical studies played an important role for him.

From the 1870s onwards, led by outward circumstances, he started to concentrate on the organisation of science. His great wish of participating in an Antarctic mission did not materialise because of political reasons.

As a child and as a youth Neumayer had the privilege of growing up in an environment of unusual intellectual freedom. Without compromise he decided to study science<sup>2</sup> and enrolled at the Polytechnikum in Munich in 1847. For half a year Neumayer had been an assistant to the famous astronomer and geophysicist Johann von Lamont (1805–1879)—a backer of the famous Carl F. Gauss (1777–1855)—when he abruptly quitted this occupation in April 1850 for



Fig. 1. South Georgia – Royal Bay. Gouache, showing the German IPY station 1882-83 painted by Hans Prückner, München 1885 (AWI Archives).

reasons unknown. Maybe political attitudes played a role in this decision.

Neumayer then tried to join the Prussian, the Dutch or the American Navy, but without success.<sup>3</sup> Eventually he signed up on a cargo ship bound for



Fig. 2. Neumayer as a sailor, 1852, age 25. (Bundesamt für Seeschifffahrt und Hydrographie, Hamburg).

Brazil. On returning from this journey, he managed to acquire a master license from the navigation college in Hamburg within a few weeks of lessons. He rejected the offer to join his former ship as second mate! He still wanted to enter the Navy.

At that time the Austrian Navy was being extended. Neumayer travelled to Trieste at the Mediterranean Sea, hoping to get his opportunity there. He worked as a navigation instructor. But after he had spent six months on the strands of the Adriatic gulf without getting a position which suited his interests, he went back to Hamburg. There he was welcomed by C.C.L. (Charles) Rümker (1788–1862), head of the navigation college and the observatory, and employed as a teacher for navigation as well.

Only a few weeks later, in April 1852, Neumayer was sailing again, this time as an ordinary seaman on a vessel bound for Australia (*Reiherstig*) owned by the shipping company Godeffroy. When, after a voyage of 135 days, the ship finally arrived in Port Jackson, all members of the crew deserted – except Neumayer. He managed to properly sign off after he

had made several voyages along the Australian coast. But then he immediately joined his former colleagues in the Bendigo Gold Fields (Fig. 3).

Here happened what every adventurer dreams of: Neumayer's group found a vein of gold. But before they even managed to work it, the mining pit was flooded and washed away by a great thunderstorm (Neumayer 1907). This incident was a shock to Neumayer: he decided to end his career as a gold-digger. Before he set on his homeward journey, he roamed the area near the river Murray for several months. Then, in January 1854, he put to sea on the clipper *Sovereign of the Seas* (Fig. 4) in Melbourne. Enthusiastically he said: 'I can hardly describe, how much influence this journey had on my development as a seaman'.

Neumayer's first adventure in Australia, which lasted two years, obviously triggered a process of maturation. His scientific ambitions became more clear. He did not think about the navy any more. Later he was to condemn the very same as unproductive. Later, when he was already for many years an honoured director of a naval institution which was 100% financed by the imperial Navy, he became confronted with harsh criticism (Stenzel 1892). He was accused that he had done nearly nothing for the Navy.

From 1854 on Neumayer was only interested in nautical physics, oceanography, meteorology and geomagnetism.

Neumayer claimed to have spread the ideas of the American Matthew Fontaine Maury (1803–1873) as early as spring of 1852, during his short period of teaching in Hamburg (Neumayer 1909).

This would be very remarkable, because the book which made Maury famous—*The Physical Geography of the Sea and its Meteorology*—did not come out before 1855. Maury had published the first sheet of his *Wind and Current Charts* in 1847 though, but his *Explanations and Sailing Directions to Accompany the Wind and Current Charts* were brought out in 1851.<sup>4</sup>

Maury propagated a new kind of navigation based on his own experience and the systematic evaluation of ship's logs as well as the use of scientific methods and new findings. He appealed to everyone for observations according to standardised oceanographic and meteorological methods when aboard and for handing over these findings to the respective research institutes for evaluation. As a result of his studies he suggested new inter-ocean routes, which considerably shortened the duration of sailing and thus made passages safer.



Dr. von Neumayer's Zelt mit Kamin in den Goldfeldern (am Creek der Kangaroo Gully Diggings).

Fig. 3. Left and right: In the gold fields. (Neumayer 1907).



Ein Goldfeld zur Zeit des Aufenthalts Dr. von Neumayer's um das Jahr 1853.

Maritime traffic was growing dramatically at that time, spreading mainly towards the less travelled southerly seas due to transport to Australia and California. Because of this increase, experts worldwide welcomed Maury's initiative. The first international conference on this topic was held in Brussels in 1853 (Maury 1855). It is worth mentioning that Maury agreed with Humboldt on this question.<sup>5</sup> Under whatever circumstances Neumayer may have become familiar with Maury's ideas, he was one of the first and most committed supporters of Maury's system.<sup>6</sup>

Back in Europe, Neumayer had long since set up a plan. He wanted to return to Australia as soon as possible. His goal was to found an institute there, which was to serve practical seafaring as well as science—a Central Station for Meteorology, Navigation and Terrestrial Magnetism (Wiederkehr/Schröder 1988). The young man pursued his vision persistently and skilfully: He managed to obtain the required funds necessary for the procurement of instruments from the Bavarian government and from the Hamburg shipowners Godeffroy.



Fig. 4. The Clipper *Sovereign of the Seas* (78.7m; 13.6m; 7.16m; 2400 t cargo capacity) in which Neumayer sailed to Europe in 1854. The voyage Melbourne-London took 86 days. The ship was later purchased by the shipping company Godeffroy, Hamburg (AWI-Archives).



Fig. 5. M.F. Maury.

In August 1856 he attended the congress of the British Association for the Advancement of Science to secure the support of British authorities for his plans in Melbourne. Summing up, Neumayer wrote (Neumayer 1901, p. 11): ‘Men like Whewell, Airy, Faraday acknowledged the relevance of the plan which I presented to them so that I—provided with their recommendation—could set my great undertaking in motion’.<sup>7</sup> But we have to keep in mind that this is a statement he made some 40 years after his arrival in Melbourne. It is more likely that that which he called recommendations did not play a role when he started his activities in Victoria.

Nevertheless, in 1858 Neumayer managed to open an institute in Melbourne: the Flagstaff Observatory. (Home & Kretzer 1991) (Fig. 6). The foundation did face a number of problems as Rod Home and Jochen Kretzer pointed out in an article in 1991. Their main source is a letter which Neumayer wrote to the well known chemist Justus von Liebig in September 1857 (Home & Kretzer 1991)<sup>8</sup>.

But, as we know, Neumayer overcame the resistance. That his success was based partly on his geophysical—especially geomagnetical—activities has been already shown by Rod Home and Doug Morrison. But the focus of his work and his institute was the assistance of ocean shipping (nautical physics), which, as everybody knows, was extremely important to Australia’s advancement.

We must recognise that while Neumayer was working in Australia, Antarctica began to play a vital role in his work and in his thinking. This was inherent firstly to the fact that the great circle courses, which Neumayer propagated for the passage from South Africa to Australia, reached very high southern latitude ( $58^{\circ}15'S$ ) courses to Cape Horn theoretically reached  $63^{\circ}S$ .<sup>9</sup> These regions were incompletely known. It was an imperative to explore its meteorological, oceanographic and geomagnetic conditions (declination). Furthermore, the relatively high magnetic latitude of Australia called for a localisation of the magnetic pole. May I remind you that this was seen as an important location for an improvement of the Gaussian geomagnetic model. Neumayer described his *Agitation for South Polar Research* in detail (Neumayer 1901). It is obvious that he was led to the importance of Antarctic research by his very own ideas. I call Neumayer the key-figure of the non-existing Antarctic research in the second half of the 19th century.

