

1 Entering the Company Service: Anglo-German Networks and the Schlagintweit Mission to Asia

Building (a) Reputation, Building Networks: The Early Careers of the Schlagintweit Brothers

On 12 August 1850, the eminent German naturalist and overseas explorer Alexander von Humboldt penned a letter of recommendation for two of his most treasured scientific protégés, the brothers Hermann and Adolph Schlagintweit. Hoping to open the doors and opportunities of the world of Victorian science to his pupils, whom he described as ‘very amiable and modest young people’, Humboldt addressed one of the leading British naturalists of the time:

Dare I ask for your benevolence in favour of two of my compatriots, Physicists and Naturalists, the two ... Messrs. Schlagintweit, who have long since lived among us and who are currently preparing an excellent work (similar to the one by Saussure) on the Eastern Alps. They have accomplished very interesting research on the geography of Alpine plants, on magnetism and the meteorology of the high strata of the atmosphere.¹

The recipient of this letter praising the brothers’ mountainous accomplishments was the director of the Royal Botanic Gardens in Kew, Sir William Hooker, who then presided over one of the most prestigious botanical institutions in the world and maintained an empire of patronage over aspiring British and continental naturalists. Humboldt knew that Hooker was a highly respected man of science within London’s scientific community, whose support – or rejection – could make or break a career.² The ‘benevolence’ towards these foreign naturalists, for which Humboldt politely begged, could translate into many things: from

¹ Humboldt to William Hooker [WH], 12 August 1850, RBG, DC 51, letter 254, 330. Humboldt addressed a similarly flattering letter to Michael Faraday, 13 August 1850, in James (ed.), *Correspondence* IV, letter 2313, 173.

² On WH’s prestige and influence, Drayton, *Government*, 146; on his vital role in training a small legion of German naturalists in Kew at the recommendation of Humboldt and the Prussian Envoy to London, Christian Carl (von) Bunsen, RBG, DC 51, letters 52, 53, 56, 57.

further introductions in London's many scientific societies to Hooker's support for a potential future employment in Britain.

Nathaniel Wallich, another leading botanist in England at the time, was also aware of the Kew director's far-reaching influence, when, in early 1854, he discussed with Hooker the Schlagintweit brothers' plans – this time to travel to India. Yet, Wallich approached the director with very different intentions:

Two German arch-puffers, yclept Schlagintweit brothers were recommended in 1852, by Baron Humboldt through the Pruss[ia]n Gov[ernmen]t and Consul Bunsen to [accompany] a surveying party vacant by the sad death of [Captain Elliot]. The case went through the Council of the Royal Soc[iet]y. I put a stop to the Soc[iet]y's direct recommendation. ... As I expected it to happen: the request was granted and it was stated, that in case an efficient officer in the Comp[an]ys Service not being found, or not being to be spared for that peculiar work, the brothers Schlagenze would be employed.³

Clearly enraged by this pending appointment of the German naturalists and seeming impostors to a plum position in British India, and determined to sabotage the scheme through a backdoor intervention, Wallich upped the ante by proposing a purportedly more able substitute for the brothers. Seeking support from the director for his plans, he openly mused: 'Why does not [Thomas] Thomson ask for an interview with the Chairman and offer himself as a candidate for the survey vacated by the death of Captain Elliot?'⁴ Adding fuel to the fire, Wallich explained that the British naturalist Thomas Thomson was certainly 'better qualified in all respects than ten Schlagintweits, or 10 similar German puffers, carrying large sails with little ballast'.⁵

In 1854 these 'German arch-puffers' were at the beginning of their scientific careers, having only recently reached the age of majority; nevertheless, opinions were already deeply divided over their talents, future prospects and personal character. The Bavarian brothers grew up in a respectable social milieu. Their father, Joseph Schlagintweit (1791–1854), had in some sense already anticipated many of his sons' later traits and passions. He had himself been a keen traveller and self-made 'improver'.⁶ Joseph had studied medicine, gaining a doctoral degree from the Ludwig Maximilian University in Munich. His qualification as a surgeon was followed by extensive travels throughout the German states,

³ Wallich to WH, 28 January 1854, RBG, DC 55.

⁴ The British officer formerly in charge of the geomagnetic survey of the Indian Empire.

⁵ Wallich to WH, 31 January 1854, RBG, DC 55.

⁶ The family account is mostly based on E. Schlagintweit, 'Schlagintweit'; S. Schlagintweit, 'Abriß'.

where he operated in numerous hospitals. His experiences culminated in a well-received treatise on eye surgery, complemented by a description of a new medical instrument he himself had invented for operating purposes.⁷

Following his central European travels, which brought Joseph Schlagintweit from Vienna to Prague, and from Berlin to Frankfurt am Main, he put down roots in Munich, where he founded a private hospital for eye surgery in 1822. Over time he greatly improved this field, while also writing numerous studies on childbirth, medical treatments for the poor and epidemic diseases. He assumed the directorship of Munich's Institute for the Blind (1837), and received not only the title of Royal Councillor in 1839, but also the Order of St Michael in 1842. Perhaps nothing better reflects the confidence that the Bavarian monarch Maximilian II placed in his skills than the fact that he was entrusted with operating on the king's mistress, Lola Montez.

Besides Joseph Schlagintweit's social and specialist advancement, he managed to improve his finances to such an extent that he could afford an excellent education for his growing family. His marriage to Rosalie Seidl, the daughter of a well-heeled brewer, had brought in an attractive dowry, thus cementing the family's bourgeois status. (Rosalie Seidl, born 1805, died after a prolonged illness in 1839.) The young Schlagintweit brothers attended the Königliche Alte Gymnasium (since 1849, the Königliche Wilhelmsgymnasium) in Munich. In a short time, they emerged as outstanding pupils, with top marks, especially in the field of geographical science.⁸ German teachers at the time sought to provide a deeper understanding of the field of geography, which meant putting an emphasis on the relationship between the earth and its human inhabitants – an anthropocentric approach clearly influenced by the works of the eminent German armchair geographer Carl Ritter.⁹ The latter had provided a classical account of this approach in his monumental work on 'Comparative Geography', whose original volumes can still be found in the old library of the brothers' former school, suggesting that they had encountered Ritter's oeuvre at a young age.¹⁰

In addition to their schooling, the ambitious father further improved his sons' *Bildung* by hiring private tutors, so that the young Schlagintweits acquired a privileged training in modern languages and the natural

⁷ J. Schlagintweit, *Pupillenbildung*.

⁸ See Hermann's and Adolph's school certificates at the Archiv des Deutschen Alpenvereins, Munich [DAV], and the final school examination of Robert, BSB, SLGA, VI. 8.3.1–11.

⁹ Lüdecke, 'Einfluß'.

¹⁰ *Ibid.*, 144; Ritter, *Erkunde*.



Figure 1.1 Hermann, 'Brunnthal', 13.2 × 19 cm.

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sciences.¹¹ From 1844, Franz Joseph Lauth, later the first professor of Egyptology at the University of Munich, also tutored them as official 'Hofmeister' (instructor) of the family.¹² This thorough education was complemented by an early engagement with the art of painting. Hermann once noted that the celebrated Munich artist Anton Zwengauer had instructed him in his first studies of nature.¹³ Two surviving pencil drawings of the environs of Munich by Hermann and Adolph suggest that the two had indeed received early training to nurture their talents (Figure 1.1).

Young Humboldtians in the Alps

Their visual studies *en plein air* point to another crucial aspect of their education: their early impetus to examine nature *in situ* – further spurred by their reading of Humboldt's *Cosmos*, whose first parts were published

¹¹ E. Schlagintweit, 'Schlagintweit'.

¹² Körner, 'Brüder Schlagintweit', 62.

¹³ H. Schlagintweit, *Reisen* II, 164f.; A. Schlagintweit and H. Schlagintweit, *Untersuchungen*, 444; Baud et al., *Haute-Asie*, 52.

in 1845. From 1846 to 1847, the closely attached brothers Hermann and Adolph embarked on their first two major Alpine excursions, which resulted in the publication of their first treatises.¹⁴ Crucially, their extensive research in the Alps allowed them to acquire a substantial stock of practical knowledge and experience in the 'field'. Yet, their trips also formed part of a thorough physical training (Figure 1.2). Consequently, the two were soon able to achieve some remarkable feats of mountaineering, nearly accomplishing the first ascent of Monte Rosa (4,634m) in August 1851.

While the scientific travellers continued their explorations of the German, Swiss and Italian Alps from the mid 1840s for almost a decade, this period of study in nature coincided with the start of their university education in Munich. Hermann, first encouraged by his father to follow in his footsteps, started to study medicine yet soon abandoned the subject to follow his passion for the natural sciences, and completed his geographical studies in July 1848 with a doctoral dissertation on angular measurements.¹⁵ Adolph, by contrast, received his PhD in 1849 in the field of geognosy, a branch of geology that investigates rocks and minerals in the study of the layers of mineral matter.¹⁶ The third brother, Robert, who joined the Alpine travels only in 1852 with a trip to the Zugspitze, undertook independent excursions in the autumn of 1853; he explored the mountain mass of the Kaisergebirge, a work that earned him a doctoral degree in geography in 1854.¹⁷

The Schlagintweits were part of a new wave of scientific specialists in the mid nineteenth century who started to take natural historical studies up to the highest regions of the central European mountain chain. Since the Middle Ages, there had prevailed a strong belief among European peoples in the existence of supernatural phenomena in the massive mountain system. These beliefs, which included myths about dragons and ghosts, were so forceful that a more thorough exploration of the Alps had been impeded until the late seventeenth century.¹⁸ Only then did naturalists gradually start to take measurements and to collect natural specimens and species at ever-new altitudes. One of them was the Swiss naturalist Johann Jacob Scheuchzer (1672–1733), who travelled extensively through the Swiss Alps at the turn of the eighteenth century. His works proved highly influential for future geological, meteorological,

¹⁴ Hermann, 'Gletscher'; for other early works, E. Schlagintweit, 'Schlagintweit'.

