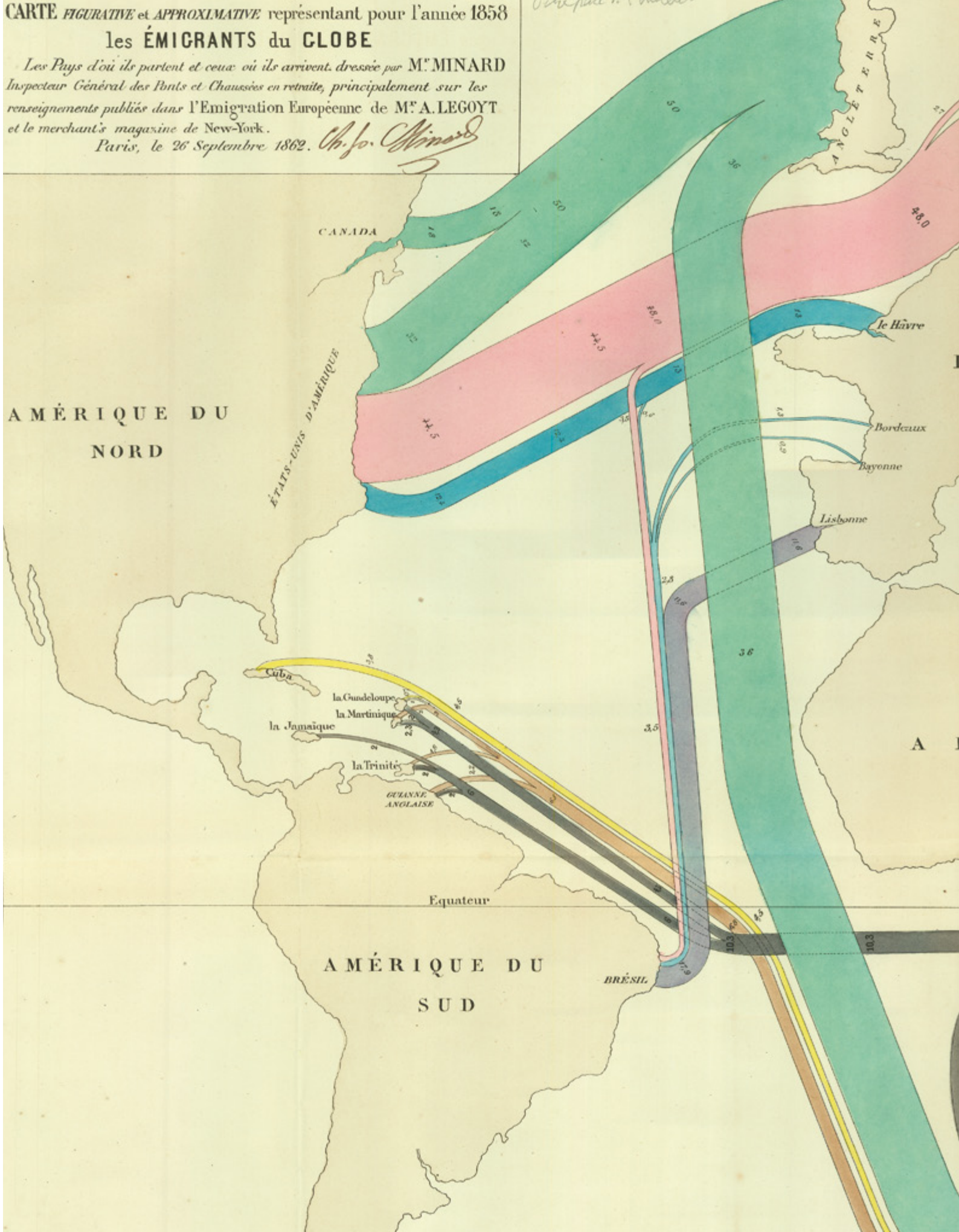


CARTE FIGURATIVE et APPROXIMATIVE représentant pour l'année 1858

les ÉMIGRANTS du GLOBE

Les Pays d'où ils partent et ceux où ils arrivent, dressée par M.^r MINARD
Inspecteur Général des Ponts et Chaussées en retraite, principalement sur les
renseignements publiés dans l'Émigration Européenne de M.^r A. LEGOYT
et le merchant's magazine de New-York.

Paris, le 26 Septembre 1862. Ch. Jo. Minard



Data Visualization

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5	Greenough	£5,000
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8	Murchison	£10,000
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10	Dobbs	£4,000
11	Knipe	£2,500
12	Minard	£400,000
13	Marcou	£4,500
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19	Malaria in British India	£3,000
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Introduction

“There are three kinds of lies: lies, damned lies, and statistics”

So Mark Twain wrote in ‘Chapters from My Autobiography’, published in ‘The North American Review’ in 1906. That Twain goes on to erroneously attribute the phrase to the British Prime Minister, Benjamin Disraeli, is beautifully ironic. However, Twain referenced the phrase to emphasize the way in which figures could beguile and conceal, as much as illuminate, the truth; much as they continue to do in our own time. Indeed, a glance at many a social media thread reveals how, in the era of “fake news”, clear visual representation of “big data” has assumed a central role in persuading audiences.

At the time of Twain’s writing, the data compiled through improved techniques during the nineteenth century had begun to inform debate in politics, economics, and the new social sciences. Cartography played a significant part in disseminating, interpreting, and making this new information comprehensible. To a certain extent all maps are data visualization, and the significant advances in mapping technologies over the preceding century made them credible to viewers. Plotting cultural and social data on a map not only allowed spatial analysis of that data, but also gave the idea authority: “thematic”, or “persuasive” cartography was born.

One of the first and greatest exponents of cartographic data visualization was Charles Minard (item 12) whose output ranged from: “the best statistical graphic ever drawn” - a map depicting Napoleon’s doomed invasion of Russia; the international cotton trade before, during, and after the America Civil War; and the population density in Paris, produced to ascertain the most efficient placement of a new central post office. Minard’s work influenced subsequent social scientists, including the criminologist André-Michel Guerry (item 20), and the social reformers Charles Booth (items 21 and 26) and Jane Adams (item 24).

Social reformers like Booth were often battling the by-products of poverty, most notably endemic disease. The fight against cholera – the disease was responsible for the greatest loss of life in the nineteenth century - was aided by the pioneering work of John Snow (item 14), whose map of the area around the Broad Street water pump in Soho demonstrates better than any table of statistics the link between infected water and death rates.

Cartography didn’t just help in the fight against disease and social deprivation: it also helped, through the new science of geology, to fuel the industrial revolution. This is most beautifully demonstrated in William Smith’s geological map of England and Wales of 1815 (item 1) – the first geological map of any country and “the map that changed the world”. The new science became hugely popular over the succeeding decades – with men of industry and the layman alike – and pioneering geological maps





were produced by the likes of Greenough (item 5, 9, and 17), Hall (item 6), Knipe (items 7, 11, and 16) Murchison (item 8), and Marcou (item 13).

Finally, rapid urban growth during the nineteenth century, with the resultant social issues, which Booth and Snow illustrate so neatly, also led to severe strain on transport systems. London's answer was the construction of the world's first underground railway network; the first line, the Metropolitan, opened in 1863. Over the next 60 years a further six lines would be constructed, with the network stretching west to east from Hounslow to Upminster, and north to south from Watford to Morden. The maze of lines led Harry Beck, (items 30 and 31), to produce his 1933 tube map, one of the most celebrated maps of the twentieth century. To make the map more intelligible, Beck dispenses with "topographical truth", in order to show connectivity. In doing so he set a world standard for graphic clarity and produced something as "rational as a contemporary Mondrian painting", proving the American statistician John Tukey's point that "the greatest value of a picture is when it forces us to notice what we never expected to see".

“The Map that Changed the World”

1 SMITH, William

A Delineation of the Strata of England and Wales, with Part of Scotland; exhibiting the Collieries and Mines, the Marshes and Fen Lands originally overflowed by the Sea, and the Varieties of Soil according to the Variations in the Substrata, Illustrated by the most descriptive Names.

Publication
London, John Cary, 1815.

Description
Third issue (the “a” series), Large engraved wall map, dissected and mounted on linen, in three sections, fine original full-wash colour, signed and numbered “a65” by the author to the lower right corner of the north section, housed in original brown mottled paper slipcase, rubbed.

Dimensions
2325 by 1850mm (91.5 by 72.75 inches).

Scale
5 miles to one inch.

References
J. Challinor, “The Beginnings of Scientific Palaeontology in Britain” *Annals of Science* 6 (1948): 46–53; Joan M. Eyles, “William Smith”, in *Dictionary of Scientific Biography* (vol.12), ed. Charles Coulston Gillispie (New York: Scribner, 1970–80) 486–492; Eyles, “William Smith: A Bibliography of his Published Writings, Maps and Geological Sections” *Journal of the Society for the Bibliography of Natural History* V (1969); H.D. Horblit, *One hundred books famous in science: based on an exhibition held at the Grolier Club* (New York: Grolier Club, 1964), 94; Ruth A. Sparrow, *Milestones of Science: Epochal books in the history of science as represented in the Buffalo Society of Natural Sciences*, (Buffalo: Buffalo Society of Natural Sciences, 1972), 180; Simon Winchester, *The Map that Changed the World* (London: Harper Collins, 2001).