In 1863 the famous geographer and editor of *Petermanns Geographische Mitteilungen* (PGM), August Petermann (1823–1878) (Fig. 7), reported that Dr. Georg Neumayer, Director of the Flagstaff Observatory in Melbourne had written a letter to the Imperial Academy of Sciences in Vienna in Austria to propose an expedition to the Antarctic regions (PGM 1863: 428).<sup>10</sup> Here it says: ‘May this vigorous man succeed in putting his plan to action’.

It is not known why Neumayer left Australia and returned to Europe in 1864. He himself—normally being very concerned about weaving legends around his person—never wrote about the reason of this decision. I think it is not unlikely that he might have had the vague idea of participating in an Antarctic expedition promoted by a European nation. (This idea is also supported by Kretzer, pers. Comm.. 24 May 2009, Neustadt.)

It is a remarkable fact that the above-mentioned August Petermann was one of the first scientists Neumayer met in Germany after his return from Australia. Petermann, a famous cartographer who had lived many years in Scotland and England, was originally known for his engagement in what was called ‘Af-

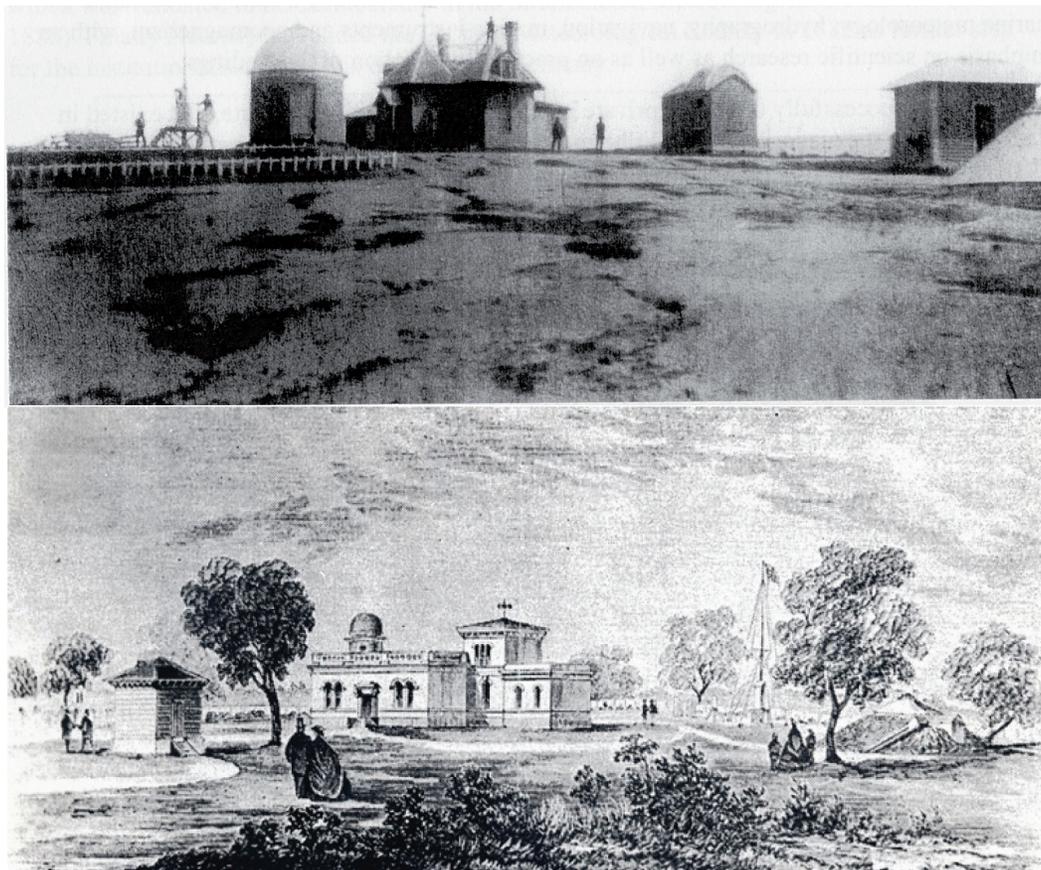


Fig. 6. Flagstaff Observatory, Melbourne 1859. Top: from Neumayer's own album. Figures from left to right J. Bauer, W. Wills, G. Neumayer, unknown. Above: from Kretzer 1983.

rica research'. Later he produced ideas how to find the legendary but missing Arctic expedition under the leadership of Sir John Franklin and became a leading promoter of Arctic research. He proposed an open Arctic Ocean, which according to his visions was to be reached after the overcoming of what he called an ice belt. He constructed an analogon to the penetration into the Antarctic Ross Sea in 1840 by James Clarke Ross. And according to Petermann there is no Antarctic continent but an Antarctic Ocean. The few known landmarks he declared as Islands. (Keep in mind that this example is very close to the famous adventures of Gordon Pym written by Edgar Allen Poe.)

Neumayer had discussions with Petermann during the first meeting of geographers in Germany in Frankfurt on 23 July 1865.<sup>11</sup> Here Petermann promoted the exploration of the Arctic. Enthusiastically he called for a German Arctic expedition in the same year (Amtlicher Berichte 1865). Neumayer with his

great experience as a seafarer warned the delegates against overhasty actions. In vain—a kind of pioneer Arctic-expedition became a financial disaster, which was followed by a lot of negative reactions.

Generally Neumayer supported the idea of Arctic research. But he pointed out that most important for the merchant navy fleet of the German states should be a systematic study of oceanography and meteorology—an application of science to practical seafaring—including the installation of a nautical / meteorological/hydrographical institute—a naval observatory (the German word 'Seewarte' was created by Otto Volger).

According to Neumayer it was necessary to carry out great scientific sea expeditions. Of special importance should be the exploration of the Antarctic regions. In his view no other scientific project had the same relevance as an expedition to these areas.



Fig. 7. August Petermann (1823–1878).

The worst documented time interval of Neumayer's life are the years between 1865 and 1872. During that period he published his Australian magnetic data (4 vols) financed by the Royal Society of Victoria.

To understand the next steps in Neumayer's life one should remember that about 1860, although France and Great Britain were already nations in a modern sense, this was not true for Germany. A German nation did not exist. What was called Germany was a fragile federation of some 30 more or less independent states and hanseatic cities. This construction (called *Deutscher Bund*) compasses two bigger states—Austria and Prussia (with about 25 000 000 respectively 40 000 000 inhabitants each, that is, Prussia alone had as many inhabitants as UK) and behaved completely as independent nations. After a short war in 1866 between Prussia and Austria, and a heavy war between nearly all German states on one side and France on the other side, the German nation was formed in spring 1871. This nation was constructed as a federal constitutional monarchy with free elections and a parliament which had the budget authority. It was called *Deutsches Reich*—German Empire).