¹⁵ Hermann, 'Messinstrumente'.

¹⁶ Adolph, *Ernährung der Pflanzen*.

¹⁷ Robert, *Bemerkungen*; his diploma is held in BSB, SLGA, VI. 8.3.1–11.

¹⁸ Ireton and Schaumann, 'Introduction'.



Figure 1.2 Photographic collage of Adolph and Hermann Schlagintweit in the Alps, c. 1850.

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historical and cartographical studies of the mountain system, and were also a reference for the Schlagintweits.¹⁹ Scheuchzer had no difficulty in reconciling his empirical approach with a conviction in God's creation of the mountain chain as part of his physico-theological programme, indeed, he also maintained a 'lingering belief in the existence of dragons'.²⁰

¹⁹ Scheuchzer, *Natur-Historie*.

²⁰ Ireton and Schaumann, 'Introduction', 10.

Nineteenth-century itinerant geographers and geologists like the Schlagintweits, by contrast, sought to portray themselves as rational, scientific investigators of these elevated regions. The images and treatises they produced on their travels found a ready market, not just in the German-speaking world. Indeed, the mid-century witnessed a European-wide craze for Alpinism, reflected in a nascent tourism industry and the foundation of several Alpine societies throughout the continent and in the British Isles.²¹ The brothers profited from this contemporary interest among mountaineers and natural historians alike, who then rightly regarded the Alps as one of the last understudied regions *within* Europe.

The Schlagintweits' early scientific approach was heavily influenced by the work of Alexander von Humboldt (1769–1859), whose writings they had thoroughly studied and to whom they dedicated their first monograph, published in 1850.²² Humboldt acted as a role model for a whole generation of naturalists during the early decades of the nineteenth century. Charles Darwin and the son of the Kew director, Joseph Hooker, both acknowledged the influence of Humboldt's overseas expedition on their careers as itinerant naturalists. Humboldt's *Personal Narrative* – his most famous American travelogue – remained for them both a constant source of inspiration and crucial point of reference.²³

'Humboldtian science', a term introduced by Susan Faye Cannon to define the scope and main features of Humboldt's intellectual programme, was among other things based on personal observations in the 'field' and the extensive and increasingly exact measuring of the natural world through an array of the most up-to-date instruments.²⁴ There was, to be sure, nothing particularly 'German' about conducting empirical science out in the open.²⁵ Rather, Humboldtian science combined a set of practices and scientific interests with often global reach (as in the fields of plant geography, terrestrial magnetism and meteorology) that were shared by a community of scientists that cut across national-political boundaries. Humboldt himself wrote the bulk of his American opus whilst residing in Paris from 1804 to 1827, in close exchange and discussion with Parisian scientific communities while he manifested his scientific-aesthetic paradigm in over twenty volumes. One aim of

²¹ Hansen, 'Founders'.

²² A. Schlagintweit and H. Schlagintweit, *Untersuchungen*. Finkelstein, 'Mission', 182.

²³ Werner, 'Verhältnis'; for further examples of Humboldtianists, also in Britain, Kirchberger, 'Contribution'.

²⁴ The best contextualisation and critique of the concept, initially advanced by Cannon in *Science in Culture*, are Dettelbach, 'Humboldtian Science'; and Ratcliff, 'Geomagnetism'.

²⁵ Porter, 'Gentlemen', 820–1; Dettelbach, 'Humboldtian Science'; Olesko, 'Humboldtian Science'.

Humboldt's rigorously trans-disciplinary approach to physical geography was to capture the specific character of a given landscape by collecting as much detailed data as possible, which could in turn be compared trans-regionally, indeed trans-continently. In a sense, the scale of Humboldtian science was always local and global at the same time.²⁶ The overarching concern was to formulate and then to depict, in entirely novel ways, general physical laws out of a wealth of observational data, and thus to detect the 'interaction of forces' in nature that in Humboldt's view formed a 'general equilibrium'.²⁷ As he famously stated before his American travels, '[m]y single true purpose is to investigate the confluence and interweaving of all physical forces'. He thus sought to combine the data collecting and classifying practices of the naturalist in order to achieve a holistic approach to 'terrestrial physics [as] a master-science'.²⁸

Humboldt's conviction that a good naturalist also had to be an inspired physicist was accepted by some, but certainly not all, practitioners of natural history. The disorderly process of disciplinary specialisation in the sciences was, by the mid nineteenth century, underway, and there were many contemporaries of the Schlagintweits who did not appreciate their all-encompassing approach towards the study of nature. German universities, especially when compared with their British counterparts, underwent important reforms in the first half of the nineteenth century, and tended to place a stronger emphasis on rather specialised fields of research. This resulted in the foundation of chairs in newly circumscribed fields such as forestry, chemistry, mineralogy and other branches of science.²⁹ Their holders tended to be critical of Humboldtian approaches in field sciences. Hence, despite the long shadow that Humboldt cast upon European science in the first half of the nineteenth century, ideals and scientific practices were gradually changing throughout the German states and other parts of continental Europe and Britain.³⁰ In that sense, the brothers were transitory figures between competing scientific paradigms.

What further connected the Schlagintweits' studies with the works of their role model and later mentor Humboldt was their eagerness to visualise nature and its inherent forces in an aesthetically pleasing way

²⁶ On the different scales at work in Humboldtian science, and the importance of trans-continental analogies of forms and types, Daston, 'Humboldtian Gaze'.

²⁷ Dettelbach, 'Humboldtian Science', 289f.

²⁸ *Ibid.*, 290.

²⁹ Still useful is Allen, 'Professionals'; Allen, *Naturalists*.

³⁰ For important changes in the German university system, see Nipperdey, *Deutsche Geschichte*, 470–82; Wehler, *Deutsche Gesellschaftsgeschichte*, 3, 417–29; Cittadino, *Nature*, 22–5; Dorn and McClellan, *Science*, 309.

(Figure 1.3).³¹ Already in their first book, the brothers included a variety of diagrams and lithographed watercolours of beautiful panoramas, yet always with a specific object of study in focus, most often Alpine glaciers. These views were accompanied by a wealth of observations and data, and an explanatory sheet – a visual technique later repeated for their images from Asia.³² Their views from the Alpine glaciers had such a quality in the use of colours and contrasts that many depictions even managed to convey a sense of the depth and direction of the slowly moving masses of ice.³³

Yet, to produce even greater *Anschauungsmaterial* (illustrative material) of the topographical forms they encountered, the Schlagintweits collaborated with a Berlin zinc plaster company to produce three-dimensional mountain reliefs.³⁴ These objects provided a tangible sense of the shapes of ranges and valleys to the viewers (Figures 1.4, 1.5). The reliefs or ‘galvanised models’, which the brothers not only presented as gifts to royal benefactors but also sold to scientific institutions and private collectors, give us a sense of them as science popularisers.³⁵ Not only could these models be ordered and used for pedagogic purposes, the brothers also provided a cheaper series of stereoscopic photographs of these reliefs for the wider public.³⁶ The use of new techniques and visual aids indeed became a pillar of their research and scientific reputation. In their later careers, too, the Schlagintweits never tired of experimenting with the most recent instruments and new photography and print technologies in order to enhance the appeal of their work, which was otherwise heavily based on columns of data and dry prose.

Unlike their later publications on the Indian mission, parts of their Alpine treatises were immediately translated into other European languages.³⁷ The apparent appreciation of their early works was also reflected by the invitations to deliver papers at scientific societies and royal courts in Berlin, Paris, London and elsewhere, including two lectures at London’s Royal Society in January 1851, during their first visit to England.³⁸ Their initial explorations within Europe, together with

³¹ Daston, ‘Humboldtian Gaze’; Werner, *Naturwahrheit*; Kraft, *Figuren*.

³² See, e.g., A. Schlagintweit and H. Schlagintweit, *Untersuchungen*, 52–3; also useful as an introduction are Fritscher, ‘Panoramas’, 606; Fritscher, ‘Praxis’, 77; Finkelstein, ‘Mission’, 182–3; indispensable is Kleidt, ‘Kunstwerk’.

³³ The Schlagintweits’ studies of the structures and properties of Alpine glaciers, their velocity and motion heavily drew on the work of the Swiss-born naturalist Louis Agassiz; Agassiz and Bettannier, *Études*; Lüdecke, ‘Hochgebirge’.

³⁴ Brogiato, Fritscher and Wardenga, ‘Visualisierungen’, 239.

³⁵ Felsch, ‘14.777 Dinge’.

³⁶ On the pedagogic function of their visual materials, Fritscher, ‘Praxis’.

³⁷ For example, H. Schlagintweit, *Observations*.

³⁸ A. Schlagintweit to WH, 10 January 1851, RBG, DC 51, 549.