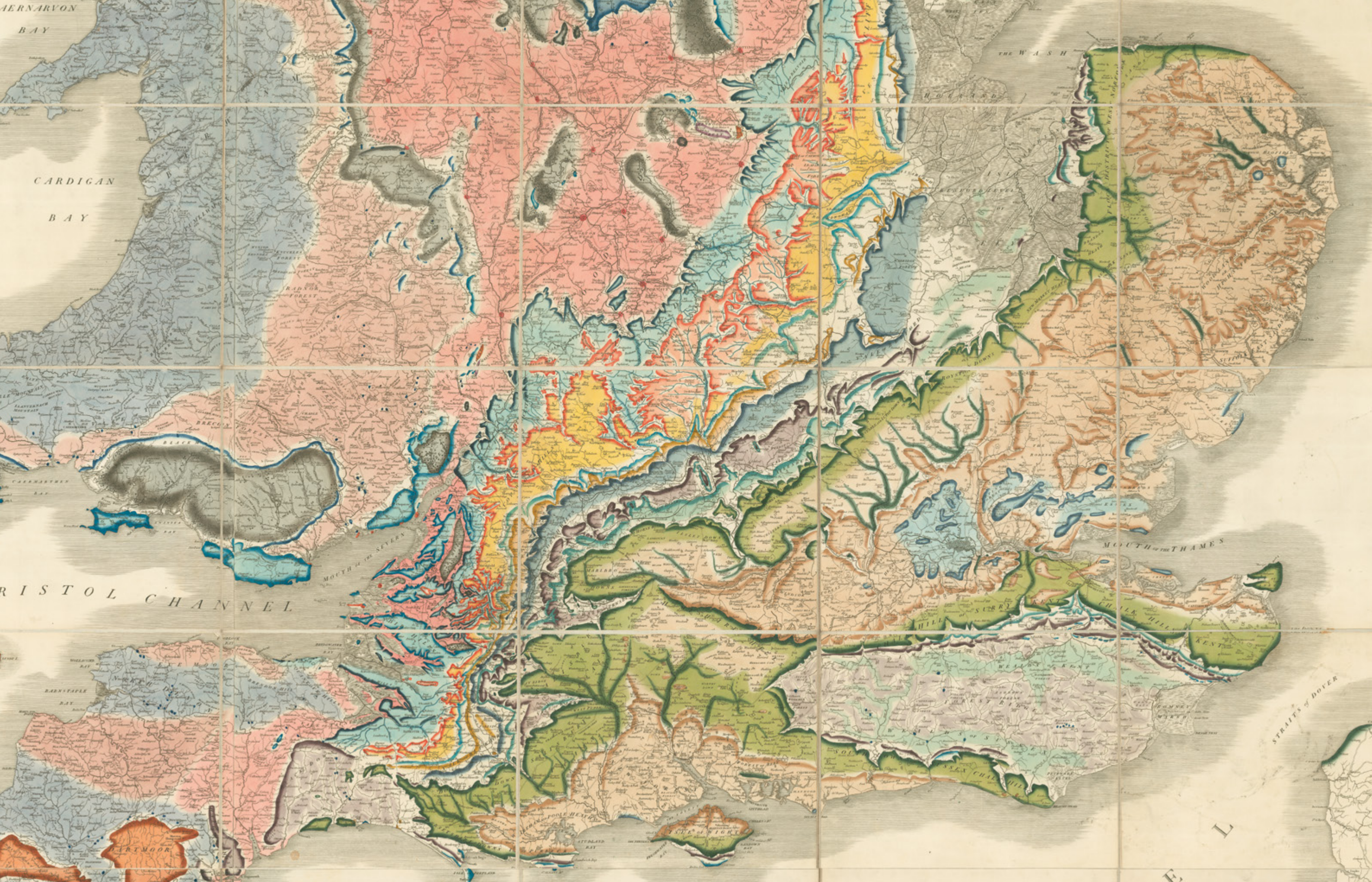
The first large scale, detailed scientific geological map of any country: “A major cartographic and scientific achievement” (Eyles, DSB). Smith’s triumph in executing this, his subsequent fall and then final recognition is the stuff of scientific legend: “he was imprisoned for debt, turned out of his home, his work was plagiarised, his wife went insane and the scientific establishment shunned him” (Winchester). However, Smith’s overwhelming contribution to the science of geology was his recognition, as outlined in Memoir to the present map, “that each stratum is also possessed of properties peculiar to itself, has the same exterior characters and chemical properties, and the same extraneous or organised fossils throughout its course”. It was this theory, developed as early as 1796, that enabled Smith to “accurately predict, and therefore map, the geological composition of Britain” (Challinor). The connection between strata and their fossils was noted by the Danish scientist Nicolas Steno in his 1669 work ‘De Solido’, but it was Smith who first understood that the principles of stratigraphy could be applied on a national scale. His development of the mechanisms of superposition (the theory that geological strata are formed in order), placed palaeontology as a fundamental part of geology and lent credence to the theory of deep time, leading to a better understanding of the age of the earth. His great map is astoundingly accurate, and modern versions have made only relatively minor modifications to his work.

Five states of Smith’s work have been identified: an early unnumbered state (known in only a few copies); a series numbered 1–100, which Smith signed between 2 November and 17 December 1815; a series numbered a1–100 (the present example is of this series), signed between 17 December 1815 and 23 January 1816; a series numbered b1–100, signed after 23 January 1816; and an unnumbered series probably issued in 1823 or later (watermarks are dated 1823).

“The map was supplied either in sheets [usually bound as an atlas], or mounted on canvas and rollers, or fitted in a case for travelling [as in the present example]” (Eyles, Bibliography). Most probably no more than 320–350 copies of the map were published, of which perhaps 130 survive today.

The present example corresponds to Eyles’ second issue, series III map: “a65”, was examined and signed by Smith on 13 January 1816. It was one of a batch of 15, which had been coloured by Morse, signed that day and numbered.





Rare chart of the world showing lines of magnetic variation

2 YEATES, Thomas

Chart of the variation of the magnetic needle For all the known Seas comprehended within Sixty Degrees of Latitude North and South: with a New and Accurate Delineation of the Magnetic Meridians, accompanied with suitable Remarks and Illustrations, by Thomas Yeates. Drawn & Engraved by J. Walker. To the Right Honourable The Master, the Deputy Master, Wardens and Elder Brethren of the Corporation of Trinity House, of Deptford Stroud. This Chart, honoured with their Munificent support is by Permission, most respectfully Dedicated, By their Most Humble and most obliged Servant the Author.

Publication
London, Published as the Act directs by Tho[ma]s Yeates, & Sold by Black Parbury & Allen, Leadenhall Street, 22nd, August, 1817.

Description
Large engraved chart, dissected and mounted on linen, letterpress text panels, remarks and explanation to side margins, folding into original green cloth slipcase.

Dimensions
545 by 1493mm (21.5 by 58.75 inches).

References
BLMC Maps 974.(2.)

The text panel to the left hand side of the chart, written by Thomas Yeates, contains a brief history of the knowledge of magnetism from its discovery by the Chinese “more than a thousand years before the Christian Era”, to the discovery by Columbus of “the Variation of the Compass in his Voyage to America, in the Autumn of 1492, before which period it was thought the Needle at all places pointed due North”. Its systematic charting would not start until the seventeenth century when Dutch seamen under the orders of Prince Maurice were ordered to “observe and register the Variation in all places”. Finally, researches into magnetic variation whilst “steering a ship at sea”, were undertaken by Captains Cook and Flinders. Flinders’ findings are expanded upon and explained in detail in Yeates’ text.

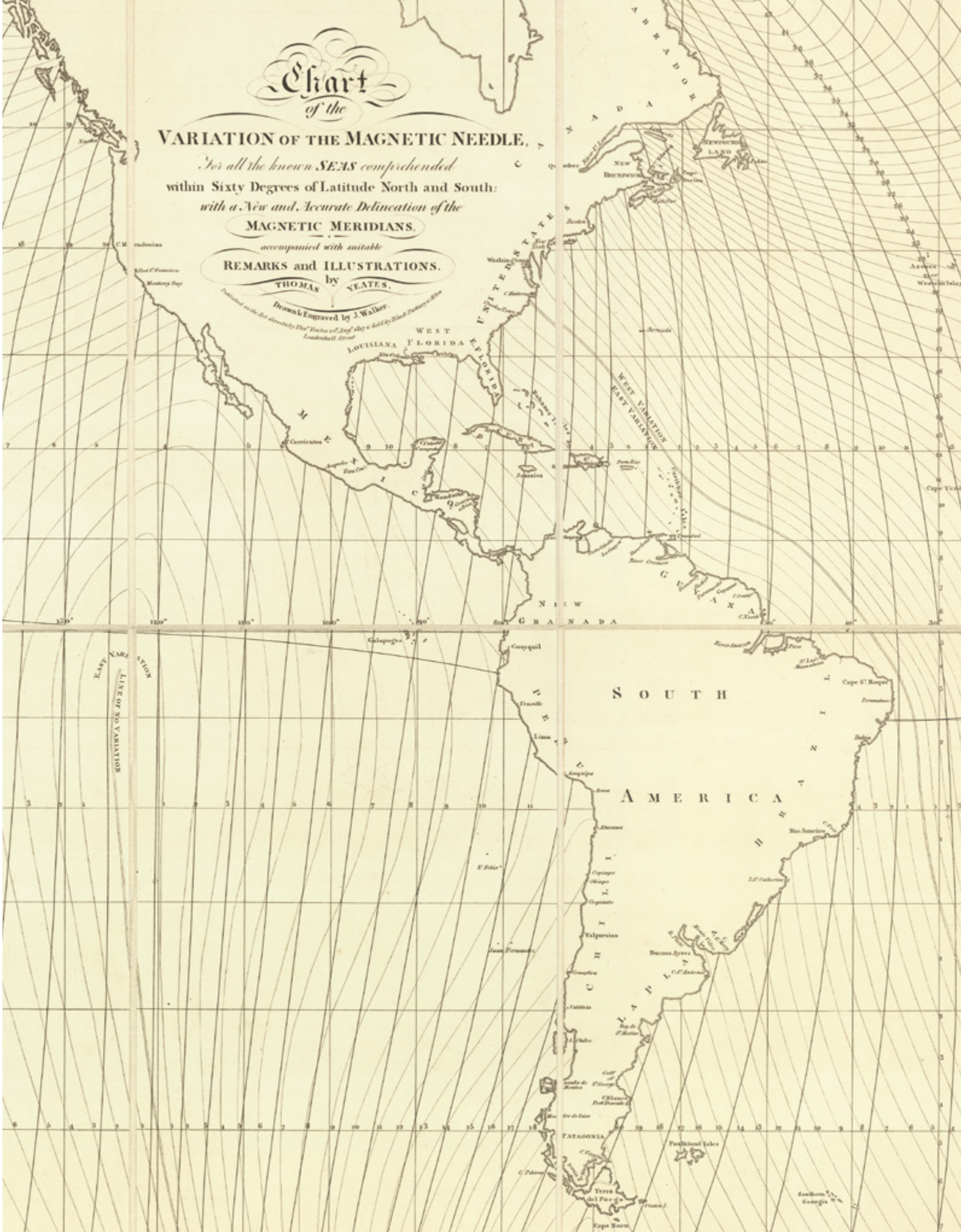
Yeates further explains the history of ‘Variation Charts’, with Edmund Halley’s famed chart of 1701 highlighted as the template for all the subsequent charts produced throughout the eighteenth century. Yeates goes on to state that the current chart improves on the ‘Halleyan System’, which only covered the Atlantic and Indian Oceans, with the “delineation of the Magnetic Meridians, shewing as well geometrically as numerically the Quality of Variation for all the known seas within the limits of Sixty Degrees of Latitude north and south of the Equator, including the whole extent of the Pacific Ocean with geographical improvements according to the latest authorities”. Finally, Yeates gives a brief explanation on how to use the magnetic variation lines that appear on the chart.

Thomas Yeates (1768-1839) was an orientalist and scholar, who wrote extensively on Indian, Middle Eastern, and Biblical history. One might assume an orientalist to be a rather unusual choice for the authorship of such a chart, and he admits as much by acknowledging the help of Captain Hurd of the Royal Navy and Hydrographer to the Admiralty and Captain Horsburgh, Hydrographer to the East India Company.

We were only able to trace two institutional examples of the first edition: one in the British Library and the other in the National Maritime Museum. The chart was subsequently republished by J.W. Norie & Co. in 1824, with the only institutional example we could trace of that being held in the National Library of Australia.