It is documented that Neumayer again spoke publicly about Antarctic research at a meeting of natural scientists in Innsbruck in 1869. In 1871, together with Ludwig Friederichsen (1841–1915) he presented a map of the South Polar Region on the International Geographical Congress in Antwerp. This was a remarkable map, which gave oceanographic and nautical details as well. With only a few alterations and additions this map again was printed as a supplement for Neumayer in 1901 (scale 1:27 780 000 – 80 cm x 80 cm).

Since spring 1870 Neumayer had been in contact with the command of the Austrian Navy, which was planning a south polar expedition combined with the observing of the transit of Venus in 1874—an idea based mainly on Neumayer's agitation. According to his own account already in 1870 Neumayer was granted the scientific leadership of the expedition. The plan of the expedition was brought to a halt because of the German-French war which started in August 1870. However, it had not been cancelled in spring 1871, but this was soon after the unexpected death of Admiral Wilhelm von Tegetthoff (1827–April 1871) who had been the protagonist of this enterprise.

Finding out that the Austrian Antarctic expedition would not be carried out affected Neumayer deeply. It is essential to recognise that in the meantime two German Arctic expeditions had been accomplished, both under the leadership of Carl Koldewey (1837–1905). One could name the first expedition a test expedition—absolutely different from the second in the years 1869–1870 to the east coast of Greenland: That time very considerable geographic discoveries were made. Six scientists participated the undertaking. These and more than 20 external experts wrote a scientific report—a volume of nearly 1000 pages. Although Neumayer was not engaged in this undertaking, he was involved in the expeditions. Not only was he acquainted with Koldewey but also with the geophysicist of the second German Arctic Expedition, Carl N. Börgen (1843–1909) with whom he later produced a couple of publications (Fig. 8).

During the summer of 1871 Neumayer lived in Hamburg where he had friends. Several times he visited Wilhelm von Freeden (1822–1894) in Hamburg whom he knew from the important geographical meeting in Frankfurt in 1865. Freeden was a very famous person, not only was he publisher of a nautical magazine and member of the parliament in Berlin, but in 1868 he had founded in Hamburg a semiprivate nautical observatory, the 'Seewarte' (Fig. 9).



*Fig. 8.* Top left: Carl Koldewey (1837-1908), polar scientist, Captain and navigation expert. Neumayer and Koldewey were in contact since 1871 and worked together at the Deutsche Seewarte in Hamburg from 1875 to 1903. Top right: The polar scientist and geophysicist Carl N. Börgen (1843-1909) who cooperated with Neumayer for decades. Above: A very rare photograph from 1869 showing the polar-vessel *Germania*. Neumayer bought this ship (without engine!) in 1882 and used it for transportation of the German IPY crew and its equipment to Baffin Island! (All photographs from AWI-Archives).

In the private correspondence of Carl Koldewey I found several quotations where he alludes to meetings with Neumayer—sometimes together with Freeden. Neumayer's goal is clear—together with Koldewey and Freeden he wanted to convert Freeden's semiprivate nautical institution into a public funded imperial institution. I could never figure out why Neumayer and Freeden became antagonists during this process. In October 1871, Neumayer moved from Hamburg to Berlin, trying to get in contact with the command of the newly established German Imperial Navy. He was a 46 year old man and had been without a paid position for seven years.

A single talk on compass deviations, held in Berlin on 3 February 1872, ended Neumayer's struggle for a career.<sup>12</sup> Because of the extensive use of steel and iron for the newly built navy vessels the compass problem—that means a reliable function of the magnetic compass—was highly explosive for the Command of the Navy. The core of the problem was the so-called deviation, that is the error of the compass caused by the temporally and spatially variable field components produced by the iron parts of the ship itself. This problem—theoretically solved by Poisson in 1837—was understood in full by only very few persons at that time, one of those being Neumayer. The solution of the equations is a vector with nine components, and for a good compensation of the magnetic compass (that means for a compensation that fits practical requirements) four to five coefficients of the components should be known.

Albrecht von Stosch (1818–1896; Head of the Admiralty, State Secretary, plenipotentiary of the Bundesrat) (Fig. 9) recommended Neumayer, who became a member of the Hydrographical Bureau of the Imperial Admiralty on 1 July 1872. On 24 December 1872 he was promoted to Hydrographer of the Admiralty. Neumayer used his new position not only for scientific works but also for activities in research politics. He was the driving force and the scientific mentor in the orientation of the expedition to the seas of the southern hemisphere with the *Gazelle* during the years 1874–1876 (Fig. 10).

It is interesting to note that the ships *Gazelle* and the famous British *Challenger* had much in common although the scientific results of the *Challenger* were by far more extensive. The ships' captains met in Montevideo and made an arrangement for the deep sea soundings on their way home to Europe.

The expedition of the *Gazelle* which had visited the isles of Kerguelen, was a first step towards Ger-

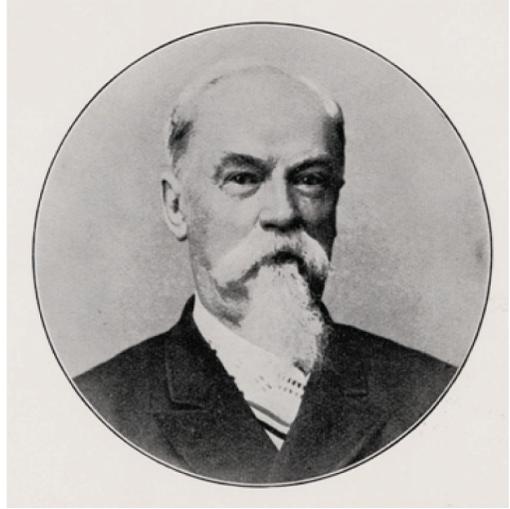


Fig. 9. Top: Wilhelm von Freeden (1822–1894), navigation-expert, member of the parliament, later Neumayer's antagonist in concern of the Nautical Observatory (BSH-Archives). Above: Albrecht von Stosch (1818–1896), head of the admiralty—Bismarck's rival—Neumayer's very influential mentor (frontispiece in Stosch 1904).



Fig. 10. The meeting of the sisterships *Gazelle* and *Vineta* in the Strait of Magellan by Alexander Kircher (1867–1939) (Kircher 1934). The dimensions of the vessels are: 73 m; 12.8 m; 6.6 m; 1.000 KW; 13.5 kn.; built 1869.

man south polar research. But it is necessary to keep in mind that Neumayer's new position—which obviously differed from his engagement in 1870/71 for the Austrian imperial Navy—did not allow him to participate in an expedition in person.

In addition political circumstances changed. Neumayer was not in the position to extend his south polar research ambitions. He was faced with a new challenge. After long discussions the government decided on the conversion of the already mentioned semiprivate naval observatory in Hamburg into an imperial institution with the name *Deutsche Seewarte* (German Naval Observatory) (Fig. 11).

Neumayer took the post of the director of this institution at the beginning of 1875. He held this position until 1903. There are two German historians of science, Mr. K.-H. Wiederkehr and Mr. Walter Horn, who conducted extensive studies on the establishment of the institution 'Deutsche Seewarte'. But they could not definitely say whether Neumayer was lucky with obtaining this new position or if he had followed an order of his superior authorities when he took the post.

Be that as it may, Neumayer transformed the Naval Observatory into an internationally acknowledged institute, which was well-known for its technical and scientific innovations. Neumayer provided many interesting improvements to technology of navigation, meteorology and geomagnetism, and in addition to that, he acted very stimulatingly in this field. Neumayer also proved to be a competent theorist as already mentioned (Fig. 12).