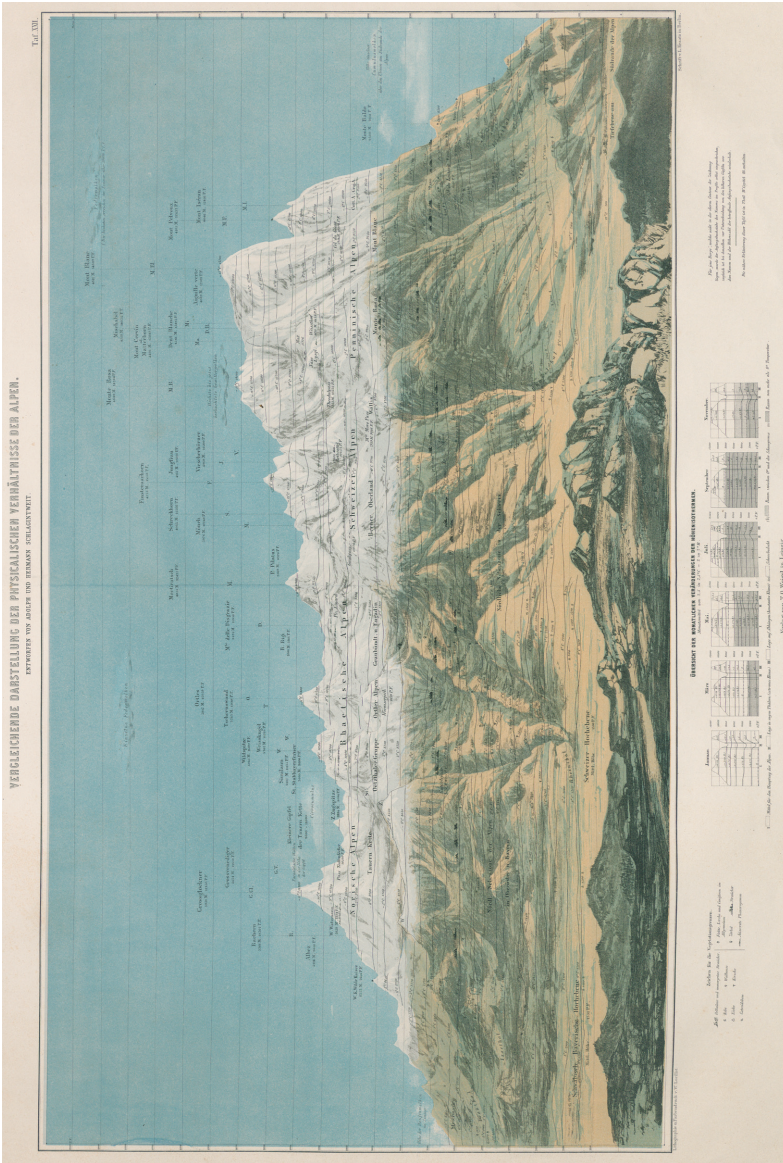


Figure 1.3 Adolph and Hermann Schlagintweit, 'Vergleichende Darstellung der physicalischen Verhältnisse der Alpen', a visualisation of plant geography and Alpine meteorology clearly influenced by Humboldt's work on the varying distribution of the Chimborazo's flora in the Andes. Adolph and Hermann Schlagintweit, *Atlas* accompanying their second book, *Neue Untersuchungen* (1854).
 © ETH, Rare Books.

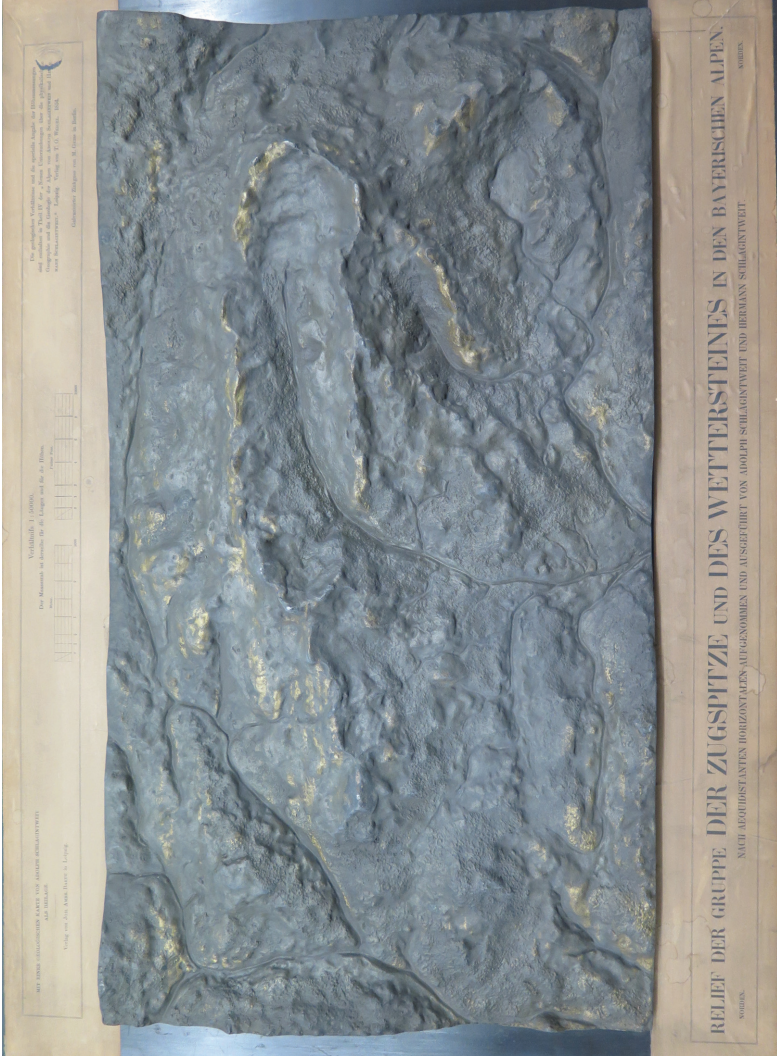


Figure 1.4 Relief of the Zugspitze and the Wetterstein in the Bavarian Alps, ‘galvanised zinc cast by M. Geiss in Berlin’.

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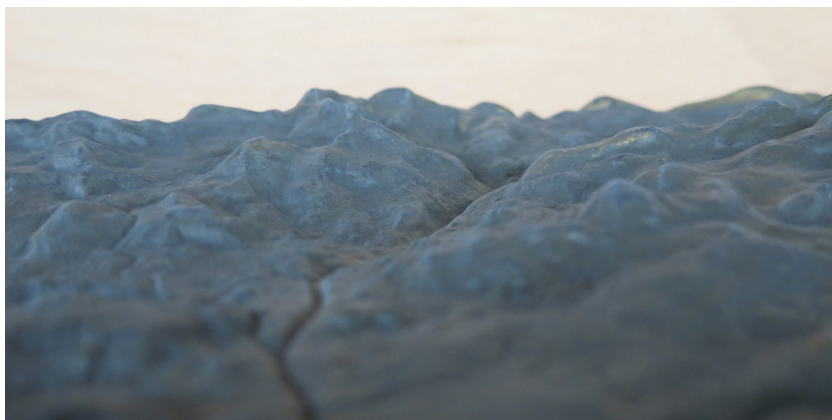


Figure 1.5 Relief of the Zugspitze and the Wetterstein in the Bavarian Alps, 'landscape view'.

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the skills and professional acquaintances they had thus acquired, opened up the potential for overseas employment.³⁹

One important stepping-stone for the Schlagintweits' future was to have attracted the attention of a group of eminent geographers in Berlin, then one of the leading German scientific centres. Many of them had close ties to its Geographical Society (Gesellschaft für Erdkunde zu Berlin), founded in 1828 as the second oldest in Europe. Notably the Society's president, Carl Ritter (1779–1859), who also held the chair in geography at Berlin University, and one of its honorary members, A. v. Humboldt, acted as significant patrons of German geographical talents and overseas explorers.⁴⁰ The less illustrious Carl Ritter was perhaps just as important as Humboldt in promoting transnational scientific collaborations. Ritter had played a crucial role, for instance, in arranging Heinrich Barth's employment in a British-backed African exploration of 1849 by mobilising his various diplomatic and scientific acquaintances in London and Berlin.⁴¹ Crucially, both Humboldt and Ritter had developed a strong interest in Asia's geographies and natural histories, and it is certain that the Schlagintweits' life-long engagement with that continent was strongly influenced by the works of these Berlin-based

³⁹ Roquette, 'Note'.

⁴⁰ Päßler, *Mittler*; Suckow, 'Rußland'.