Provenance

Book plate of Michael Morrah, who practiced as a surgeon in Worthing during the first half of the nineteenth century.



Smith’s geological map of Durham

3 SMITH, William

Geological Map of Durham by W. Smith Mineral Surveyor. A New Map of Durham divided into wards, exhibiting its rivers, roads, parks, &c. By John Cary engraver, 1824.

Publication
London, Published by J. Cary Engraver and Mapseller, No 86 St James's Street, March 1st, 1824.

Description
Engraved map, fine original hand-colour, dissected and mounted on linen, folding into original brown marbled paper slipcase with publisher's label.

Dimensions
480 by 535mm (19 by 21 inches).

References
A.G. Davies, 'William Smith's Geological Atlas and the Later History of the Plates', *Journal for the Society for the Bibliography of Natural History* 2 (1952), pp.388-95; Joan M. Eyles, "William Smith", *Dictionary of Scientific Biography* (vol.12), ed. Charles Coulston Gillispie (New York: Scribner, 1970-80), pp.486-492; Eyles, 'William Smith (1769-1839): a Bibliography' in *Journal for the Society for the Bibliography of Natural History* 5 (1969) pp.87-109, no. 33; T. Sheppard, 'William Smith: His Maps and his Memoirs', *Proceedings of the Yorkshire Geological Society* 19 (1920), pp. 75-253, p.155; A.W. Skempton et al., eds., *A Biographical Dictionary of Civil Engineers* (vol.1), (London: Thomas Telford for the Institution of Civil Engineers, 2002), p.639.

First edition of William Smith’s geological map of Durham, one in a series of county maps produced by Smith, each separately issued, which were the first detailed geological maps of specific areas. Smith’s individual maps are extremely rare on the market.

Smith produced the first geological map of England and Wales in 1815 (item 1), which contained “an amazing amount of correct detail” (D.S.B.) and was the basis for all the geological maps that followed. In 1819 he began the publication of a geological atlas of England and Wales. Published in parts over five years, it remained unfinished, containing twenty-one maps of various English counties.

“All the county maps published contain much more information than was shown on Smith’s large map of 1815, and indicate that during the intervening years he had done much to increase his knowledge. The maps are based on Cary’s county maps, and are headed ‘By W. Smith, Mineral Surveyor.’ Each map measures 21 ½ inches by 19 1/4 inches [across the ruled border]; the scale varies slightly but averages 3 miles to an inch.”—Sheppard, *William Smith: His Maps and his Memoirs* (1920), p. 155.

The map of Durham appeared in the sixth and last part (1824), and was also issued separately, as here. The title above appears in the upper margin; another title is given in a circular tablet in the lower left corner: “A New Map of Durham, divided into Wards, exhibiting its Roads, Rivers, Parks, &c. By John Cary Engraver. 1824.”

“One of his significant achievements was the identification of the presence of coal in the eastern parts of County Durham, beneath the overlying Magnesian Limestone. The advice he gave to the landowners there led to the establishment of new collieries, resulting in the construction of port and dock facilities at both Hartlepool and Seaham Harbour during the 1830s; both ports were connected by rail to the new mines.”—Skempton et al., eds., *A Biographical Dictionary of Civil Engineers*, p. 639. On this copy of the map the railways in the south-east of the county have been added later in manuscript.



Smith's geological map of Sussex

4 SMITH, William

*Geological Map of Sussex by
W. Smith Mineral Surveyor A
New Map of Sussex Divided into
Hundreds. Exhibiting Its Roads,
Rivers, Parks Etc.*

Publication

London, Published by J. Cary Engraver and
Mapseller, No 181 the Strand, January 1819.

Description

Engraved broadsheet map with hand colour, small loss to the left margin, slightly affecting the text but not the image, some strengthening to the folds, manuscript text on verso.

Dimensions

480 by 535mm (19 by 21 inches).

First edition of William Smith's geological map of Sussex.

Smith's map of Sussex was first published by Cary in 1819, alongside Norfolk, Kent and Wiltshire. It is a reissue of Cary's map of 1801, with the addition of the geological information.

In his major work 'A Delineation of the Strata of England and Wales with part of Scotland' of 1815, Smith ordered the strata through a colour key, whereas here he identifies them by name and number with coloured boxes, and places them around the boundary adjacent to their outcrop. On this map, a box and its related text overlap the engraved border.

Stratigraphy

2, 3 and 4. Brick Earth and Sand, with pebbly Gravel and Crag occasionally.

The highest Strata in the County.

5. Chalk, the upper beds of which are soft enough to mark with, abounding with flinty Nodules. The under beds are much harder and without Flints.

6 and 7. Green Sand and Golt Brock Earth, at the edge of the Chalk Hills.

8 and 10. Sand, beneath the Golt Brick Earth, in the lower part of which in Dorsetshire, the Portland Rock is found.

11. Oaktree Clay, part Slaty, and highly Bituminous, as at Kimmeridge.

13. Sand and Sandstone, laying below the Oaktree. The deepest Strata in the County.



Rare reduction of Greenough's geological map of England and Wales

5 [GREENOUGH, George Bellas]

A Geological Map of England and Wales reduced by permission from the map in 6 sheets published by the Geological Society.

Publication
London, Published by J. Gardner, July 21st, 1826.

Description
Engraved map, fine original hand-colour, dissected and mounted on linen, folding into original green cloth slipcase, with publisher's label.

Dimensions
685 by 560mm (27 by 22 inches).

Scale
17.5 statute miles to 1 inch.

References
John Farey, Philosophical Magazine, 3 May 1815; G. L. Herries Davies, Whatever is Under the Earth: The Geological Society of London 1807-2007 (London: Geological Society of London, 2007); Simon Winchester, The Map That Changed the World: A Tale of Rocks, Ruin and Redemption (London: Penguin, 2002).

The first reprint of George Greenough's great geological map, first published in 1819. Please see item 9 for a full discussion of the map.

The present map has been reduced from the original six sheets on to one, and curiously does not bear Greenough's name. The decision to omit his name is unclear, however, the smaller cheaper format must have been intended for the growing interest in geology from the new middle class. This market would later be handsomely supplied by the likes of James Knipe (items 7, 11 and 16), and Elias Hall (item 6), both of whom were members of the 'British Association for the Advancement of Science', founded in 1831.

The map is known in at least three other issues: an extremely rare earlier issue with the same imprint as the present map, but dated 1st June; and two others with the same date as the present example but bearing the names of either C. Smith, 172 Strand, or G.F. Cruchley, 81 Fleet St., on printed slips pasted over the Gardner imprint.

Provenance

Ownership inscription to slipcase of William Ewart (1798-1869), liberal politician, reformer, and originator of the Blue Plaque scheme.



Hall’s fine geological map of Lancashire

6 HALL, Elias

A Mineralogical and Geological Map of the Coalfield of Lancashire with parts of Yorkshire, Cheshire & Derbyshire by Elias Hall.

Publication
Castleton & Manchester, [c1836].

Description
Large engraved map, fine original hand-colour, dissected and mounted on linen, a few tears to old folds, and some loss to green silk edging, folding into original red cloth slipcase, with black morocco label, lettered in gilt, rubbed and scuffed.

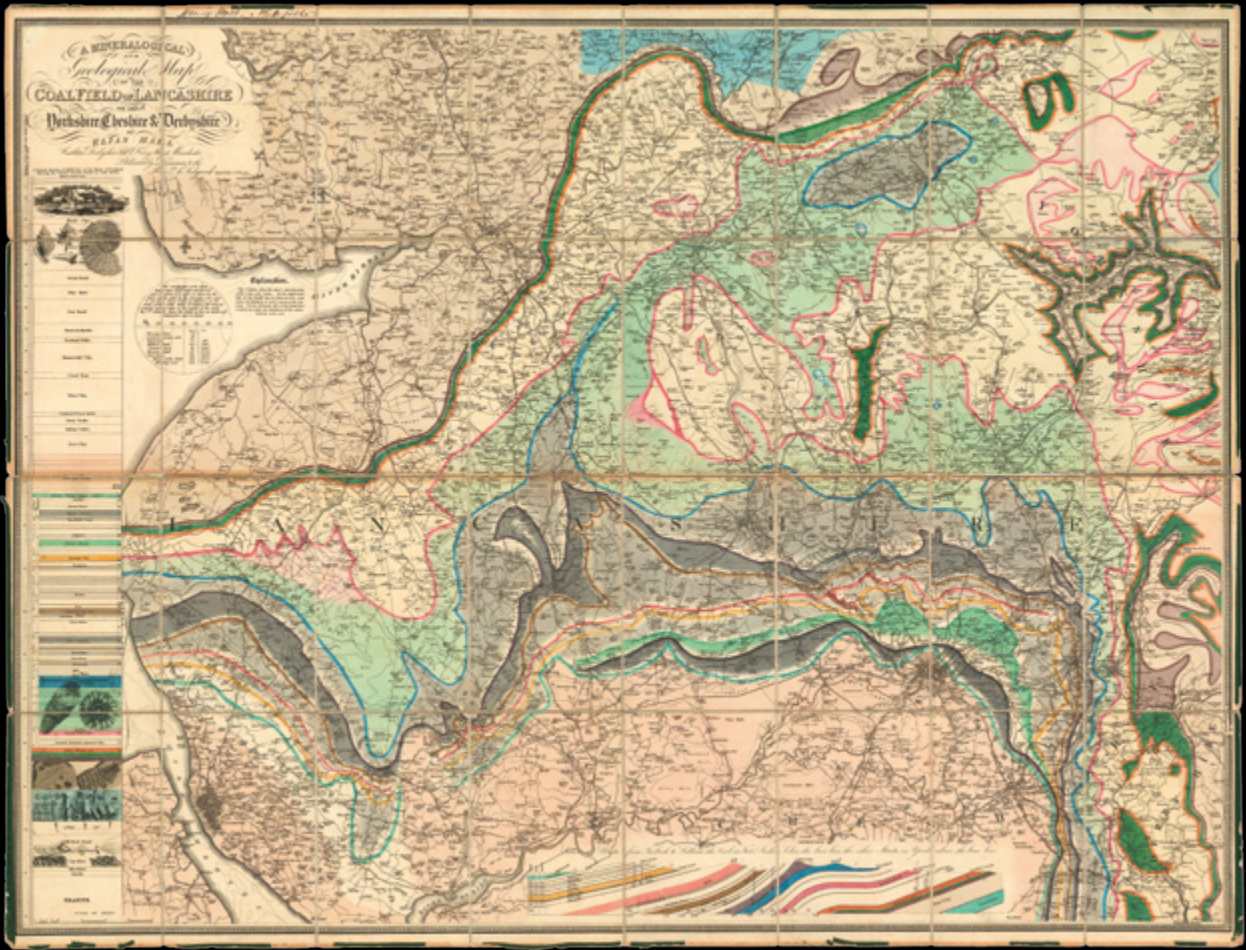
Dimensions
990 by 1300mm (39 by 51.25 inches).