But what about Neumayer's polar ambitions? Besides the commitment at the Naval Observatory, the year 1875 brought about another important event: the conference of a group of 14 scientists summoned by the Imperial Chancellory to discuss future polar research in general. Neumayer was one of the most influential members of this commission.

This basic evaluation of polar research had become necessary because of an initiative of the *Verein für die deutsche Nordpolarfahrt* in Bremen (German Society for Arctic Exploration in Bremen) which had organised the above-mentioned second German Arctic Expedition, that is, the German East-Greenland expedition, (1869–70) under the guidance of Carl



Koldewey (1837–1908). The protagonists of the free hanseatic city of Bremen had appealed to the Bundesrat (upper house, federal counsel) with a petition in order to set up another East-Greenland expedition,<sup>13</sup> which was supposed to be closely linked with a planned English West-Greenland expedition under Sir George Nares. There were close personal relations with the British researchers. It is important to understand that the proposal of the Bremen people, which was mainly supported by Moritz Lindeman (1823–1908) (Fig. 13), fitted nearly perfectly all the needs of modern polar research.

The proposal combined an extensive international cooperation with a well equipped over-wintering facility at the east coast of Greenland and included a northward push from the same coast. To make a long story short, although the evaluation report was positive, the Bremen-proposal was rejected by the government.

In this connection Neumayer's role was very dubious! And he was aware of this.

However, the crucial point of the events in the political background was not due to Neumayer's activities. A considerable financial crisis had befallen



*Fig. 11.* Top: Deutsche Seewarte. Neumayer was head of the Deutsche Seewarte—imperial German naval observatory (hydrographic office)—from 1875 to 1903. The impressive building was inaugurated in 1881 and destroyed during World War II. Above: Deutsche Seewarte, Hamburg ca. 1939.



*Fig. 12.* Neumayer's 70th birthday, 1896—colleagues and some guests in front of the Seewarte building entrance (Archives Bundesamt für Seeschifffahrt und Hydrographie, Hamburg).



*Fig. 13.* Moritz Lindeman (1823–1908), technology writer, correspondent of Neumayer (AWI-Archives).

the newly founded German nation. And in addition there was strong political pressure towards an extension of the research activities in Africa, with the very clear intention of acquiring colonies overseas. In this connection it is worth noting that by far the best talk concerning the need for polar research was the one Neumayer had presented to the African Society(!) —I am talking about his 1874 speech in which he demanded international cooperation in solving the problems of meteorology and geomagnetism (see Neumayer 1901).<sup>14</sup>

In not opposing the rejection of the Bremen application in 1875, Neumayer did more or less betray his own polar research ambitions. And it is important to recognise that this was seen also by his contemporaries. There is a letter from Petermann to Lindemann which overwhelms Neumayer with mock and sarcasm.

But there came help for Neumayer from another direction. In 1872 an Austro-Hungarian North Pole Expedition had started under the leadership of Carl Weyprecht (1838–1881) and Julius Payer (1841–1915)—the latter responsible for shore-based activi-



ties. The expedition was planned to pass the so called North East Passage north of Asia. Lying east of the island of Nowaja Semlja, Weyprecht turned the bow to the north—a terrible mistake (Fig. 14).

The ship became trapped in the ice for two years and was later abandoned. Even though during the drift an undiscovered archipelago was detected, Weyprecht took the expedition as a scientific failure.

This frustration gave birth to a new idea, which Weyprecht formulated in a few sentences which he called 'Principles'. Instead of pressing national expeditions through the white and cold deserts, an international cooperation should take place. His motto was: 'Observatories instead of expeditions'. Each nation interested in polar research should operate at least one well equipped observatory in high latitudes.

The goal: Synchronous measurements in the field of meteorology and geomagnetism—minimum eight to nine stations located at appropriate positions—were seen as sufficient to meet the demands.

Strangely, in a first reaction Neumayer rejected Weyprecht's plans!<sup>15</sup> But soon he became the major



Fig. 14. Top: Carl Weyprecht (1836–1881). Photo: Heeresgeschichtliches Museum Vienna. Above: Research vessel *Tegethoff*; painting by Alexander Kircher (1867–1939).

promotor of the idea. Neumayer discarded parts of his initial ideas concerning polar research and together with Weyprecht and others tried to realise the installation of circumpolar stations with international participation.

A good chance to push the plans ahead occurred in April 1879 at the second international meteorological meeting in Rome (21 April 1879). Neumayer invited the delegates of all interested nations to participate in an international campaign according to Weyprecht's ideas<sup>16</sup>. During the week from 1 to 5 October 1879, delegates from eight nations met in Hamburg. A complete program was elaborated. An International Polar Commission was founded with Neumayer as its president. A first circular of the International Polar Commission was issued with the date January 26.

But when Neumayer step by step tried to approach an international consensus it became obvious that the German government was not willing to provide any funds for polar research. Neumayer as

President of the International Commission could not rely on a German Polar Commission. Consequently he had to give up his presidency. Heinrich Wild (1833-1902) (Fig. 16), the leader of the Russian St. Peterburg-Observatory, took his duties.

With the 'Circular' number 14 dated 1 May 1881 the IPY president Wild stated that the conditions for beginning the international polar undertaking which were given in conferences in 1879 in Hamburg and 1880 later in Bern were fulfilled. The important passages of the circular read (translation by the author):

... Because of this double statement (of the Russian and Austrian participants) the conditions according to article. 10 and 11 of the Hamburg-conference as well as the article 11 of the conference in Bern are fulfilled ... the start of the operation in 1882 is sure ... the preparations of the expedi-

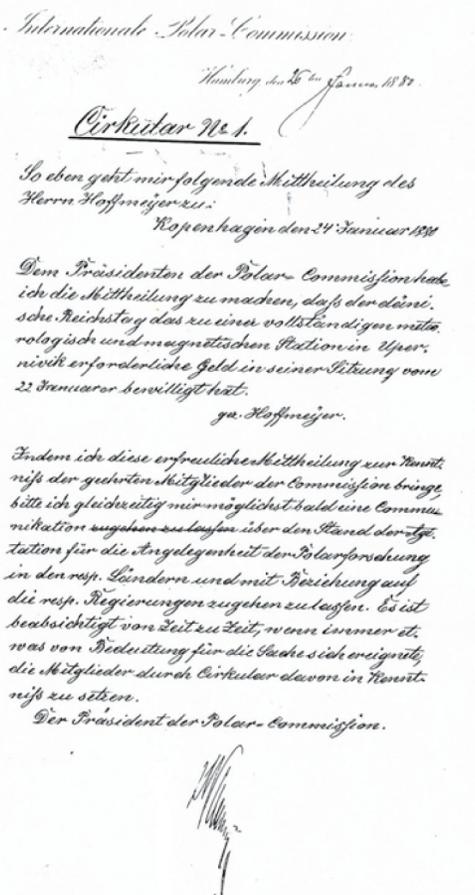


Fig. 15. Left: 'The Northpole-Expedition of the Future'—the title page of a proposal of Carl Weyprecht (1838-1881). Right: The first circular of the International Polar Commission signed by Neumayer as its president.