⁴¹ Naranch, 'Beyond the Fatherland', 237.

mentors.⁴² To be sure, there also existed a large community of German oriental scholars in the Prussian capital, who engaged in important religious and philological studies of the East, sometimes through similarly close contact with British peers and East India Company men in south Asia. Yet, the Schlagintweits mingled less with Berlin's humanistic scholars but regularly attended and contributed to its geographical and natural scientific societies, including the *Physikalische Gesellschaft zu Berlin* (founded in 1845), full members of which they became in 1849.⁴³

Berlin as a Hub of Indian and Central Asian Geography

In the first decades of the nineteenth century, a number of systematic accounts of Indian and central Asian geography, natural history and mineralogical resources were compiled and published in Berlin, and in the nearby Saxon town of Gotha near Erfurt. Gotha was the centre of the publishing house of the Justus Perthes Anstalt, where August Petermann (1822–78) produced his widely read journal, *Petermanns Geographische Mitteilungen*. Crucially, geographic and cartographic works by famous geographers such as Petermann, Heinrich Kiepert and Heinrich Berghaus drew heavily on the accumulated data, observations and collections made by Russian and French travellers and missionaries, and also by EIC servants in south Asia. These, in line with the by no means static hierarchies of science at the time, would often provide the materials and observations for further analysis and compilation in Europe – not least by German *savants*, who in most cases had no direct duty to the British East India Company.⁴⁴ Their works were then often retransmitted to the scientific and imperial establishments of other European states. Humboldt's treatises on central Asia's geography were widely consulted among scientific and administrative circles in Britain, the Russian Empire and India. The same applied to the arm-chair geographer and master synthesiser Carl Ritter. Years after the publication of the 'Comparative Geography', Ritter's volumes on Asia were still considered important enough that Peter Semenov, Secretary of the Imperial Russian Geographical Society, was sent to Berlin, following

⁴² Ritter's monumental work, *Erdkunde*, almost exclusively treats the continent of Asia; see also Humboldt, *Fragments*; Humboldt, *Asie Centrale*.

⁴³ See also Finkelstein, 'Mission', 183.

⁴⁴ Endersby, 'Herbarium'. On these hierarchies and their critical reconsideration, see also Arnold, 'Plant Capitalism'. Other works of history and geography have further challenged and refined any simple conceptualisation of 'centres' and 'peripheries' in the history of science; Schaffer et al. (eds.), *Brokered World*; Raj, 'Beyond Postcolonialism'; Burke, *History of Knowledge*; works often in direct opposition to older diffusionist models as classically advanced by Basalla, 'Spread'.

the Society's decision to have his oeuvre updated and translated into Russian. Semenov remained in Berlin for three semesters, closely collaborating with Ritter on the translation while also preparing his own journey into central Asia.⁴⁵

Perhaps the most striking case of a scientific interlocutor between empires was Humboldt. In view of his unfulfilled desire to travel in the British territories in India and into the Himalayas, he had found a way to complement his American travels with a mission into parts of central Asia on behalf of the Russian Empire in 1829. This was the second expedition that the Prussian explorer had undertaken within the colonial framework of a foreign power. Similar to his former journey through the Spanish Empire in the Americas (1799–1804), Russian officials expected that Humboldt would provide useful and commercially applicable knowledge on the regions he traversed. The terms of his employment set out by Tsar Nicholas I and his minister of finance, Georg Cancrin, made clear that the Prussian naturalist was expected to deliver information on 'exploitable resources'; Humboldt ultimately agreed 'to report more on products and institutions than on people'.⁴⁶

Even though Humboldt might be best known for his American opus, he was, however, deeply involved in and respected for his work on the trans-Himalayan and central Asian natural histories, in particular those regions' massive and complex mountain chains: the Himalayas, the Karakoram and the Kunlun Shan.⁴⁷ In fact, he personally regarded his book *Asie Centrale*, published in French in 1843, as 'a work, which has never been translated into English, but which is that in which, I think, I have brought forward more novel information than in any of my other publications'.⁴⁸

To test his own assumptions and interpretations of the physical character of south and central Asia against the accounts of itinerant naturalists, Humboldt was indefatigably concerned with securing firsthand observations from Company servants and other European travellers in those regions.⁴⁹ He was acquainted with a number of Anglo-Indian officials and naturalists in the 1840s and 50s. Among them were the

⁴⁵ Freitag, 'Atlas', 121.

⁴⁶ Sachs, *Current*, 83. Humboldt was accompanied by other German naturalists, including Gustav Rose (1798–1873), who published an important study of Russia's mineralogical treasures, *Reise*.

⁴⁷ For Humboldt's crucial role in 'rediscovering' South and Central America, Kennedy, *Spaces*, 6ff.; and Pratt, *Imperial Eyes*.

⁴⁸ Humboldt to WH, 11 December 1850, RBG, DC 51, 217.

⁴⁹ The Prussian-born soldier-naturalist Leopold von Orlich reported to Humboldt during his time in a British regiment fighting against the Sikhs (1842–3); von Orlich, *Reise*.

British Resident in Darjeeling, Brian Houghton Hodgson ('an impartial and well-informed eye-witness', according to Humboldt), and the eminent Himalayan traveller Joseph Hooker, son of the Kew director William Hooker.⁵⁰ The detailed correspondence between the younger Hooker and his aged Prussian confrère not only testifies to how Humboldt's *Asie Centrale* was indeed a widely read and authoritative source on the region's geography for British naturalists and Company servants.⁵¹ It also provides insights into how the Berlin-based geographer subtly influenced ongoing explorations in the East. Humboldt and the British botanist managed to exchange long and detailed letters during the latter's travels. Their correspondence dealt with a number of scientific conundrums in fields as diverse as plant geography, Indian topography, meteorology, mineralogy and glaciology. Humboldt regularly supplied Hooker with long lists of unresolved questions that he urged the traveller to address whilst still in Asia, thus subtly guiding the occupations and studies of his 'close friend'.⁵² Partly flattered, partly stimulated, Hooker was eager to meet Humboldt's demands, and spared no time or effort to send long elaborations, sometimes illustrated with topographical sketches.⁵³

Indeed, after the publication of his travelogue, Hooker wrote to Humboldt about the immense influence the latter had exercised on his scientific pursuits.⁵⁴ 'I have felt so much the influence of your career, from my childhood, & owe so much to all you have done for science generally & for myself in particular that I do feel it a great privilege to have been permitted to write a book that has especially interested you.'⁵⁵ Humboldt, in turn, regarded some of Hooker's letters from the field as so important that he secured their publication in British journals, relying on his close relations with a number of metropolitan men of science. In doing so, he self-consciously acted as a scientific intermediary between India and Britain.⁵⁶

Another close collaborator of Humboldt's was the geographer and editor August Petermann, who acted as a crucial intermediary between Britain and the German states. Petermann had been a member of the Royal Geographical Society since 1847 and had lived in Britain for many

⁵⁰ Humboldt to WH, 11 December 1850.

⁵¹ Joseph Hooker [JH] to Humboldt, Khassya, 23 September 1850, RBG, JDH/1/9, 482–4.

⁵² Ibid.

⁵³ The archives in Berlin and London are filled with their field correspondence, besides JDH/1/9, see especially the letters (of up to twenty pages each) in Staatsbibliothek, Berlin [SBB], Nachlass Humboldt.

⁵⁴ Hooker, *Himalayan Journals*.

⁵⁵ JH to Humboldt, SBB, Nachlass Humboldt, gr. Kasten 11, no. 10, 21 September 1854.

⁵⁶ Humboldt to WH, 11 December 1850.

years before returning to Germany following a dispute over his loyalty with other members of the RGS in 1854.⁵⁷ His career is an intriguing example of the role of personalised knowledge, as his mobility entailed a transfer of skills from the British imperial centre to the European imperial periphery. As Bradley Naranch put it: ‘Petermann’s relocation to Germany, following years of extensive experiences in Britain with leading scientific societies and research facilities, provided an important impetus for the development of cartography, overseas exploration, and scientific imperialism in German society during the later 1850s.’⁵⁸ Humboldt considered Petermann a vital source of information from the centre of the British Empire: after Petermann’s departure, Humboldt thought that ‘it is a great loss for German geography that he did not stay close to the source on the happy island’.⁵⁹

The willingness of German experts in Indian and central Asian geography to collaborate with British colleagues – both at home and in the colonies – found a ready expression in a number of projects that helped to further integrate the German states into the knowledge networks of British imperialism.⁶⁰ One was a joint publishing scheme in 1849–51. Preliminarily termed *Traité de géographie, destiné à l’instruction des écoles de l’Indoustan*, this work – intended as schoolbook for Indian pupils – was compiled by the Berlin-based Heinrich Berghaus (1797–1884), Joseph Hooker, Hodgson and Humboldt.⁶¹ While ultimately never published, it is evidence that Germans were respected authorities on Indian geography, and that joint publications created strong bonds between them and British men of science that could be mobilised for shifting purposes. One of them was to secure employment for talented German naturalists and explorers.

When the Schlagintweit brothers entered the stage and made a name for themselves in the late 1840s and early 50s, they could readily tap into these long-established networks. In particular, in London Humboldt, Ritter and Bunsen maintained close ties with a number of leading British men of science active in the Royal Society and other institutions, including the militarily, politically and commercially inclined Royal Geographical Society. The RGS had become the largest and most powerful of all

⁵⁷ Naranch, ‘Beyond the Fatherland’, 243.

⁵⁸ *Ibid.*, 244.

⁵⁹ Humboldt to Bunsen, 30 December 1854, in Schwarz (ed.), *Briefe*, 184. On Bunsen’s life, his standing and connections in England: Höcker, *Vermittler*; Foerster, *Bunsen*; Kirchberger, *Aspekte*.

⁶⁰ Kirchberger, ‘Naturwissenschaftler’.

⁶¹ The episode is comprehensively reconstructed in Brescius, ‘Empires of Opportunity’, ch. 1.