References
Second state with the NHM Map Room SB 72Aa HALL. T.D. Ford and H.S. Torrens, 'Elias Hall, pioneer mineral surveyor and geologist in the Midlands and Lancashire', *Mercian Geologist* 17 (2011), pp.249-261.

One of the earliest large-scale geological maps.

In 1834, Elias Hall published the present work, one of the first, if not *the* first, geological map to be published on a scale of one inch to one mile. The map is dedicated to Adam Sedgwick, Vice President of the Geological Society, and is coloured in similar fashion to William Smith’s 1815 map of England and Wales (item 1), with dense colours marking the lower outcrops (bassets) of the coal seams and other units, and with the colour then fading down. To the left is a column of 15,000 feet of the strata then known (with names taken largely from Smith and Farey) with units ranging from the Bagshot Sand [Eocene] down to the Old Red Sandstone [Devonian] and Transition Limestone [Silurian], with Mica Slate, Gneiss and Granite beneath. The sequence of coals is fairly accurate, but there are minimal details of the Millstone Grit and Carboniferous Limestone. Some sketches of typical fossils were superimposed in the column. The London Clay has a sketch of an elephant, horse, rhinoceros, giraffe and two humans, which are now assigned to the then unrecognised Quaternary.

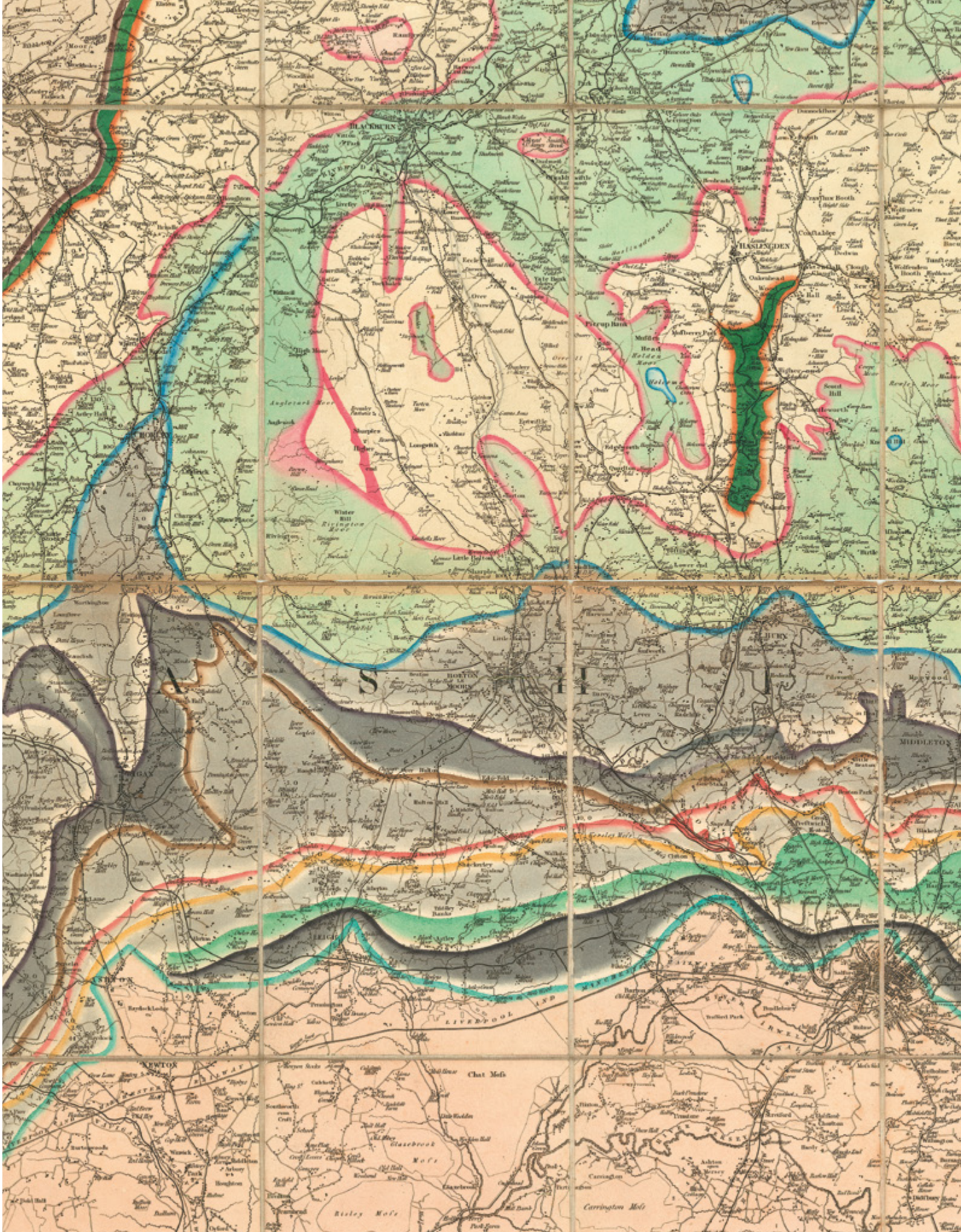
Elias Hall (1764-1853) was a pioneering Midlands and Lancashire geologist. Little is known regarding Hall’s early life. He is first mentioned in 1796, in the cash book of marble worker White Watson, as “Elias Hall, Castleton stone dealer”. It wasn’t until 1807, with the arrival of John Farey, William Smith’s most important pupil, that Hall began to realise the important practical aspects of Smith’s geological stratigraphy. Over the next decade Farey and Hall would work closely, with Hall producing scale models from Farey’s surveys. It was through Farey that he would make contact with Joseph Banks, and later George Greenough, president of the Geological Society in London. However, Hall was to be the victim of a bitter dispute between Greenough and Farey, the former having refused to publish Farey’s detailed geological survey of Derbyshire. Furthermore, Greenough went on to describe Hall’s model of the Darbyshire dales, with its rather garish colours, as more akin to “a tray of Guts and Garbage in a Fishmonger’s or Poulterer’s Shop”. Hall did, however, receive praise from both Joseph Banks, botanist and President of the Royal Society, and Charles Koenig, curator of minerals at the British Museum, who visited Hall in Castleton in 1819. He ordered two of Hall’s models of the topography of Derbyshire and Cumberland. Hall continued to publish geological material throughout the 1820s, most notably his works depicting the geological sections of the Lancashire coalfields. It was at this point that he began to call himself a mineral surveyor. In the 1830s he not only published the present work, but was also involved in the coal industry, and became a founding member of the British Association for the Advancement of Science (now the British Science Association). He continued to be active in geological circles right up to his death in 1851.



Copac records only three institutional examples: Bristol University, Manchester University, and The Natural History Museum. OCLC records a further example at Cambridge University Library.

Provenance

Ownership inscription on slipcase and map of Henry Holt, of Wakefield, West Yorkshire, a civil engineer and fellow member of the British Association for the Advancement of Science.



Vital mineral deposits

7 [KNIPE, James Alexander]

A Geological Map of England and Wales, and Part of Scotland, Showing also the Inland Navigation By means of Rivers and Canals with their elevation in feet above the sea together with the Rail Roads and Principal Roads.

Publication
London, by J. & C. Walker, No. 9 Castle Street Holborn, Dec., 31st 1837.

Description
Hand-coloured engraved map, dissected and mounted on linen, geological section from 'Lands End to the German Sea' in bottom border, key upper right, green cloth pull-off slipcase, red morocco label, lettered in gilt to spine.

Dimensions
1390 by 1000mm (54.75 by 39.25 inches).

References
Not traced in BLMC but cf. BLMC Maps 218.c.4 for 1835 edition.

First published by James Knipe in conjunction with John Walker and Charles Walker, leading London engravers and publishers, in 1835. In this later printing Knipe's name has been removed from the title, leaving the credit only to the Walkers. This was due to the fact that Knipe issued a similar geological map under his own name alone in the same year.

The present example is the third state, in which the map has been heavily re-engraved. The original title has been erased and re-engraved in the north sea, together with a key to the railways and canals. Above the title the explanation of the colouring has been re-engraved, with the map now extending as far as Forfar. Along the lower border is a geological section from 'Lands End to the German Sea' (North Sea) and St. George's Channel to the German Sea, with an extensive colour key, 'Explanation of the Colouring', 'Explanation of the Signs' and, acknowledging the times the map was engraved in, a key to 'Railways Completed or in Progress' and 'Projected Railways'.



Murchison’s seminal work on the Silurian System

8 MURCHISON, Roderick Impey

The Silurian System founded on geological researches in the counties of Salop, Hereford... By Roderick Impey Murchison, F.R.S. F.L.S.

Publication
London, John Murray, Albemarle Street, 1839.

Description
Two parts in one volume, 4to (320 by 270mm), three engraved maps, 14 lithographic plates of which two folding and three hand-coloured, nine folding hand-coloured geological sections, 31 engraved plates of fossils, contemporary half calf over green marbled paper boards, rubbed, together with the rare engraved geological map, fine original hand-colour, three sheets mounted on linen, housed in contemporary half-calf over buckram solander box, gilt library stamp.