Fig. 16. Heinrich Wild (1833–1902), physicist, meteorologist, conducted the Physical Central Observatory in St. Petersburg, Russia. Without Wild the first IPY would never have become reality. Neumayer and Wild became good friends. In 1884 he offered Neumayer the sharing of the presidency during the fourth meeting of the International Polar Committee in Vienna. (Ernst v. Baer Museum, Erki Tammiksaar, Tartu)

tions should start ... a next conference will take place in St. Petersburg ... (H. Wild)

Obviously the IPY was ready for a start in the second half of 1882. Participation of Germany was no longer necessary. Neumayer, not to mention one of his German colleagues, did even attend the last conference of the International Polar Commission, which happened during the first days of August in 1881.

That this situation was a great shock for Neumayer is self explanatory. Several more or less direct attempts were made to make the government change its mind. Assistance also came from foreign colleagues and institutions—but all efforts remained without success.

Help came from a different and unexpected direction—from the parliament (Reichstag). Rudolf Virchow (1821–1902), the worldwide known pathologist, during that time member of the Reichstag, asked Chancellor Bismarck's deputy why no money for an international scientific mission of such a high importance was available. With the votes of nearly all members of the parliament an official inquiry was decided. At least Chancellor Bismarck personally supported Germany's IPY attendance. At the end of

August 1881, more or less together with the inauguration of the new building of the naval observatory in Hamburg, it became clear that sufficient money for a German participation was available. Immediately a German Polar Commission with Neumayer as its president was founded.<sup>17</sup>

Indeed, there was not much time left for the organisation of two expeditions to remote inaccessible areas should begin with its measurements on 1 September 1882. And it is important to underline that it was Neumayer who, from the very beginning of the IPY propaganda campaign, had insisted on including the South polar areas.

To establish an observatory in the remote southern hemisphere turned out to be less difficult than in the much closer northern areas. Instead of Kerguelen, Neumayer decided to settle and measure on South Georgia. Now his close friendship with the leader of the admiralty showed its value. The personnel of 11 men (seven scientists, four workmen) and roughly 80 tons of equipment were shipped by liner only to Montevideo and from there with a navy vessel, *HMS Moltke* (75 m, 2900 t displacement, no plating) to the Royal Bay on the north east coast of South Georgia.

The overwintering of the German crew became a scientific success. Not only were a lot of interesting data acquired, by means of a tide gauge the Krakatau eruption was detected, but the transit of Venus was observed in its entirety.

Looking to the north many more problems occurred. One has to admire Neumayer because from various files one can see that he was seriously engaged to organise a station which should work on the east coast of Greenland. But to understand the problem related, one must know that this coast is also in summer blocked by an ice-stream of a width up to a hundred miles and sometimes even more. Passing this ice-stream may be extremely difficult and dangerous. Shipowners demanded unusual high rates and long charter times for sending ships to that area.

At last Neumayer—and his collaborators and supporters—had to give up the plan because of insurmountable financial hurdles. Instead the old German expedition vessel *Germania* was bought. Four times the tiny ship made the 2500 miles over the roaring North Atlantic to Baffin Island where the station was erected and the wintering over of the German scientists took place (Fig. 17).

Hence the execution of the IPY 1882/83 is inextricably linked with the name of Neumayer. It is his greatest success as an organiser of scientific endeav-

ours—an achievement which deserved and received international respect, a merit which still ennobles German marine and polar research today. It has already been mentioned that Neumayer vehemently stood up for integrating the Antarctic into the Polar Year. Apart from a number of cooperating minor stations in the southern hemisphere, only France and Germany had implemented expeditions to Antarctic regions (South Georgia and Straits of Magellan).

As for the results of the IPY: no summarising work came out and no circumpolar synopsis, which had been the focus of the whole concept—at least regarding meteorology and geophysics. The works on the different expeditions were published in the official languages of the respective research teams. The main work of the German expedition, a collection of meteorological and geophysical data, was published in September 1886 in two impressive volumes (Neumayer & Börgen 1886). But the volumes on Descriptive Natural Sciences and the Historical Part were not brought out before 1890/91 (Neumayer 1891).<sup>18</sup> Acknowledgements of the IPY which came out later agree that the scientific outcome was considerable.

Nevertheless the German scientific community at the end of the 19th century was well aware of the lack of summarising works and made considerable efforts to produce global views. One of these is Neumayer's *Atlas des Erdmagnetismus* (Atlas of Earth Magnetism) (Neumayer 1891). It was partly based on IPY-data and can be regarded as an IPY outcome. This is also true for Hann's *Atlas of Meteorology*.<sup>19</sup>

A fourth International Polar Conference was held in Vienna on 17 to 24 April 1884. This was the last international convention under the roof of the IPY. In Munich 1891 in connection with the international

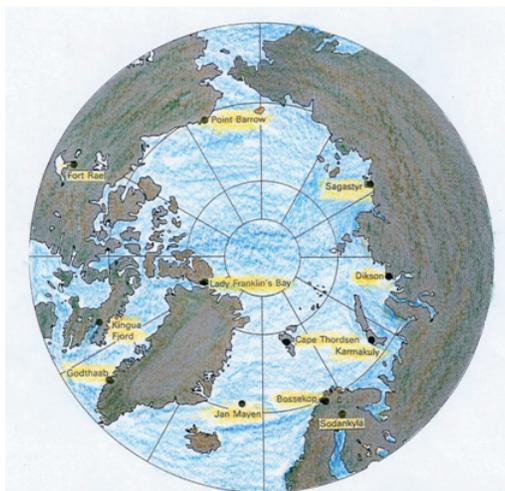


Fig 17. Top: The positions of the northern IPY stations 1882–83. Below: the German IPY Station at Kingua Fjord, Baffin Island.

meeting of the directors of the meteorological institutions it came to a final IPY meeting and the International Polar Commission was terminated.<sup>20</sup> Almost half a century passed before the idea of a Polar Year was taken up again. Again the idea arose in Germany and was supported mainly by the staff of Neumayer's old institution—Deutsche Seewarte—the German Hydrographic Observatory.

With the conclusion of the IPY, Neumayer's efforts to further polar research did not come to an end. His favourite idea—Antarctic research—had not been tackled seriously so far. So he used every opportunity to remind others of starting to work on it. In 1865 he had described the exploration of the Antarctic regions as a 'nautical-geographical problem which remained to be solved by our century'. With these explorations he expected to find data to better understand meteorology and the theory of geomagnetism. It was a 'gathering of material for theoretical research'. One hundred and thirty years ago Neumayer phrased the very principle which is still the motivating force behind today's polar research.

In the above-mentioned lecture of 1874 in which he had examined the geographical problems within the polar regions and their interrelation before the Society for the Exploration of Central Africa, Neumayer had emphasised that the most pressing questions of geophysics could be solved only by intensive polar research (Neumayer 1874). Indeed the IPY 1882/83 was a first success in realising his visions. When the 5th Deutsche Geographentag (Meeting of the Society of German Geographers) 1885 was held in Hamburg, Neumayer used this opportunity to vehemently promote Antarctic research. Here he also fulfilled an obligation which had its origin in a petition by Friedrich Ratzel (1844–1904) the year before (for details see Neumayer 1885).<sup>21</sup> A number of lectures by Neumayer and other internationally known scientists such as Friedrich Ratzel (1844–1904), Albrecht Penck (1858–1945) and Carl Friedrich Wilhelm Peters (1844–1894) were dedicated to Antarctic research. Neumayer's talk (Neumayer 1885) was not characterised by restraints or reservation—on the contrary, some of his statements could not have been clearer. The following phrases show his position:

'... for more than 40 years nothing has happened to extend our geographic field of vision towards the Antarctic regions ... without a thorough exploration of the physical conditions in the Antarctic it is absolutely impossible to get a full understanding of the natural phenomena of our Earth

... without this [Antarctic] research we cannot even think of a development of the geophysical science ... it seems to me that the necessity of scientific treatment of the south polar regions should be seen as an unchallengeable ethical law' (Neumayer 1885: 176–177),

to quote but a few. Other quotations where he bitterly—sometimes nearly cynically—talks about 'general philosophical principles' and the 'logical element in geophysical research' have been left out. We see that the nearly 60 year old Neumayer is more aggressive than ever.