London societies by mid-century, and vigorously promoted the cause of British overseas exploration and empire under its president, Sir Roderick Murchison.⁶²

It is unclear when precisely the brothers formed the idea to embark on an Indian and Himalayan expedition. Robert Schlagintweit claimed in the 1860s that his wish to explore the Himalayas reached back to his 'earliest youth'.⁶³ Such a statement has to be taken with a pinch of salt, however, since Robert was always keen to portray himself as a true *conquistador* in front of popular audiences. It is more reasonable to assume that the plan emerged between 1849 and 1850. In May 1849, Adolph and Hermann left Munich. To pursue their *Habilitation*, they settled down in Berlin, the Mecca for geographical science in the German-speaking world. Humboldt, in his meetings with the brothers since their acquaintance in June 1849, made no secret of the vast opportunities awaiting naturalists in the Himalayas, especially those who were experienced mountaineers. While Humboldt enthusiastically endorsed the brothers' pursuits, others were far more critical about their abilities, especially when set against their extensive ambitions, as their *first* and forgotten attempt to embark on an Indian scientific voyage in 1852 demonstrates. However, the episode sheds light on the ambiguous perceptions that German scientists also had of the brothers, long before they would become the focus of an international polemic over their Asiatic travels and results. Many of the tropes of the later Schlagintweit controversy, in fact, already appeared in previous years, albeit on a smaller scale.

On 12 May 1852, the Prussian monarch Frederick William IV received a 'direct submission' (*Immediateingabe*) by Adolph Schlagintweit.⁶⁴ The purpose of the submission was twofold. First, Adolph again sought to obtain his *Habilitation* from the Philosophical Faculty of Berlin University, which had been declined the year before. The second objective was to petition for the monarch's support for a scientific expedition to the Himalayas, to be carried out by Adolph and Hermann 'at the public expense'. Both dimensions of the petition were inextricably linked, since the king's granting of his financial patronage for the voyage essentially depended on a positive evaluation of Adolph's qualifications. To enquire about these matters, Karl Otto von Raumer, the conservative minister

⁶² Bell et al., 'Introduction', 8; Driver, *Geography*, ch. 2; on its strong 'military emphasis', Stoddard, 'RGS and the "New Geography"', 191.

⁶³ Robert Schlagintweit [RS], Lecture notes for 'English Lectures on High Asia Delivered during the Years 1868 and 1869 in Various Towns of the United States of America', BSB, SLGA, V.2.2.1, 21.

⁶⁴ Adolph Schlagintweit [AS] and Hermann Schlagintweit [HS] to the king, 12 May 1852, Geheimes Staatsarchiv Preußischer Kulturbesitz, Berlin [GStAPK], I. HA Rep. 76 Ve, Akt Kultusministerium, Sekt. 1 Abt. XV Nr. 189, 'Wissenschaftliche Reisen ...' [WR].

of education in Prussia, requested a formal report to be issued both on Adolph's renewed application for the *Habilitation*, the licence to teach at university level, and on the naturalist's general competence, not least with a view to completing such a strenuous overseas exploration.

The advisory scientist charged with compiling the official report was Christian Samuel Weiss (1780–1856), a notable German mineralogist born in Leipzig, who had become professor in mineralogy at Berlin University and also director of the Cabinet of Mineralogy. Unfortunately for Adolph, Weiss had also sat on the committee that had previously declined his *Habilitation*.⁶⁵ In his formal reply to the government, Weiss provided a lengthy assessment of the petition, and of the perceived scientific qualifications of the brothers – or, in some regards, a lack thereof:

Concerning the individual aptitude of the two brothers Schlagintweit for such a travel scheme, it has to be fully acknowledged that both are able, persevering and experienced mountaineers, who do not shy away from pains and hardships. [Both] are precise observers in the field of physical geography, whose painstakingly compiled observations ... are useful and worthwhile contributions to physical geography, without being able to claim a rank amongst important discoveries.⁶⁶

In restating the reasons for Adolph's previous failure to obtain his *Habilitation*, Professor Weiss continued by acknowledging the unusual 'physical endurance' of the brothers; yet, he also pointed to the perceived gaps in their scientific competence. 'When ... their joint work on the physical geography of the Alps was carefully examined last year, it seemed that, despite the fact that their talent and their achievements as observers were duly praised, their professional qualifications seemed not to be without fault, and not everywhere thorough enough, [especially] for lecturers at a university.' This was a direct critique of a colleague, since Hermann Schlagintweit, who had successfully received his *Habilitation* under Carl Ritter in 1850, had started to lecture as a *Privatdozent* for 'physical geography' at Berlin University two years later, giving classes especially on meteorology.⁶⁷

In focusing on Adolph's works in the field of geology, Weiss's report further stated that 'they, too, provide evidence of painstaking and meticulous observing; the general description, however, was ... merely a repetition of the already known conditions'.⁶⁸ Hence, while the professor stressed above all the Schlagintweits' skills as travelling and observing naturalists,

⁶⁵ Raumer to Weiss, 19 June 1852, *ibid*.

⁶⁶ The report by Weiss to Raumer, 16 August 1852, *ibid*.

⁶⁷ HS, *Vertheilung*.

⁶⁸ Report by Weiss to Raumer, 16 August 1852, GStAPK, WR.

he subtly criticised their failure to adequately use these empirical results to alter general understandings of, in this instance, Alpine geology. In other words, no higher scientific theories were gained from the mosaic of local observations the brothers had gathered in the field. In hindsight, this was the Achilles' heel of the Schlagintweits, as they were to be confronted with the same criticism regarding the results of their future travels to the East.

In a next step, Professor Weiss turned to a lecture 'On the Geological Structure of the Alps' that Adolph had attached to his application. Weiss saw it as merely 'an attempt to synthesise foreign accounts of the most recent times', thus indicating that Adolph possessed only 'an ephemeral personal acquaintance with Switzerland'. Even worse, Adolph seemed perfectly unacquainted with, or had failed to acknowledge, the results of leading naturalists such as the Zurich-born geologist Johannes Konrad Escher (1767–1823).⁶⁹ Here, too, Weiss raised a point of criticism that would later play a significant part in the international controversy over the Schlagintweits' Indian expedition, as it relates to the lack of acknowledgement that many British travellers felt the Schlagintweits had given to their predecessors.

To complete his judgement on the brothers' ineptitude, Weiss considered the work Adolph had submitted for his 'renewed application for the *Habilitation*' in the field of geognosy. Adding insult to injury, Adolph had apparently failed 'to provide a clear and commanding understanding of the incredibly fragmented mountain range of the Monte Rosa', because he had not become sufficiently familiar with the area itself. 'It would ... require a considerably longer and more often repeated stay' on the spot to gain a thorough knowledge – a knowledge 'that was not to be hypothetic, but grounded in actual observation'.⁷⁰ In short, it seemed that Adolph had a tendency to literally cover too much ground; to spread his scientific investigations over too large an area, leading him to make judgements on regions he was less familiar with, and to attempt more scientific disciplines than his academic education had prepared him to succeed in.

Not surprisingly, Weiss's report to the Prussian government ended with a negative evaluation of the petition. He even claimed that Adolph required further scientific training 'before he embarks on such an important geognostic voyage'.⁷¹ Building on this dissection of the brothers' scientific qualities and Alpine research, the Berlin professor

⁶⁹ Ibid.

⁷⁰ Ibid.

⁷¹ Ibid.

suggested that their ‘analysis in situ, and the scientific opinions [that would be later] grounded in them, would not sufficiently guarantee scientific results worthy of the modern progress in the sciences’.⁷²

Weiss was an expert in the field of mineralogy, and his more narrow expertise sat uncomfortably with the much broader aspirations of the brothers and their Humboldtian tendency to engage in holistic studies of a given region. This tension is reflected in the report that the ministry of education compiled for the Prussian king, which copied entire passages of Weiss’s statements.⁷³ In the eyes of administrators, the brothers’ proposal for a loosely defined trans-disciplinary investigation of the enormous mountain chain was not sufficient; rather, a clear-cut geographical ‘problem’ – an *explicandum* – was needed to justify the large sums of money necessary for such an undertaking in an age of advancing scientific specialisation, and growing bodies of literature to be mastered in each field of study.⁷⁴

Yet, before Frederick William IV decided to decline the petition, he informed von Raumer that ‘I wish first and foremost that you also obtain the opinion of ... von Humboldt, who is acquainted with the brothers Schlagintweit’.⁷⁵ This request reflects the status Humboldt enjoyed as scientific adviser to the monarch. The fact that the brothers had earlier strategically nurtured their relation with the king also played a role. To establish their names with the king, they had used Humboldt as their go-between to present him with scientific gifts, which they hoped would reflect their scientific achievements and potential.⁷⁶

When Humboldt was consulted on the matter in mid October 1852, his reply was more than a recommendation for the Schlagintweits’ projected scheme; it was also a defence of his own scientific paradigm – in view of the specialising ambitions and attacks of his contemporaries. Humboldt first stated that ‘[t]he opinions, which I hereby [express?] about these so scientifically excellent and multi-talented young men, are not based on personal contact and impressions acquired through individual conversations’ – a rather blatant lie. Adolph Schlagintweit would soon even assist Humboldt in preliminary works for the later parts of his *Cosmos*.⁷⁷ Humboldt nonetheless claimed to have based his judgement

⁷² Ibid.

⁷³ Draft of the Ministry’s report to the king, 24 September 1852, GStAPK, I. HA Rep. 76 Ve, Kultusministerium, WR.

⁷⁴ Weiss’s report, 16 August 1852, *ibid*.