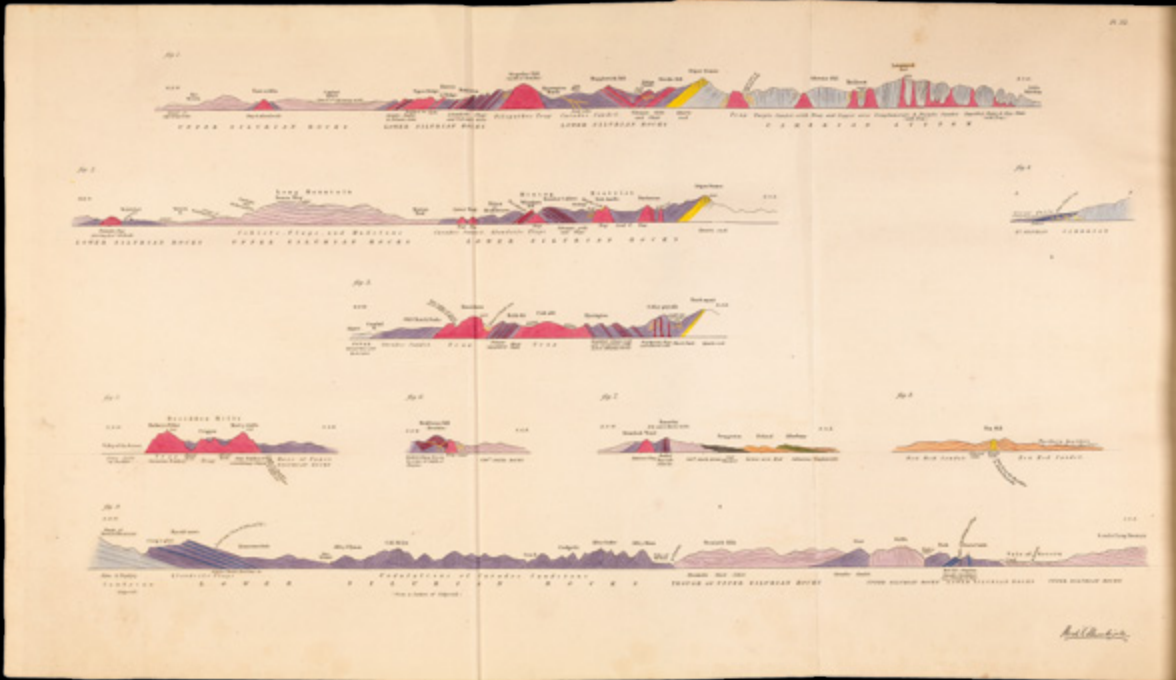
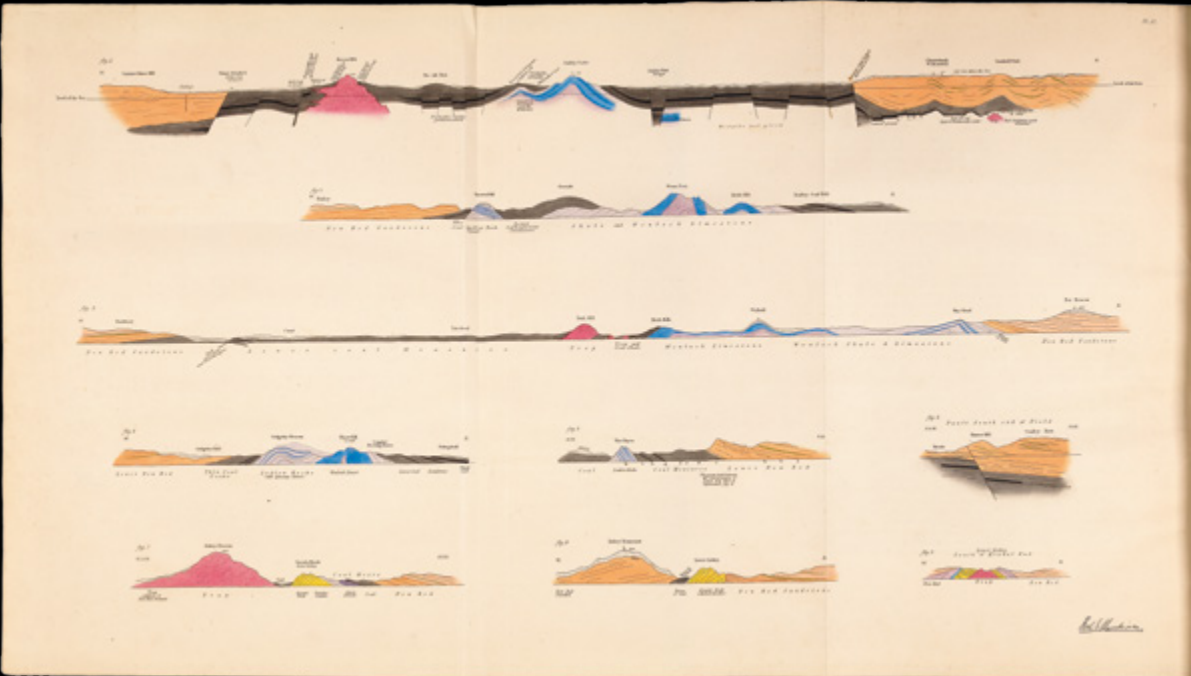
References
T.C. Bonney, 'Murchison, Sir Roderick Impey', Oxford Dictionary of National Biography; Diana H. Hook and Jeremy M. Norman, The Haskell F. Norman Library of Science and Medicine, (Jeremy Norman & Company, 1991), 1569; J.C. Thackray, 'R.I. Murchison's Silurian System (1839)', Journal of the Society for the Bibliography of Natural History 9 (1978),pp.61-73.

“An important milestone in geology, for it established the oldest fossil-bearing classification then known” (ODNB).
In 1831 Murchison went to the border of England and Wales, to attempt to discover whether the greywacke rocks underlying the Old Red Sandstone could be grouped into a definite order of succession. The result was the establishment of the Silurian system under which were grouped, for the first time, a remarkable series of formations, each replete with distinctive organic remains other than and very different from those of the other rocks of England. “Murchison was the first to establish a uniform sequence of Transition strata, to which he gave the name “Silurian” after a British tribe; these strata constituted a major system with uniform fossil remains, displaying an abundance of invertebrates and a complete lack... of the remains of vertebrates or land plants” (Norman). These researches, together with descriptions of the coalfields and overlying formations in South Wales and the English border counties, were embodied in ‘The Silurian System’. The implications for the evolutionary history of the earth were enormous.

The Silurian is a geologic period and system that extends from the end of the Ordovician Period, about 443 million years ago, to the beginning of the Devonian Period, about 416 years ago. As with other geologic periods, the rock beds that define the period’s start and end are well identified, but the exact dates are uncertain by several million years. The base of the Silurian is set at a major extinction event when 60% of marine species were wiped out.

Although the large accompanying map was published with each copy of the text, it is an extreme rarity today. Thackray consulted 25 institutional examples of the work, with only 11 containing the map.

Provenance
Gilt stamp of Wigan Public Library to upper cover.



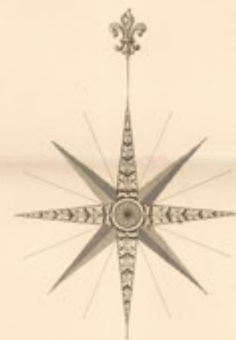


TABLE OF COLOURS OF THE SEDIMENTARY DEPOSITS.

NO.	NAME OF DEPOSIT	COLOUR	EXPLANATION OF SIGNS
1	Triassic	Light Brown	
2	Permian	Dark Brown	
3	Carboniferous	Black	
4	Devonian	Dark Green	
5	Silurian	Light Green	
6	Ordovician	Blue	
7	Pre-Cambrian	Grey	
8	Triassic	Light Brown	
9	Permian	Dark Brown	
10	Carboniferous	Black	
11	Devonian	Dark Green	
12	Silurian	Light Green	
13	Ordovician	Blue	
14	Pre-Cambrian	Grey	
15	Triassic	Light Brown	
16	Permian	Dark Brown	
17	Carboniferous	Black	
18	Devonian	Dark Green	
19	Silurian	Light Green	
20	Ordovician	Blue	
21	Pre-Cambrian	Grey	

EXPLANATION OF SIGNS

Upper Silurian	1
Lower Silurian	2
Devonian	3
Carboniferous	4
Permian	5
Triassic	6
Quaternary	7
Glacial	8
Recent	9

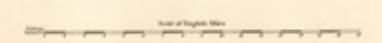
THE SILURIAN REGION

AND ADJACENT COUNTIES OF ENGLAND & WALES

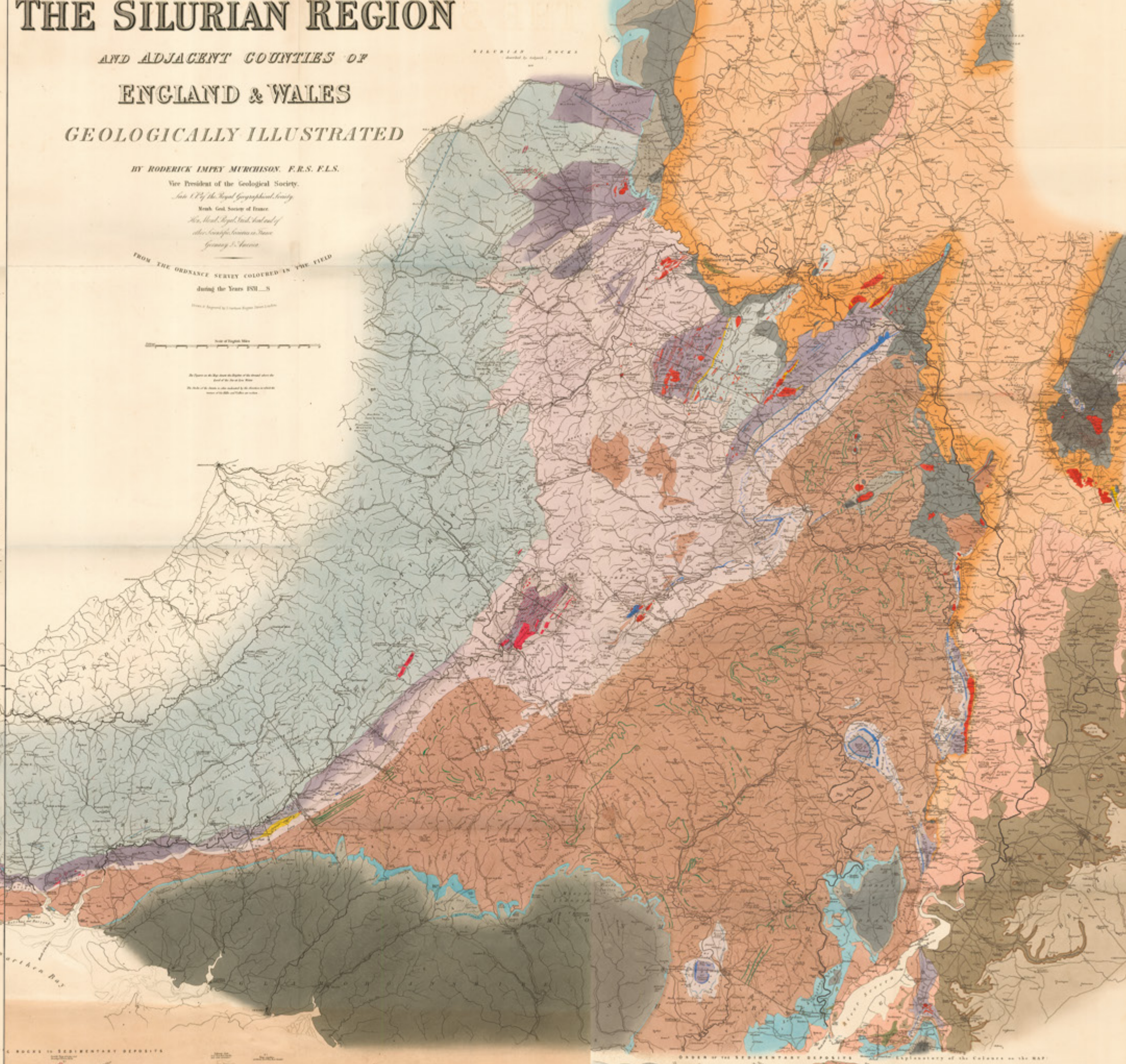
GEOLOGICALLY ILLUSTRATED

BY RODERICK IMPEY MURCHISON, F.R.S. F.L.S.
 Vice President of the Geological Society.
Joint Editor of the Royal Geographical Society.
 Member, Geol. Society of France.
Hon. Member, Royal Acad. Sci. of Spain.
Geology, S. America.