In fact a few positive reactions ensued but in general his massive efforts and his agitation were in vain.

Again 10 years later (1895) at the opening speech of the 11th convention of the German Geographic Society in Bremen, Neumayer expressed his exhaustion in promoting south polar research. He had only agreed to speak at that opening because he was asked to speak on the same matter at the 6th convention of the International Geographic Society in London. But already the meeting in Bremen turned out to be a starting point for a new era in Antarctic research. At this meeting a German Commission for South Polar Research was founded.

This gave new hope and new strength to Neumayer. In London he commented on the objectives and tasks of the exploration of the south polar regions in more detail than in Bremen. He quoted mainly works and opinions of German scientists and explained that the range of scientific questions was reaching far beyond those of geomagnetism and meteorology.<sup>22</sup> At the end of his speech he stressed that it would be most desirable to carry out research in an international cooperation. He had in mind the participation of three nations.

Following an invitation by the Royal Society Neumayer took part in a *discussion meeting on Antarctic science* in London in February 1898. The eminent historian of science, Gordon Fogg, commented: 'If any one event can be taken as signalling the beginning of Antarctic science as a coherent field this discussion surely was it' (Fogg 1992: 116).

It was interesting to see that the British, who had a long tradition in polar research, were struggling hard to set up a new south polar expedition even though the project had two famous advocates in Sir Clements Robert Markham (1830–1916) (Fig. 18) and Sir John Murray (1841–1914).<sup>23</sup>

Only the Belgians with Adrien de Gerlache (1866–1934) acted with determination and started

Table 1. List of Antarctic Expedition which took place around the beginning of the 20th century.

At the turn of the century seven scientific Antarctic Expeditions of six countries took place:

1. 1897–1899, Belgian Antarctic Expedition; Leader: A.V. de Gerlache (1866–1934); Ship: Belgica.
2. 1898–1900, British (- Norwegian) Antarctic Expedition Leader: C.E. Borchgrevink (1864–1934), Ship: Southern Cross.
3. 1901–1903, German South Polar Expedition; Leader: E. v. Drygalski (1865–1949); Ship: Gauß.
4. 1901–1904, Swedish South Polar Expedition ; Leader: N.O.G. Nordenskjöld (1869–1928); Ship: Antarctic.
5. 1901–1904, British National Antarctic Expedition; Leader: R.F. Scott (1868–1912); Ship: Discovery.
6. 1902–1904, Scottish National Antarctic Expedition; Leader: W. S. Bruce (1867–1921); Ship: Scotia.
7. 1903–1905, French Antarctic Expedition; Leader: J.-B. Charcot (1867–1936); Ship: Francais.



Fig. 18. Georg von Neumayer (1826–1909) and Sir Clements Markham (1830–1916)—the most engaged protagonists of south polar research.

an expedition to the Antarctic Peninsula in the summer of 1897. Other nations were to follow four years later, with Germany taking on a leading position (see Krause 1996) (Table 1).

When choosing the destination of the German expedition, Neumayer was able to use his authority and pushed through a long favoured idea. He wanted a landfall at 90°E, even though influential voices preferred the area of the Weddell Sea, as Cornelia Lüdecke had shown (Lüdecke 1991, 1995). Neumayer believed that he had indications that there is a stream in southern direction in the area of 60°E. This idea was supported by a famous German oceanographer Otto

Krümmel who had drawn a so called Kerguelen Current in his map of the currents of the oceans in 1886.

Krümmel had a very interesting idea. In the whole sector between 70°W and 90°E only a very few sightings of land were known. That this area was occupied by a huge sea was by all means possible (Fig. 19).

The German *Gauss* (Fig. 20) was much more designed as a special polar research vessel than the newly built vessel of the British expedition under Robert F. Scott (1868–1912)—the *Discovery*. Once frozen in, *Gauss* should be able to withstand the ice pressure. Under good conditions it should be possi-

ble that the intended Kerguelen Current would drift the ship over the South Pole. That meant sitting in an armchair in the heated mess-room, smoking pipes, reading books and at the same time reaching the South Pole was a realistic possibility.

As we know—this combination of events did not occur. Erich von Drygalski (1865–1949), the leader of the German expedition had bad luck. He even missed the Amery Basin (around 75°E). His high quality polar research vessel *Gauss* got trapped at the polar circle at 66°45'S, 90°E.

The geographic discoveries of the German expedition remained minor compared to those of the British, who worked in the Ross Sea at the same time. This shortcoming discredited the expedition, especially in the eyes of the German Emperor Wilhelm II. This strongly hindered any further development of German Antarctic research. The *Gauss* was immediately sold to the Canadian government.<sup>24</sup>

Neumayer who had devoted his life to establish Polar research, at the end of his professional career,

was confronted with the negative effects resulting from his erroneous oceanographical ideas of the southern oceans. But this statement is true only for the one German Antarctic expedition from 1901–1903.

Due to Neumayer's agitation, which was highlighted at the conference in London in 1895 via the grandiose seventh international Geographic Congress in Berlin in 1899, it led to the well-known rush of seven expeditions to the sixth continent. So Neumayer could lean back. His visions indeed were being realised.

And during his last years, after most of the interesting data and events of the expeditions were published, he became witness to the new international polar research ambitions.

## NOTES

- 1 In the following the term 'International Polar Year' and its abbreviation IPY will be used continuously. In