⁷⁵ King to Raumer, 6 October 1852, *ibid*.

⁷⁶ HS to Humboldt, 19 March 1852, SBB, NAvH, gr. K. 11.

⁷⁷ SBB, NAvH, gr. K 11, 53, Berlin, 18 December 1851.

of the brothers only on his 'close acquaintance' with their published Alpine works.

Since Humboldt regarded the Schlagintweits as his talented pupils, his report was overly imbued with praise. He purported that the brothers' 'important treatise on "The Physical Geography of the Eastern Alps" encompasses more [findings] than any other recent [work] on a specific mountain range'.⁷⁸ Against the charge that the brothers were intellectually overreaching, Humboldt argued that their 'great range of miscellaneous observations gives a satisfying impression of the current state of the sciences' and further praised their 'talent for graphic depiction, [and] a long and proven experience in mountaineering'.⁷⁹

The aged polymath further backed the idea of a Schlagintweitian Himalayan expedition, one that would necessarily take them through British territories, by alluding to the international reputation the brothers had purportedly secured. The brothers had 'acquired not through recommendation, but through published work – the only source of impartial evaluation – an outstanding esteem in a country [Britain], where one is overly parsimonious with praise, especially to foreigners'. In view of their supposed 'industriousness ... and fondness for thorough research', Humboldt concluded that the brothers had chosen a suitable and promising object of study: 'The Himalayan mountains will present a stimulating area for scientific investigations for another century', and 'one can expect that their stay in India would prove of great value to the sciences'.⁸⁰ The expedition in this format, framed as a Prussian-only initiative and funded by Frederick William IV, who held no political stakes in south Asia, was never to take place.⁸¹ However, it introduced the general idea of such a scheme to the monarch and, given Humboldt's words of praise, also established the brothers' names with the king.

This initial failure did little to quell the Schlagintweits' eagerness to undertake an ambitious Himalayan expedition, for which they had already nurtured ties with the British scientific and political establishment. The brothers were acutely aware that no scientific expedition into British India was feasible without the concession of free passage by the Court of Directors in London. The East India Company carefully channelled and restricted access to their colonial possessions, fearing the intrusions of disruptive outsiders who might undermine their commercial privileges

⁷⁸ Humboldt's report, 27 November 1852, GStAPK, WR.

⁷⁹ Ibid.

⁸⁰ Ibid.

⁸¹ For Humboldt's frustration with Raumer's influence over the king, see Humboldt, *Letters to Varnhagen von Ense*, diary entry Ense, 9 September 1853, 214–16.

or hegemony in India – the most important British overseas colony at the time. To realise a Himalayan expedition under whatever flag in the future, it had thus been crucial that the brothers established a reputation in the British Isles as capable naturalists. For this purpose, too, the long-established networks of their mentors could be mobilised.

Given the high esteem in which Carl Ritter was held in British circles, the Schlagintweits turned to him prior to their first trip to England in 1850 to ‘kindly ask you to provide us with some recommendations ... especially to the directorates of the great ethnographic and other collections’.⁸² ‘The most perfect admiration’ Ritter enjoyed there meant, they assured him, that ‘only a few words’ would secure them ‘an excellent reception’.⁸³ Equipped also with letters from Humboldt and Heinrich Wilhem Dove (1803–79), professor of physics and, since 1849, director of the Prussian Meteorological Institute, the brothers received a warm welcome from many eminent British men of science during their stay in the winter of 1850/1. They frequented scientific institutions in London, but also visited Oxford and Cambridge, meeting there such distinguished polymaths as William Whewell, who had coined the term ‘scientist’ in 1833 at a meeting of the recently founded (1831) British Association for the Advancement of Science.⁸⁴

Adolph and Hermann Schlagintweit presented themselves in 1850/1 to many of the same British naturalists and science administrators who would later support their appointment to British India.⁸⁵ A meeting with the royal family also proved successful. Adolph Schlagintweit noted that ‘Lord Palmerston’, the future prime minister, ‘had the great kindness of offering us to be presented to Prince Albert’ in 1850. Albert, Queen Victoria’s consort, acted as an important patron for German musicians and artists in England but also supported scholars and naturalists.⁸⁶ However, the Schlagintweits also encountered those who sought to obstruct their scheme. For instance, they were introduced to the renowned Danish-born surgeon-naturalist Nathaniel Wallich (1786–1854). Wallich had made a long and successful career in colonial India himself, above all by clinging to the position of superintendent of the

⁸² Hermann to Ritter, 20 July 1850, SBB, Nachlass Ritter [NR], Hermann Schlagintweit, 85–85a.

⁸³ Ibid.

⁸⁴ Hermann to John Couch Adams, St John’s College, Cambridge [JC], Adams Papers, 13/32/1, 5 January 1851.

⁸⁵ Neuhaus, *Tibet*, 70.

⁸⁶ Adolph to John E. Gray, 19 December 1850, American Philosophical Society [APS]; on the Hanoverian connection and its role for German engagement with south Asia, Tzoref-Ashkenazi, ‘Voices’.

Calcutta Botanic Garden from 1817 to 1846, then one of the most prestigious scientific offices outside Europe.⁸⁷ Following his prolonged period in the Company's service, Wallich had settled down in Britain in 1847 as a respected naturalist. His elevated status was cemented in his appointment as vice-president of the Linnean Society, and of the Royal Society in 1852 – the same institution that would later back the recruitment of the Schlagintweits.⁸⁸

Adolph lectured in December 1850 at the Linnean Society and the brothers at first profited from the acquaintance with Wallich.⁸⁹ This turned into more than a superficial contact, and he still offered later in 1851 to 'charge himself with making the abstract' for a Schlagintweit publication, destined for *Hooker's Journal of Botany and Kew Garden Miscellany*.⁹⁰ Yet, the brothers' acquaintance with the Danish-born naturalist turned sour, as Wallich's harsh judgements on the brothers' lack of ability and social comportment clearly show. His rejection was arguably the result of the brothers' presumptuous and often rude behaviour, which would estrange them from numerous colleagues over their careers.

Given his influential position and botanical knowledge, Kew director William Hooker was another crucial figure the Schlagintweits were keen to meet. In letters of introduction to him, Michael Faraday and others, Humboldt lent scientific authority to the brothers by flatteringly comparing their work with Horace-Bénédict de Saussure's oeuvre (1740–99), the alleged founder of Alpine studies.⁹¹ It proved even more significant to meet those scientific administrators directly involved with British surveying projects overseas. First and foremost among these was the physicist and army officer Colonel Edward Sabine (1788–1883), whose acquaintance the Schlagintweits made during a guided visit to the New Observatory at Kew in January 1851.⁹² Sabine had gradually climbed the ladder of office at the prosperous Royal Society, whose elected treasurer and vice-president he had become in 1850. His influential role at the Royal Society was complemented by his position as general secretary of the British Association for the Advancement of Science.⁹³ Sabine

⁸⁷ Arnold, 'Plant Capitalism'.

⁸⁸ Boulger, 'Wallich'.

⁸⁹ A. Schlagintweit, 'Summary'.

⁹⁰ AS to WH, RBG, DC 51, 10 January 1851, 549.

⁹¹ Humboldt to WH, 12 August 1850, RBG, DC 51, 254.

⁹² On Sabine's influence, Good, 'Sabine'.

⁹³ On the rivalry between the Royal Society as an elite, traditional scientific club, and the much younger and reform-oriented British Association for the Advancement of Science, which organised public lectures and events across Britain and represented a more dynamic approach with a pronounced interest in applied science, Cawood, 'Magnetic Crusade'.

also acted as scientific adviser to the Admiralty, and maintained close relations with the War Office.⁹⁴

Besides his excellent contacts with political and scientific authorities in Britain, Sabine was also an active member of the networks that linked London to British overseas colonies, and to Berlin. He was a personal friend of Alexander von Humboldt, whom he had known since 1818. Humboldt was highly appreciative of Sabine's research, and had twenty-five of his works in his private library in Potsdam; no other scientist is more often cited in the index of Humboldt's *Cosmos*.⁹⁵ The fact that both shared a strong interest in the field of geomagnetism had already led to collaborative projects. His wife, Elizabeth Juliana Sabine, had translated Humboldt's *Cosmos* into English. Edward had annotated her translation with personal notes and instructive explanations that had received high praise from the Prussian *Naturforscher*.⁹⁶ Humboldt, in turn, secured a number of foreign medals for the British colonel, such as the Cosmos medal in 1848.⁹⁷ Humboldt furthermore secured Sabine's honorary membership of the prestigious Berlin Academy in 1855, and paved the way for his friend's admission into the esteemed order Pour le Mérite for Sciences and Arts in 1857. These personal collaborations and mutual favours generated a feeling of obligation between the two men of science. Unsurprisingly, Humboldt could later count on Sabine's outspoken support for the Schlagintweits to realise their Himalayan expedition after all – this time through a different and unexpected window of opportunity.⁹⁸

The 'Magnetic Crusade' in Britain

Edward Sabine owed his Prussian and other foreign decorations to his achievements in the field of geomagnetism, and he spent almost a lifetime forcefully promoting its study. It was during the first decades of the nineteenth century that an increasing interest in the earth's magnetic sphere had emerged among European physicists. Whereas European imperial powers undertook topographical surveys of their national and imperial

⁹⁴ *Ibid.*, 518.