FROM THE ORDNANCE SURVEY COLOURED IN THE FIELD
 during the Years 1831-5



The figures on the map show the depth of the strata above the level of the sea in feet.



IDEAL SECTION—SURMISED RELATIONS OF VOLCANIC ROCKS TO SEDIMENTARY DEPOSITS

ORDER OF THE SEDIMENTARY DEPOSITS

Greenough’s riposte to Smith in the battle of the geological maps

9 GREENOUGH, George Bellas

A Physical and Geological Map of England and Wales By G.B. Greenough Esq. President of the Geological Society of London. At its Establishment and at subsequent periods: President of the Royal Geographical Society of London &c. First Edition No. 1st 1819. Second Edition Novr. 1st 1839. [together with]: Memoir of a Geological Map of England, to which is added, an Alphabetical Index to the Hills, and a List of the Hills Arranged according to counties. By George Bellas Greenough F.R.S.

Publication
London, Published by the Geological Society, 1839, and 1840.

Description
Large engraved map with fine contemporary hand colour, in four sections dissected and laid on linen, separate key dissected and mounted on linen, together with, 8vo., xi, 29pp., booklet, original brown paper wrappers, title to upper cover, all housed in original brown cloth slipcase, with manuscript label.

Dimensions
1950 by 1670mm (76.75 by 65.75 inches).

References
John Farey, Philosophical Magazine, 3 May 1815; G. L. Herries Davies, Whatever is Under the Earth: The Geological Society of London 1807-2007 (London: Geological Society of London, 2007); Simon Winchester, The Map That Changed the World: A Tale of Rocks, Ruin and Redemption (London: Penguin, 2002).

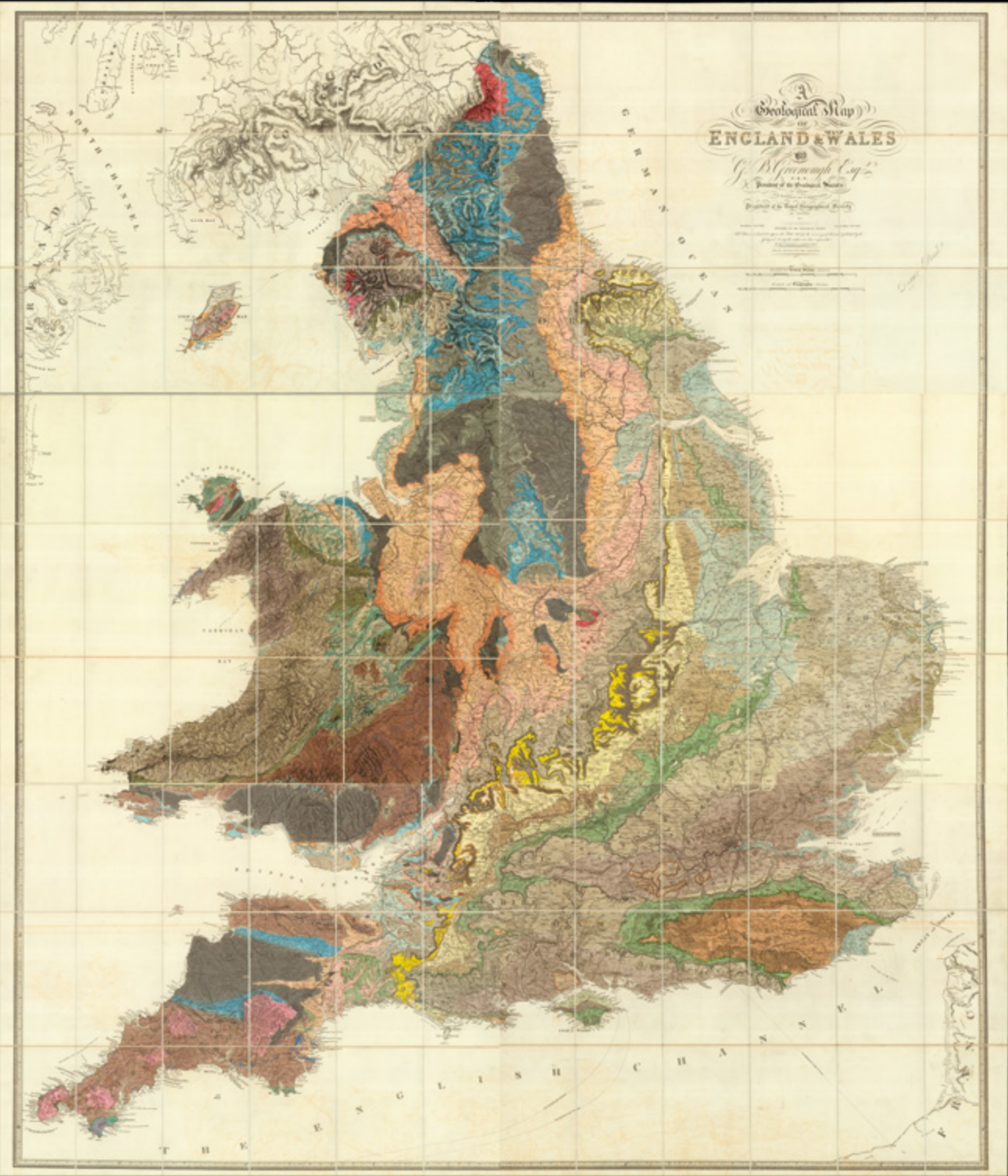
Second edition of George Bellas Greenough’s geological map of the United Kingdom, here with the rare Memoir (introduction) to accompany the map.

It was first published in 1819, four years after, and in response to, William Smith’s seminal map on the same subject, and a key milestone in the history of geology.

Greenough (1778-1855) was the first President of the Geological Society, and was later President of the Royal Geographical Society. The Geological Society was founded in 1807, but Smith never became a member, although his geological work that was the basis of the map was well underway by then. Greenough had actually been shown a copy of an early version of Smith’s map by the surveyor John Farey in 1802, who later attacked Greenough in the press for his “unhandsome conduct” in the matter (Philosophical Magazine). There were two reasons for this: personally, Smith probably could not afford the membership fee; and professionally, he advocated a method of differentiating between strata using the fossils in each layer. This theory went against the prevailing scientific method of inductive reasoning, and was viewed with suspicion by most of his contemporaries. Greenough and other Society members visited Smith to look at his collection of fossils and the progress of his stratigraphical map, and were unconvinced by Smith’s method, his claims to have done the field work for the map himself, and probably unimpressed by his plain lodgings (Herries Davies).

Greenough decided (as he claimed later) that Smith did not have the resources to complete the project and initiated the production of an official map on behalf of the Geological Society. Greenough’s map, with the financial backing of the Society, benefited from expert draughtsmanship and engraving, which Smith could not afford. Unlike Smith, however, Greenough did not conduct field work himself. Instead, he relied on the work of other geologists, including Smith - both he and the Society are on the list of subscribers to Smith’s map - creating much debate as to the extent to which his map is derived from Smith’s. It is clear that Greenough’s work drew on Smith’s method of delineating strata, and he does not credit Smith at all for this. There are, however, several stylistic differences between the two: Greenough uses a scale of six miles to the inch rather than five; retains the topography whereas Smith removes it; and uses flat areas of colour rather than the fading watercolour washes employed by Smith.

Greenough’s map, and its lack of fieldwork, was met with a scathing reception by some. The geologist Thomas Webster called it “so very defective and inaccurate that I was obliged to begin de novo” (Winchester). It sold, however, by virtue of being produced under the auspices of the Society and because it was cheaper than Smith’s work, which has been suggested as a deliberate ploy on Greenough’s part (Winchester). Greenough was forced to defend his actions later, arguing that the similarities between



Rare embossed geological map of England and Wales

10 DOBBS & Co

Dobbs & Co.'s Relievo Maps, Drawn & Engraved from the Highest Official Authorities. Geological Map of England & Wales. Arranged by permission from an Improved Index Map by R.I. Murchison Esqr. F.R.S. Resid[en]t of Geological Socie[ty].

Publication
London, Published by Dobbs & Co., 134 Fleet St. & 13 Soho Sqre. Sold also by D. Bogue Fleet St. and All Print and Mapsellers, [1843].

Description
Embossed geological map, fine original hand colour, table of geological strata upper left, table of English counties upper right, dissected and mounted on card and linen, varnished, some minor abrasions, library stamps, folding into original embossed red cloth covers, title in gilt to upper cover, spine split.

Dimensions
545 by 450mm (21.5 by 17.75 inches).

References
BL Cartographic Items Maps R.M.87.

The map's geological information is based upon Roderick Impey Murchison's map of 1843. However, the present map's innovation is in representing elevation above sea level with the use of embossing. In order to ascertain the approximate heights above sea level, a "Vertical Scale" key, has been added below the list of English and Welsh counties. The key depicts cross sections of mountain ranges from under 700 feet to between 2800-3500 feet above sea level.

The map is cited in the, LR 8 Geological Societies Archives 84 - Secretaries' Letterbooks, No.22: "Dobbs & Co 1843 June 20 London, present relievo map."

Dobbs & Co was founded by H. Dobbs in 1803 and had, by the middle of the nineteenth century, become one of the leading manufacturers of embossed, ornamental and illustrated cards, writing paper envelopes and valentines. Later the company became known as Dobbs, Bailey and Co. and Dobbs, Kidd and Co.

We are only able to trace one institutional example of the map; that in the British Library.

Provenance
Library stamps from Kensington and Camberwell Libraries.



Knipe’s detailed geological map of the British Isles with part of France

11 KNIFE, J[ames] A[lexander]

Geological Map of the British Isles and Part of France. Rivers and Canals, Railways and Principal Roads, and Sites of the Minerals. Under the Patronage of Prince Albert, to whom This Map is by express Permission Humbly Dedicated.

Publication
London, Published for the Proprietor by H. Baillière, 219 Regent St and Mess.rs Grant & Griffith St Pauls Churchyard (Late Harris), 1845.

Description
Engraved map, dissected and mounted on linen, fine original hand colour, edged in green silk, folding into blue morocco slipcase, with Prince Albert’s coat-of-arms and title on the upper cover, gilt.

Dimensions
1575 by 1300mm (62 by 51.25 inches).

One of the first geological maps of the British Isles on a uniform scale and key.

The map provides a wealth of geological information supplied by the extensive index and notes located at the bottom left-corner. Knipe has also included a number of cross-sections from various locations in France and the British Isles on the map: ‘Section from London to Essex’, ‘From Hindhead to Tucksbury Hill’, ‘From Roundhill near Bath to Charhill Hill near Calne’, ‘Bristol coalfield’, ‘From Brown Clee Hill to Caer Caradoc’, ‘From the Black Mountains to the River Towy’, ‘From Wellington Heath to Malvern Hills’, ‘Carboniferous Limestone series in North of Ireland’, ‘County of Donegal’, ‘Isle of Arran’, all of which are illustrated in vivid colour, showing the soil and rock strata. Next to these are two in-depth examinations of the rock and soil layer beneath the cities of London and Paris.