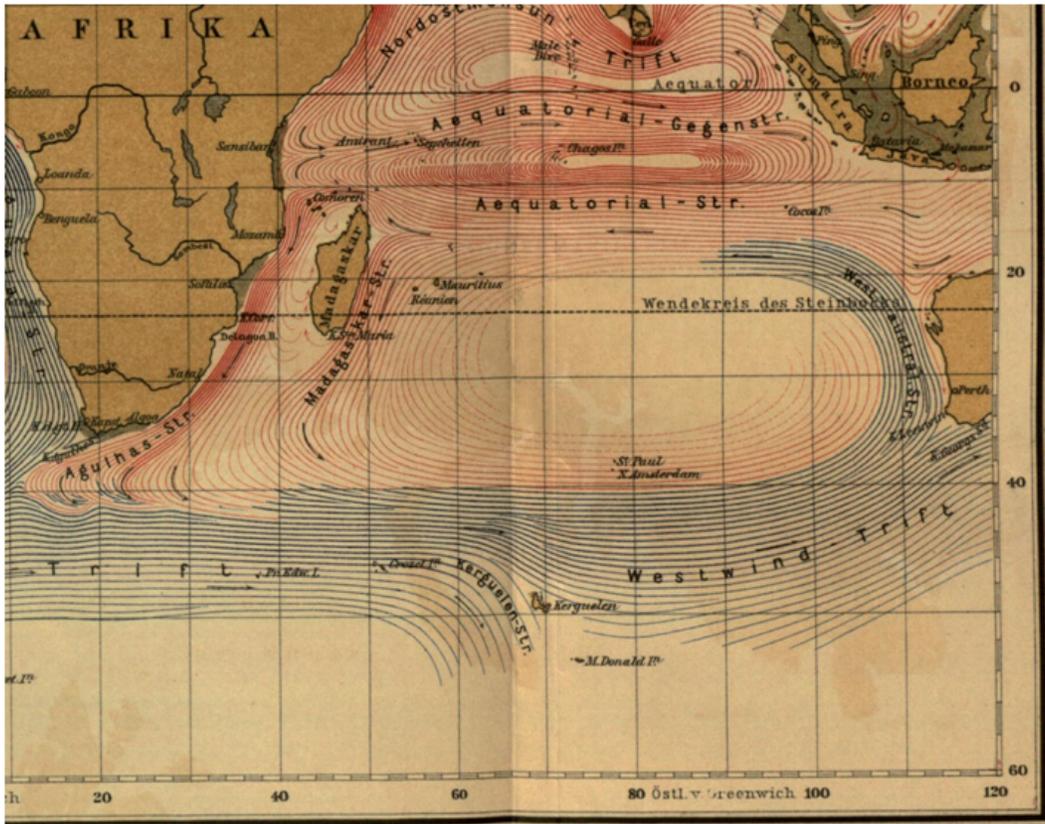


Fig. 19. The proposed Kerguelen current as drawn by Otto Krümmel in 1886.



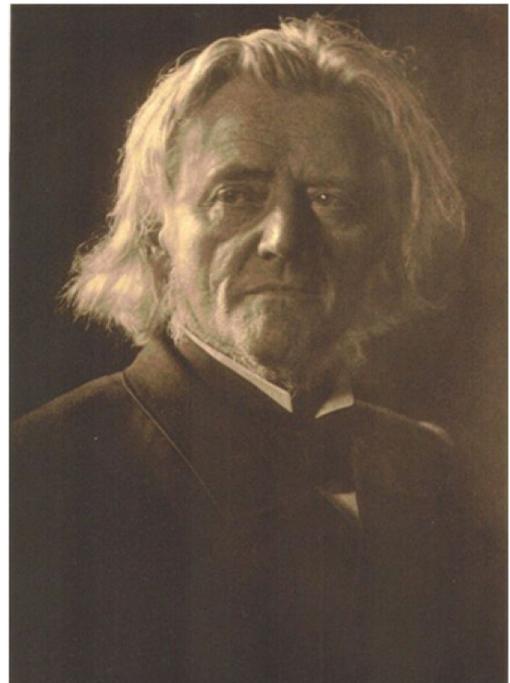
Fig. 20. The German Polar-research-vessel Gauss (46 m bpp; 10.7 m; 4.8 m cd; 1442 t dpl; aux.eng 325 hp ind.). Left: Loading provisions in Bremerhaven; Right: trapped in the ice off Antarctica (appr. 66°30'S, 90° E). (AWI-Archives).



Fig. 21. Left: The Neumayer Station in Antarctica (2009) 70°41'S, 8°16'W. Below: Neumayer 1905 (AWI- Archives).

a strictly historical sense that is not correct. The international polar undertaking 1882–1883 was identified by the contemporaries with the institution of an International Polar Commission. According to the author's enquiries the Term Polar Year was first used in Ehrhart 1902.

- 2 Neumayer openly reflected his personal development and wrote about his adolescence in great detail in several essays. Also see Krause 2001, p. 197 and next footnote.
- 3 It is obvious, that Neumayer's wish to join the Navy is to be seen in connection with his patriotic basic position. The blockade of German ports by the Danish and the resulting surrender of the Prussians were seen as a humiliation by many Germans.
- 4 For a detailed history on the publication of *Wind and Current Charts* and *The Physical Geography* see Leighly 1963 pp. IX–XXX in reprint Maury 1861
- 5 Maury is referred to in Humboldt's *Kosmos*— with a work on astronomy though (see Humboldt 1845, vol. 3, p. 569). In Wiederkehr & Schröder (1988: 6) it is said without reference, that Humboldt heard about Maury from Rümker in 1849. This is supported by Kortum & Schwarz (2004: 170), where it is written that Maury had his just completed *Wind and Current Charts* sent



- to Alexander von Humboldt through Rümker. Here (p. 158) it can also be read that Maury met Humboldt in Berlin after attending the earlier mentioned conference in Brussels in 1853. During this encounter the title for Maury's main work was set up.
- 6 From the obituary, which Neumayer wrote for Maury, it can be presumed that Neumayer read about Maury's ideas aboard the *Sovereign of the Seas* (H. M. 1873: 49–51). According to Wiederkehr 1987, footnote 12 Neumayer knew about Maury's work as early as 1849.
  - 7 Neumayer's cleverness also shows in another aspect: he succeeded in making the Hamburg ship owner Johann Caesar Godeffroy (and his brother, the Senator Gustav Godeffroy) pay attention to his project. The shipping company Godeffroy, which was increasingly engaged in transport to Australia, was certainly interested in getting nautical and meteorological assistance for their ships in Melbourne. His memorandum *Denkschrift/der Brief an den Hamburger Senat/Gustav Godeffroy* is preserved (Wiederkehr 1987, p. 15) Neumayer points out that he followed the *instructions* of the Bavarian King and that he had the *recommendation* of famous British scientists.
  - 8 In connection with Neumayer's agitation for a magnetic survey of Australia is very interesting, so are his reasons. He wrote: '... that there exists a relation between the productiveness of a tract of land and the values of the magnetic constants. Further there exists a relation between the same quantities and some geological formations, for instance the coal beds as I have shown in Palatine. ...' Even auriferous land should be more easy to be detected by the help of a magnetic survey (Home & Kretzer 1991: 230). The institute became an important pillar of the institutionalisation of Australian academic life. Today, therefore, Georg von Neumayer is as famous in Australia as he is in Germany—exactly the reason for a Neumayer Symposium in Melbourne.
  - 9 At a great circle course between Cape Agulhas and middle of Bass Strait the Phi max 58°15' S is attained at Lambda 75°39'E. The distance is 5326 sm.
  - 10 Petermann had never believed in an Antarctic continent, instead he maintained that the south pole was situated in a south polar sea.
  - 11 The yearly gatherings known as *Deutscher Geographentag* (Convention of the German Geographic Society) only began in 1881.
  - 12 Wiederkehr & Schröder (1988: 19) state that the influence of the astronomer Wilhelm Foerster (1832–1921) on von Stosch, was decisive for the employment.
  - 13 The protocols of these meetings and other documents remained. For background information on the conference see Krause 1992.
  - 14 Attention—on the title page of the article one finds a bad mistake—the day of the presentation is not in 1876 but 1874. A version of the talk is also available in AHMM 1874: 51–53, 63–68, 75–82.
  - 15 See Berger et al. 2008: 447—here one finds a letter of Weyprecht to his companion count Hans Wilczek (1837–1922) in which the reactions to his ideas are discussed.