⁹⁵ Biermann, *Miscellanea*, 103–5.

⁹⁶ Humboldt to Bunsen, 28 September 1846, in Schwarz (ed.), *Briefe*, 88.

⁹⁷ Humboldt to Bunsen, 29 July 1848, *ibid.*, 107–13, 109; Biermann, *Miscellanea*, 103–5.

⁹⁸ Humboldt to Bunsen, in the midst of the Crimean War, 20 February 1854, 'The king ... had instructed me to thank you wholeheartedly for the useful vividness [*Lebendigkeit*], with which you in a time of tense political conflicts keep on supporting the travel of these young men. It needs your powerful protection to initiate and carry out the scheme', in Schwarz (ed.), *Briefe*, 170–8.

territories as separate state-backed projects, measuring the magnetic field and its variation at specific moments, by contrast, had necessarily to be carried out simultaneously over a wide area, at best on a global scale. It was therefore only feasible through the collaborative effort of several European states and empires.

Partly initiated by Humboldt, magnetic observatories were set up in a number of European countries and overseas colonies in the first decades of the nineteenth century: in Germany, Russia, Italy, Sweden, England, the United States and Australia.⁹⁹ Since Britain lagged considerably behind in this field, Humboldt had specifically addressed the president of the Royal Society in 1836, stating that being 'in possession of the most extensive commerce and the largest navy in the world', it would be crucial for the advancement of the discipline for Britain to establish magnetic stations in its overseas possessions.¹⁰⁰ At that time, British territories already spanned the globe, ranging from Canada, over St Helena, the Cape of Good Hope to Asia and Australia. Humboldt's proposal received a favourable response from the British government. Consequently, fixed magnetic observatories were established in a number of British colonies. The accumulated data from those stations were then often compiled in Europe, with the view of formulating scientific theories in terrestrial physics, thereby exposing the 'geography of scientific production in the British Empire'.¹⁰¹

There was only a narrow dividing line between the pure and applied aspects of the study of terrestrial magnetism. It was for this reason that the British War Office, the Admiralty and the East India Company soon heavily financed the systematic study of the earth's magnetic field. Shortly after Britain had launched what was called its global 'magnetic crusade' in the 1830s, it had become 'a scientific enterprise ... of a magnitude never obtained before' in that country.¹⁰² Above all, a more comprehensive understanding of the factors that caused the variation of the magnetic north had wider implications for the art of navigation. First, it was hoped that a more thorough knowledge of geomagnetic forces and their troublesome variations could help to improve navigational skills in case of bad weather conditions at sea. Second, there was a growing need in the nineteenth century to handle the problems that the construction of

⁹⁹ Chapman, 'Geomagnetic Science'.

¹⁰⁰ Reich et al., *Geniestreich*.

¹⁰¹ Ratcliff, 'Geomagnetism', 327. Beside Sabine and Humboldt, a leading theorist in the field was the German mathematician Carl Friedrich Gauß (1777–1855), who, in 1838, published the path-breaking treatise 'General Theory of Geomagnetism'; on his significance, Schröder and Wiederkehr, 'Geomagnetic Research', 1651.

¹⁰² Cawood, 'Magnetic Crusade', 517.

iron-hulled ships caused for reading a compass bearing.¹⁰³ An enhanced understanding of geomagnetic forces promised to yield highly useful knowledge for any seafaring nation – or so the British supporters of the ‘crusade’ argued to secure renewed financial support. The British promotion of large-scale geomagnetic studies was also bound up with inter-imperial rivalries and notions of scientific prestige. John Herschel, a leading lobbyist for the crusade, even claimed that ‘Great physical theories, with their chains of practical consequences, are pre-eminently national objects, whether for glory or utility.’¹⁰⁴

In 1846, the Court of Directors of the EIC launched a major ‘Magnetic Survey of the Eastern Archipelago’ under the leadership of Captain Charles M. Elliot.¹⁰⁵ This survey extended the area of research from the oceans and coastlines deep into the interior of British India. Sabine had by then assumed effective control of the magnetic mission. He presided over the resources through which the Company and the Royal Society financed the magnetic survey in south Asia.¹⁰⁶ However, the project came to an abrupt halt in 1852 with the unexpected death of Captain Elliot, who had only commenced the survey. The EIC let the project lie, until it was reinvented by a Prussian initiative. Bunsen, from London, informed Humboldt about the willingness of the Company and the Royal Society to conclude the eastern magnetic survey.

What followed was a masterwork of scientific diplomacy that underlined the importance of scientific networks and transnational systems of patronage. Eager to send his close protégés to India, who could provide him with crucial observations for his treatises on Asia, Humboldt seized the moment. The right timing was crucial. He first arranged another meeting between the Schlagintweits and the Prussian king. The royal audience was successful and convinced Frederick William IV to now support a *different* Indian mission of the Bavarian naturalists. Since the consent, and considerable financial support, of the EIC were the *sine qua non* for this undertaking, a concerted effort had to be made. On 27 February 1853, Frederick William IV dispatched a letter to Bunsen. Therein, the envoy was informed that the king would commit himself to subsidise an Indian expedition of the Schlagintweits on the condition that the East India Company would grant their permission, but also share the burden of the expenses.¹⁰⁷

¹⁰³ Headrick, *Tentacles*, 18–24.

¹⁰⁴ Herschel, ‘Memorial’, 39.

¹⁰⁵ Elliot, ‘Magnetic Survey’.

¹⁰⁶ Cawood, ‘Magnetic Crusade’, 515.

¹⁰⁷ Polter, ‘Nadelschau’; Finkelstein, ‘Mission’.

Bunsen, in office since 1841, was a man of considerable qualities in both political and scientific terms – as well as being another close ally of Humboldt's with excellent contacts to the British scientific community.¹⁰⁸ Their appreciation of the liberal Bunsen went so far that Joseph Hooker wrote to Humboldt after the envoy's resignation in 1854: 'We all feel the departure of Mr Bunsen as a national loss.'¹⁰⁹ For numerous German travellers and naturalists seeking employment in Britain or her colonies, Bunsen's embassy at Carlton Terrace in London was the first calling point.¹¹⁰ The Prussian diplomat was a respected orientalist scholar himself, who mastered Persian and Arabic and had long held the wish to travel to India, expressing his great interest in oriental scholarship in his correspondence with William Hooker.¹¹¹

It now proved an asset that Bunsen maintained excellent relations with the directors of the EIC, with most of whom he was personally acquainted. Once informed by the Prussian monarch about the projected scheme, Bunsen first set up a meeting with Edward Sabine in April 1853. Soon, the two had worked out an initial agreement. A formal proposal was sent to William Parsons (the Earl of Rosse), an Irish astronomer and president of the Royal Society from 1848 to 1854.¹¹² In the communication, Bunsen proposed that the Schlagintweits might be employed 'for the purpose of exploring the Himalayan range on behalf of a more complete knowledge of telluric magnetism, and many other branches of terrestrial physics, for the purpose of which the King of Prussia proposed to grant them pecuniary allowances'.¹¹³

The Royal Society president approved of the scheme and had it transmitted to the Company's Court of Directors. Among them was Colonel William Henry Sykes (1790–1872), a former EIC servant in south Asia. During his colonial service, he had completed a number of statistical and natural history surveys in India.¹¹⁴ Sykes eagerly supported the cause within Company circles. Backed by a phalanx of international authorities in magnetic studies, the EIC subsequently approved to continue India's magnetic survey. Sykes was to remain a crucial supporter of the brothers over the coming years. His relationship with these imperial outsiders reflects an important fact: 'While science in this period was certainly

¹⁰⁸ For a valuable treatment of him as both a political and scientific interlocutor between Britain and Germany, Kirchberger, *Aspekte*, ch. 6.

¹⁰⁹ JH to Humboldt, 21 September 1854, SBB, NAvH, gr. K. 11, Nr. 10, 16.

¹¹⁰ Kirchberger, *Aspekte*, 394.

¹¹¹ Bunsen to WH, 4 December 1849, RBG, DC 51, 64.

¹¹² Sabine to Murchison, *The Athenaeum*, 1767, 7 September 1861, 320.

¹¹³ *Ibid.*

¹¹⁴ Woodward, 'Sykes'.

not reducible simply to politics by another means ... science and empire seldom failed to communicate with each other, and indeed, often found patronage and agency in one and the same person.¹¹⁵ But even now, the Company had still not decided to hire the Schlagintweit brothers for the mission.

In a resolution taken on 18 May 1853, it said that ‘the East India Company regard all such missions with great satisfaction’. Therefore, ‘the Court of Directors propose to instruct the Government of India, in the event of their having no officer available for carrying out the objects left unfinished by Capt. Elliot, to apply to the Messrs. de Schlagintweit to ascertain if one of those gentlemen would undertake the duty; and if so to place the instruments at his disposal, and to grant him a suitable allowance for the purpose’.¹¹⁶ The reasons for the Company’s initial wish to appoint a British officer in India are evident. First, there was the general expectation by British scientists and officers that they, not foreigners, were entitled to the position. Second, it was more expensive to employ a naturalist from the continent for the scheme because he had to be specifically trained in London and then brought over to India. The Court of Directors had already enlisted a large number of skilled British officers and surgeons on the Indian subcontinent perfectly capable of finishing the scheme, and who often longed for properly paid Company employment.¹¹⁷

High Aspirations

For the Schlagintweits to turn British India into their promised land, they depended on their own initiative, since the Company was willing to pay only one of them, and merely for completing the magnetic survey. However, their personal ambitions went much further. They succeeded in securing the appointment of more than one brother in 1854 when Lord Dalhousie, governor-general of India, informed the Directors that ‘no officer competent to such an undertaking could ... be spared from military duty’ so that an ‘application was made by the Court to the Messrs. de Schlagintweit’.¹¹⁸

The brothers also managed to fundamentally change both the scientific objectives and the financial grounding of their commission. Whereas

¹¹⁵ Arnold, *Travelling Gaze*, 10.