In the bottom left-hand corner, there is a geological table, “with the Nomenclature of Systems and Formations in English, German and French”, and also a key of symbols and mineral signs.

James Alexander Knipe (1803-1882) career as a geologist and publisher of geological maps, spanned 46 years from 1835-1881. He was during that time, “with the exception of the Geological Survey... the most prolific geological map publisher of mid-nineteenth century Britain.” (Toland). He also produced numerous engravings and reports for the recently formed British Association for the Advancement of Science. Between 1835, and 1858, Knipe produced three of his most important geological maps, which were hugely popular with the new learned middle class: A Geological Map of England and Wales (item 7); Geological Map of the British Isles the present map; and a Geological Map of Scotland (item 16).

The map was first published by Knipe in 1843 with 24 different issues between 1843 and 1880; with two editions: 1843-1851, and 1852-1880. The present map is the third issue of the first edition, printed in 1845.



From states to statistics

12 MINARD, Charles Joseph

[Statistical Maps].

Publication
[Paris, Charles Minard, 1844-1866].

Description
A collection of 46 lithographed maps, 23 of which are inscribed by Charles Minard, with a further 14 signed by Minard; and five publications, three of which are inscribed by Minard.

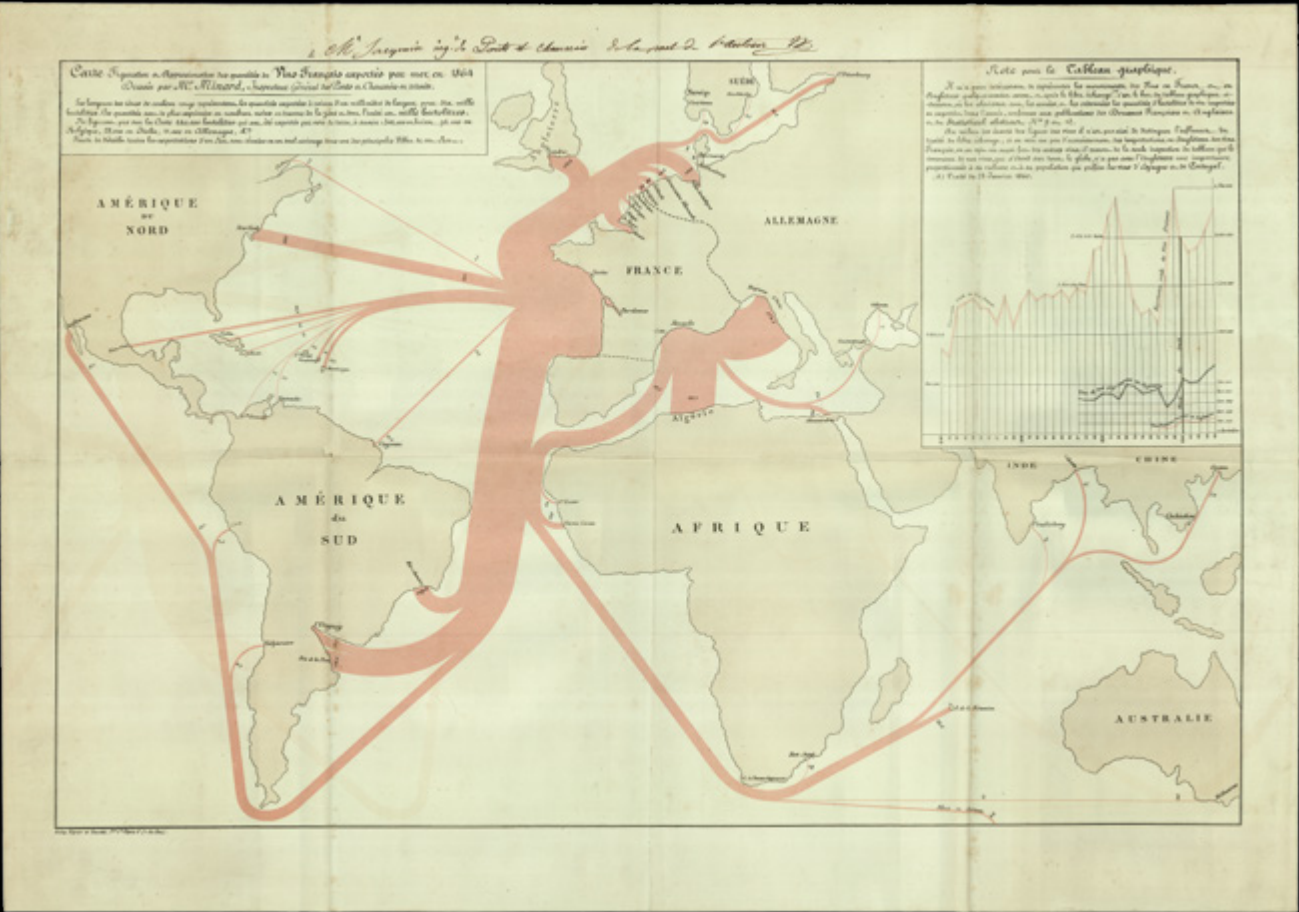
References
Michael Friendly, 'Revisions of Minard', Statistical and Computing Graphics Newsletter 11 (1999); Michael Friendly, 'The Graphic Works of Charles Joseph Minard' at <http://euclid.psych.yorku.ca/datavis/gallery/minbib.php>; Arthur H. Robinson, 'The Thematic Maps of Charles Joseph Minard', Imago Mundi 21 (1967), pp. 95-108; Edward Tufte, The Visual Display of Quantitative Information, (Graphics, 2001).

A comprehensive collection of 60 works by Charles Joseph Minard, pioneer of statistical cartography, comprising 43 of his 71 known works, including the exceedingly rare map of the Russian campaign of Napoleon Bonaparte and Hannibal’s march across the Alps.

Charles Joseph Minard (1781-1870) was “a true pioneer in thematic cartography and in statistical graphics” (Friendly, Revisions). He began as a civil engineer, and by 1810 was working on behalf of the French government in Antwerp and Vlissingen. Minard went on to have a long and productive career, working on projects throughout Europe, and was named Superintendent of the École des Ponts et Chaussées, the School of Bridges and Roads, in France in 1830. Six years later, he became Inspector of the Corps of Bridges. In 1851, he took mandatory retirement, although still working in an advisory capacity, and undertook private research. This is when his cartographical career began in earnest.

Minard’s genius lay in his realisation that maps could provide visually clear renditions of complicated statistics. He wrote that the aim of his work was not to convey statistical results, but to show the relations between them, which would otherwise have to be worked out by the reader. He would often alter geographical reality on a map in order to make a diagram clearer, and so added the term “approximative” to the title of his works to explain his decision. He was possibly the first to use the flow-map technique (his writing indicates that he believed he had invented it) and he was certainly the first to use pie charts on a map.

The importance of Minard’s work was quickly recognised by the French government. He was awarded the Legion d’Honneur, and throughout the 1850s all Ministers of Public Works in France had their portrait painted with a Minard chart in the background. In 1861, his work was presented to Napoleon III. Minard’s maps were not widely known in his lifetime outside of the intelligentsia and upper levels of government, suggesting that he published them privately (Robinson).



The collection

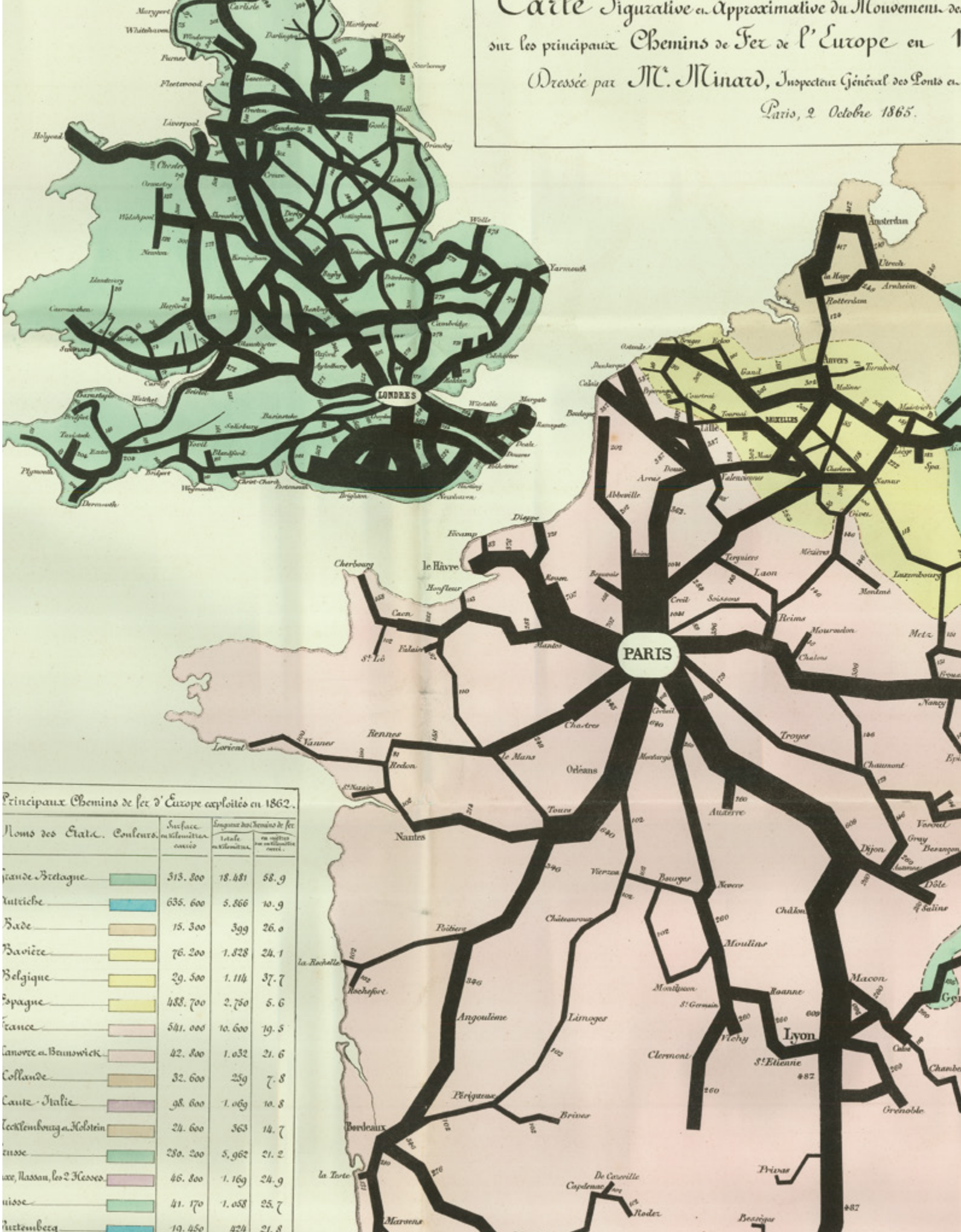
The collection comprises some 41 separately-issued maps and charts and five publications (containing a further 14 maps and charts) by Minard. Most are either signed by him or inscribed to Francois Jacqmin. According to the bibliography of Minard compiled by Michael Friendly, there are 71 known works by Minard; 43 are in this collection. As Minard most likely published his works privately or in journals with limited circulation, and appeared to have often given them personally to friends and colleagues, their print runs are correspondingly small. Whilst individual maps by Minard do appear on the market from time to time, a collection of this size is unusual, and is matched in institutional terms only by the École Nationale des Ponts et Chaussées, Minard's former employer. The Bibliothèque Nationale de France holds only 17 works by Minard. The collection also contains Minard's maps of the military campaigns of Napoleon Bonaparte and Hannibal, which are extremely rare.