- 16 S. Bericht 1880.
- 17 This story in more detail with many original papers shown in Krause 2008.
- 18 For details on plans for publications of the IPY as regards content and schedule see Neumayer 1885: 173.
- 19 Cornelia Lüdecke recovered a dissertation from 1901 which was based mainly on IPY data (Ehrhart 1902).
- 20 3. September 1891 s. Lüdecke 2004: 60.
- 21 Even the drafts for a new polar research ship were presented. Neumayer 1885: 196.
- 22 See Fogg 1992: 108. For details on the congress see PGM 1895: 208.
- 23 Many details are to be found in Markham 1902.
- 24 She remained there in service as *Arctic* for the Ice Patrol under Captain Bernier till 1925.

## REFERENCES

- AHMM. *Annalen der Hydrographie und Maritimen Meteorologie*, first time published 1873 by the Hydrographic Bureau of the Imperial Navy (Hydrographisches Bureau der Kaiserlichen Admiralität) in Berlin under the title *Hydrographische Mittheilungen* (hydrographic notices). The title changed with the 1875 volume. In 1878 the Deutsche Seewarte in Hamburg became the editor of the journal.
- AMTLICHER BERICHT, 1865. Amtlicher Bericht über die erste Versammlung deutscher Meister und Freunde der Erdkunde, Frankfurt am Main 1865, 71 pp.
- BERGER, F., BESSER, B.P. AND KRAUSE, R.A., 2008. *Carl Weyprecht (1838–1881), Seeheld, Polarforscher, Geophysiker*. Verlag der Österreichischen Akademie der Wissenschaften, Wien 2008, 587 pp.
- BERICHT, 1880. Bericht über die Verhandlungen und die Ergebnisse der internationalen Polar-Konferenz, abgehalten in Hamburg in den Tagen vom 1. bis 5. Oktober 1879. Rapport des discussions et des résolutions de la conférence polaire internationale, tenue a Hambourg du 1er au 5 Octobre 1879, 13 pp.
- EHRHART, S.B. 1902. Die Verteilung des Luftdruckes auf der Erdoberfläche im Polarjahre 1882/83. Stuttgart 1902, 4 maps, 35pp.
- FOGG, G.E., 1992. *A History of Antarctic Science*. University Press, Cambridge, 483 pp.
- GÜNTHER, S., 1909. Georg v. Neumayer, Leopoldina Halle S. 91–95.
- HYDROGRAPHISCHE MITTHEILUNGEN, 1873. Vol. 1., Berlin.

- HOME, R.W. & KRETZER, H.J., 1991. The Flagstaff Observatory, Melbourne; New Documents relating to its Foundation. *Historical Records of Australian Science*, 8 (4), June, 213–243.
- KIRCHER, A., 1934. *Deutschlands Flotte*. Eher München, 151 pp.
- KORTUM, G. & SCHWARZ, I., 2004. Alexander von Humboldt and Matthew Fontaine Maury – two Pioneers of marine sciences. *Historisch-meereskundliches Jahrbuch* 10: 157–185.
- KRAUSE, R.A., 1996. Gründerjahr der deutschen Südpolarforschung. *Deutsches Schifffahrtsarchiv* 19, 141–163.
- KRAUSE R.A., 2001. Georg v. Neumayer (1826–1909), Nestor der Meeres- und Polarforschung. *Deutsches Schifffahrtsarchiv* 24: 197–214.
- KRAUSE R.A., 2008. *Polarforschung* 77 (1): 17–36.
- LÜDECKE, C., 1991. Die Routenfestlegung der ersten deutschen Südpolarexpedition durch Georg von Neumayer und ihre Auswirkung. *Polarforschung* 59 (3): 103–111.
- LÜDECKE, C., 1995. Ein Meeresstrom über dem Südpol? - Vorstellungen von der Antarktis um die Jahrhundertwende. *Historisch-meereskundliches Jahrbuch* 3: 35–50.
- LÜDECKE, C., 2004. The First International Polar Year (1882–83): A big science experiment with small science equipment. *Proceedings of the International Commission on History of Meteorology* 1.1: 55–64.
- MAURY, M.F., 1855. *The physical Geography of the sea*. Harper, New York, 274 pp.
- MAURY, M.F., 1861. *The Physical Geography of the Sea and Its Meteorology*, 8th ed. Harvard University Press, reprinted 1963 with an introduction by John Leighly, Cambridge, Mass., xxx+432 pp.
- MARKHAM, C.M., 1902. Sir Antarctic Obsession – The British National Antarctic Expedition 1901–04. The cover of the original reads: The starting of the Antarctic Expedition, a personal narrative by Sir Clements Markham, Introduction Clive Holland, Bluntisham Books, Norfolk 1986, 179 pp.
- NEUMAYER, G. VON, 1885. *Notwendigkeit und Durchführbarkeit der antarktischen Forschung vom Standpunkt der Entwicklung der geophysikalischen Wissenschaften, insbesondere des Erdmagnetismus und der Meteorologie*. Verhandlungen des fünften Deutschen Geographentages in Hamburg, Berlin 173–196 pp.
- NEUMAYER, G. VON & BÖRGEN, C., (eds.) 1886. *Die Beobachtungsergebnisse der deutschen Stationen, vol I: Kingua Fjord, vol II: Südgeorgien*, Asher, Berlin, 736 + 523 pp.
- NEUMAYER, G. VON, 1901. *Auf zum Südpol*, Vita Deutsches Verlagshaus, Berlin, 485 pp.
- NEUMAYER, G. VON (author and ed.), 1891. *Die Deutschen Expeditionen und ihre Ergebnisse vol. II: Beschreibende Naturwissenschaften in einzelnen Abhandlungen*, Hamburg 1890, 574 pp. *Vol I: Geschichtlicher Theil und in einem Anhang mehrere einzelne Abhandlungen physikalischen und sonstigen Inhalts*. Asher, Berlin 1891, 243 + 118 pp.
- NEUMAYER, G. VON, 1905. Die geologisch-magnetischen Verhältnisse des einstigen erdmagnetischen Observatoriums in Hobarton (Tasmanien). *Meteorologische Zeitschrift* (Hann-Band) 67–80.
- NEUMAYER, G. VON, 1907. Ein deutscher Seemann und die Erschließung der Goldausbeute in Australien in dem Sammelband: Auf weiter Fahrt; Lohmeyer/Wislicenus (ed.) Leipzig.
- PETERMANN'S GEOGRAPHISCHE MITTHEILUNGEN, correct title 1895: Dr. A. Petermanns Mitteilungen aus Justus Perthes' Geographischer Anstalt. Herausgegeben von Prof. Dr. A. Supan. Original title since 1855: Mittheilungen aus Justus Perthes' Geographischer Anstalt über wichtige neue Erforschungen auf dem Gesamtgebiete der Geographie von Dr. A. Petermann.
- STOSCH, U. VON, 1904. *Denkwürdigkeiten des Generals und Admirals Albrecht v. Stosch – Briefe und Tagebuchblätter*. Deutsche Verlagsanstalt, Stuttgart, 275 pp.
- WIEDERKEHR, K.-H., 1987. Die hamburgische Seefahrt und die Einführung der meteorologisch-geophysikalischen Navigation. *Zeitschrift des Vereins für hamburgische* Band 73: 1–26.
- WIEDERKEHR, K.-H. & Schröder, W., 1988. Alexander v. Humboldt und Georg von Neumayers geophysikalisches Projekt in Australien. *Mitteilungen Arbeitskreis Geschichte der Geophysik in der deutschen Geophysikalischen Gesellschaft* 1–24.