¹¹⁶ Sabine to Murchison, 7 September 1861.

¹¹⁷ On the many EIC servants engaging in scientific studies in India without Company support, see Arnold, *Science*, ch. 2.

¹¹⁸ *The Athenaeum*, 1767, 320.

the Prussian monarch had agreed in 1853 to grant £200 per annum for three years, the Schlagintweits and their advocates succeeded in having the king more than double the amount, £350 per year for two brothers (roughly equivalent to around £37,000 today). Each of them also received another £100 for the purchase of books and instruments.¹¹⁹ It was furthermore ‘upon the highest order of His Majesty’ that the king issued travel passes to the Bavarians.¹²⁰ Therein, he asked any foreign military or civil authorities, but formally ‘ordered’ any Prussian subject and servant to provide the brothers full support. Hence, they could draw on the networks of Prussian consuls in India, an important asset that would later provide them with space for manoeuvring between their British and German benefactors.

The EIC directorate had underlined in the appointment letter to Adolph the more circumscribed task of completing above all the magnetic researches.¹²¹ In the end, however, the nature of the enterprise dramatically changed as the result of negotiations driven by the Schlagintweits and their supporters with the Court, senior metropolitan scientists, and the Imperial Government of India. There is no better evidence for understanding this transformation of terms than a document called ‘Operations Proposed to the India House’, which survives as a copy with annotations by Sabine.¹²² Adolph submitted this list of operations on behalf of (at first) two brothers to the directors on 28 March 1854.¹²³ Its objective was to expand their initially minor employment into a major scientific investigation of south Asia and its northern frontier regions.

The brothers first laid out a plan of the routes they would take in India and central Asia in 1854–7. The Court was informed that the brothers intended to proceed ‘from Bombay to Madras, if possible on two different routes’ after their landing in the second half of 1854. The summer of 1855 would be spent exploring the region of Darjeeling and the ‘eastern Himalaya, perhaps if under favourable circumstances with a journey to Nepal’.¹²⁴ Nepal was then hardly accessible to Europeans and jealously guarded by the Chinese; Hooker had earlier experienced great troubles regarding his planned journey into the country.¹²⁵ While

¹¹⁹ Polter, ‘Nadelschau’, 79; see the correspondence leading up to the order of 8 July 1854, at GStAPK, I. HA Rep. 162, Verwaltung des Staatschatzes, ‘Reisezuschuß’.

¹²⁰ BSB, SLGA, IV.6.2.

¹²¹ J. D. Dickinson, East India House secretary, to AS, 10 June 1854, BL, IOR, E/1/300, 1854, 1715.

¹²² The National Archives, Kew [NA], BJ 3/53.

¹²³ *Ibid.*

¹²⁴ *Ibid.*

¹²⁵ Letter to Wallich, 30 March 1850, RBG, JDH/1/9/1, 489–92.

the following winter would again force the Schlagintweits to descend into northern India (through Bihar to Agra and as far south as Nagpur in central India), they proposed to spend the summer of 1856 venturing into the central regions of the Himalayas, with travels through Kumaon, Almora, Tibet and Simla. After another separation during the winter months, the brothers would finish their researches in the summer of 1857 in the 'Western Himalaya' with separate journeys through the 'valley of the Indus at Ladak' and to the famous valley of Kashmir. From there, the plan was to proceed from the mountain chain to the Indian coast, and to return via steamship from Bombay (Mumbai) to Europe.¹²⁶ In short, the Schlagintweits hoped to combine their surveying project in Company-controlled territories with explorations in lands beyond British sovereignty, which promised significantly more public interest.

The brothers also managed to reinterpret the nature of their entire mission: 'With the magnetical observations in different parts of India we propose ourselves to unite [a] Regular Series of Observations on ... the Physical Geography of the country'. Adolph added that 'I myself will direct my particular attention to collect as complete a series as possible of observations on the Geology of India and of the Himalaya.' In alluding to what would later become large-scale surveys of resource deposits, the German geologist also suggested that:

We shall be also very happy to give our closest attention to any question of practical interest, as for instance to the determination of the Geological age of the various Coal deposits of India to the occurrence of salt or to the practical use of the sulphur occurring in western Scinde.

Such a comprehensive geological survey of the vast natural landscapes of India and the mountain chain at its northern border would have been an undertaking of several years in itself. The fact that Adolph hoped to achieve such an objective literally *en passant* reflects their high aspirations, but equally their delusion about what was achievable. This impression of over-ambition is confirmed throughout the document, as the brothers declared their intention to complement their geological, geographical and geomagnetic studies over those vast regions with additional investigations in several other fields of enquiry such as meteorology, hydrology, potamology, botany, mineralogy, palaeontology and zoology. To carry out extensive studies in all of these departments, and over such

¹²⁶ A. Schlagintweit, 'Proposed Operations', NA, BJ 3/53. Sabine thought the plan unfeasible, noting on their proposed routes during the 'Winter 1855/56': 'impossible in one winter. There are no roads & much of the country is very unhealthy even in winter.' Subsequent quotations in this and the next paragraph, *ibid*.

vast and diverse landscapes as proposed, was the exact opposite of their initially narrow magnetic mission.

Yet, the Company granted permission to the Schlagintweits 'to undertake this [geomagnetic] duty in connection with the other objects mentioned'.¹²⁷ To maintain a degree of control over the expedition, and to ensure that the brothers' pursuits would meet the interests of imperial authorities, the Court, however, established that 'your proposed plan of operations will be communicated to the Government of India, and will be subject to such modifications as from time to time may seem to the Government desirable or requisite'.¹²⁸ While initially only Adolph was to be employed, ultimately, the Court allowed first Hermann, and then also Robert, to join the scheme.¹²⁹ Like Adolph, Hermann was also enlisted in paid employment for the duration of four years for the eastern mission. Robert, by contrast, was to accompany his brothers without a salary from British pockets, but secured a 'pension' from the Bavarian king Maximilian II.¹³⁰ The Schlagintweits thus tripled their manpower. As a later critic summoned it up, the Company's final 'contract with them was so loosely drawn up that they had practically a roving commission in science, to make researches ... in all manner of subjects', to which, during the mission, the troika would add further fields of enquiry and observation, including languages, ethnography and racial sciences.¹³¹ This disciplinary overreach, henceforth built into the expedition's software, was indeed the birth defect of the entire enterprise under which their controversial careers and reputation would later suffer greatly.

From the outset, the Schlagintweits thus sought to become more than a mere episode in the century-long history of British surveying of south and high Asia. Many surveys in the Indian Empire during the first half of the nineteenth century had gone largely unnoticed by the general public. Indeed, very little was known about the precise activities of the legions of Company servants engaged in measuring and classifying India's natural landscapes. As the *Calcutta Review* put it in 1851: 'We believe that there

¹²⁷ Dickinson to AS, 10 June 1854.

¹²⁸ Ibid.

¹²⁹ The current Surveyor General of India, A. S. Waugh, noted on the 'liberal' agreement: 'The salary assigned to Mr. Schlagintweit is nearly equivalent to that of a first class Surveyor who receives no travelling allowances & exceeds by 100 Rs the salary of an Executive Engineer of the first class.' Waugh to Colonel R. J. H. Birch, Secretary to Government of India, Fort William, in National Archives of India, New Delhi [NAI], Military Department, Controlling Agency, Consultation, 15 September 1854, no. 445. After negotiations with the imperial authorities at Calcutta, the brothers ultimately received 'Rs 600 per Ms with Rs 150 per Ms for travelling expenses', NAI, Letters from the Court of Directors, 1955-09, 19 September 1855, no. 127, 919.

¹³⁰ Humboldt to Ritter, 11 March 1856, in Päßler, *Briefwechsel*, 172-3.

¹³¹ Huxley, *Letters of Huxley* I, 329.

are very few persons, even in India, who have any notion whatever of what the Trigonometrical Survey really is, or what it does for geography or science: or who can comprehend what has been already done, and why it has not long since been brought to a conclusion.¹³² In direct contrast to such obscure surveying, the Schlagintweits were eager to turn into great explorers in the public eye and longed for scientific breakthroughs and geographic feats. Their (self-)promotion as 'heroic travellers' into the supposed unknown was soon launched and promised a very different public recognition and career opportunities in Europe.

As this example of imperial recruitment shows, securing funds for scientific expeditions in foreign empires did not necessarily follow established ways. Yet, the Schlagintweits' case also demonstrates how much depended, as a recurrent pattern for such cross-border appointments, on the interests and power of patrons, whose connections reached deep into both the intellectual centres of London and Company science in India. The brothers' ingenious careers launched in the mid nineteenth century thus expose the slow, extremely uneven and conflictive transformation of private patronage towards more public, and allegedly more answerable, systems of national support of scientific enquiry.

¹³² Walker, 'Trigonometrical Survey', 514–15.