Maps in the collection

The majority of the maps in the collection display commercial information. There are 13 showing the movement of various goods by canal and railway within France. The growing importance of the railway, and its place in the rise of industry, is also shown in the three maps concerned with the volume of rail passengers on various routes and the number of people already using public coaches along the route of a proposed rail line.

There are also maps devoted to specific exports. There are five maps showing the international and European cotton trade; three showing the coal trade; a map of French wine exports; and a map of the transport of animals to Paris.

Two of the three coal maps are of British coal exports in 1850 and 1864. The 1864 map shows that the majority of coal was shipped to western Europe, followed by Russia, the Ottoman Empire and South America. Interestingly, Malta, Singapore, and Cuba imported large amounts of coal relative to their size, the Caribbean imported more coal than the rest of North America combined. These areas were European colonies, demonstrating continued colonial investment. Minard also included a graph in the upper right-hand corner of the map, showing British coal production between 1850 and 1864. Production almost doubled in that period, but the most interesting aspect is that less than 10% of British coal was ever exported, showing the dependence of Britain's industrial domination on coal.



The animal transport map demonstrates the growing importance of the railway system. The French rail network has been reconfigured so the thickness of each route represents the quantity of livestock imported to Paris, colour coded for cows, calves, pigs, and sheep. There is a small inset map showing beef imports to Paris in 1828 and 1862. Both reflect a strong demand for beef in the capital.

The collection also includes two population density maps of Spain and Paris. With the latter, Minard was proposing a solution to a question of location for a new central post office in the city in 1867. The map shows Paris divided into arrondissements, each with a black square proportional to their population. The post office should be built at the centre of population density in order to benefit the maximum number of people: the small white dot in the square on the right bank of the Seine marks his proposed location.

Collection highlights

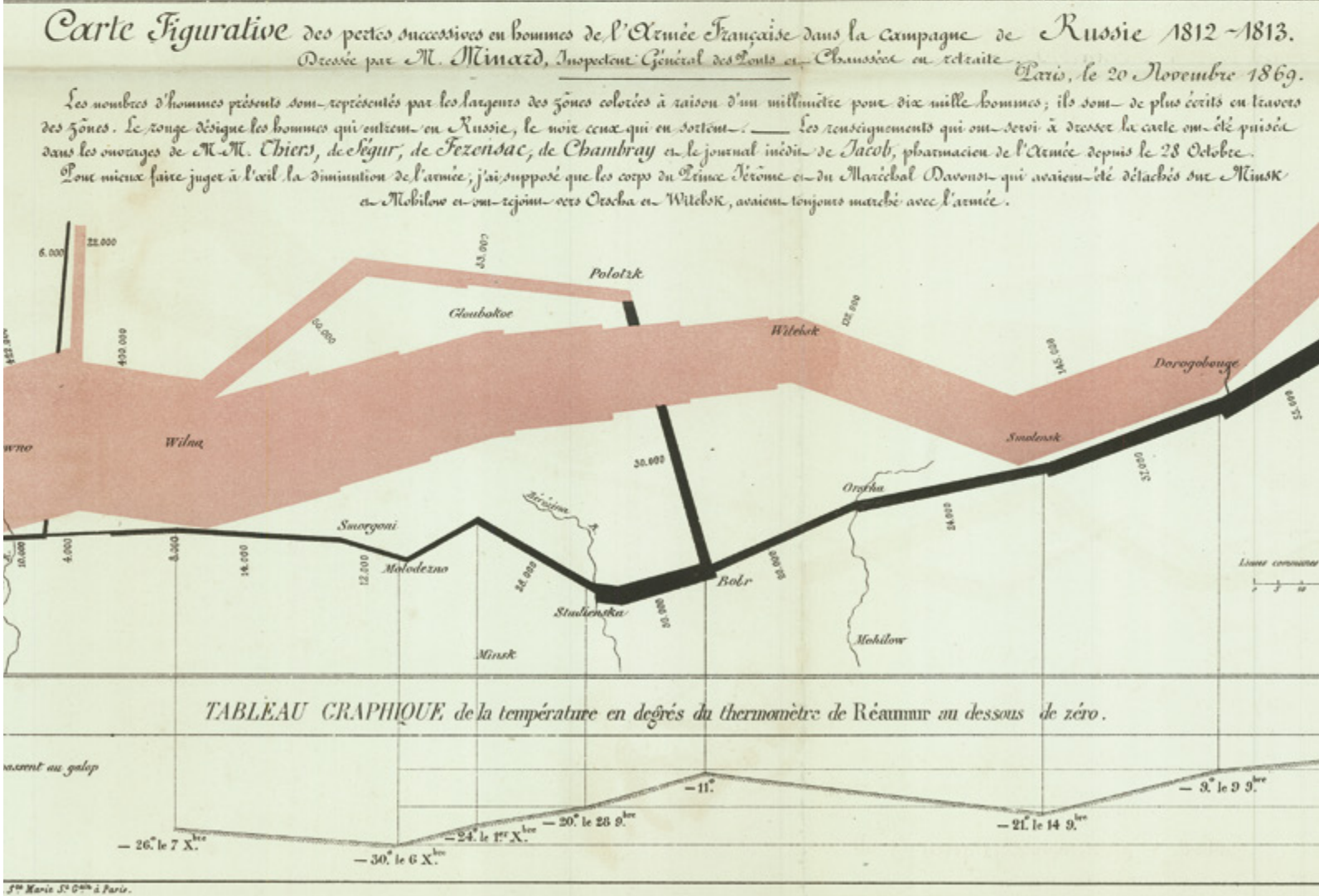
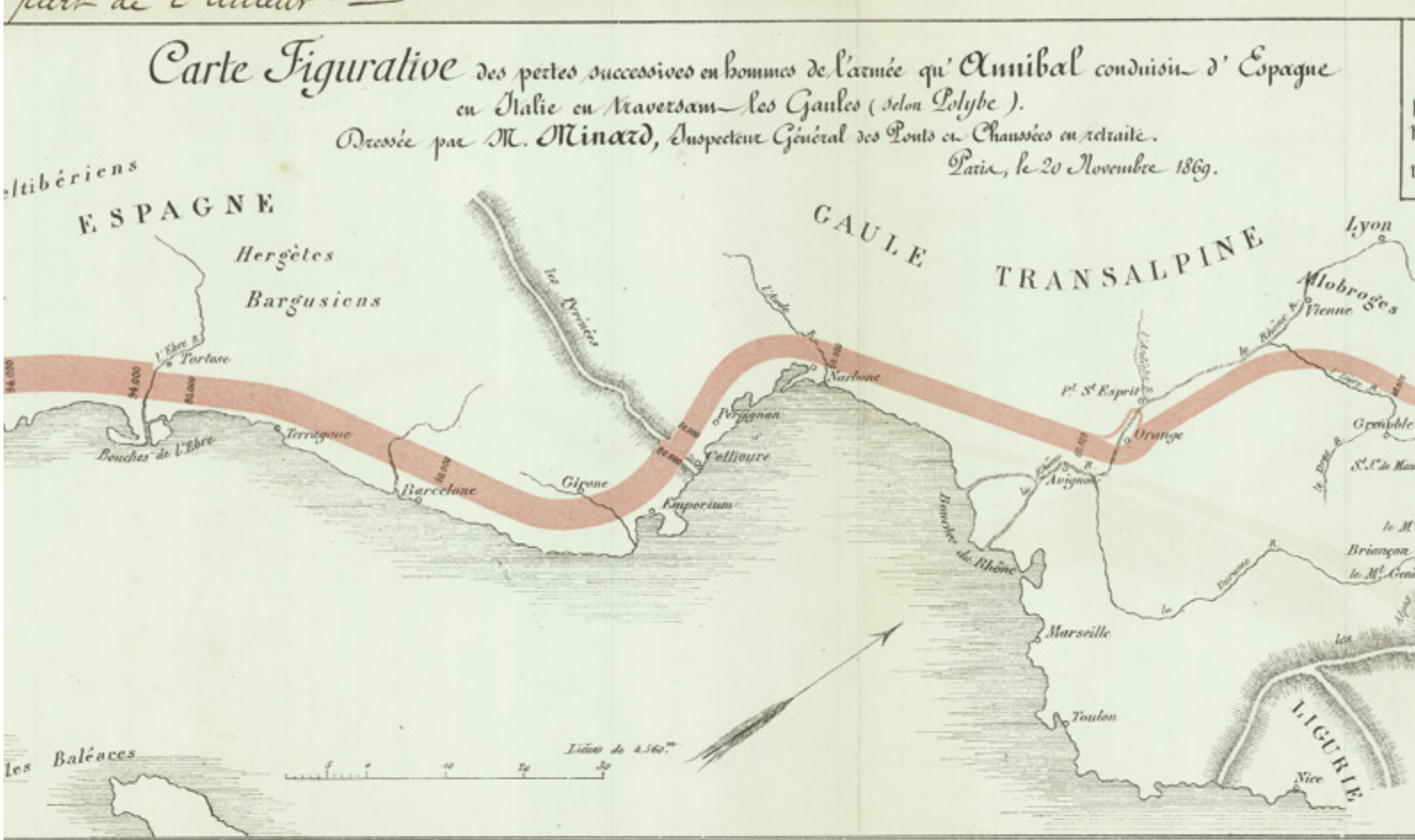
Napoleon and Hannibal

The most famous of Minard's works, these two maps on a single sheet show two doomed campaigns by a pair of the greatest military leaders in history, Napoleon Bonaparte and Hannibal.

The lower map is perhaps the best known of Minard's works, showing the invasion of Russia by Napoleon Bonaparte: it has been called "the best statistical graphic ever drawn" (Tufte). Bonaparte had successfully subdued much of mainland Europe, but faced resistance from the British. He planned to enforce a trade embargo against them to weaken Britain before an attempted invasion. Tsar Alexander I refused to stop trading with Britain through proxies, and Bonaparte formed an army to invade Russia and force his compliance, although the supposed aim of the war was to liberate Poland. The Russian army tactically retreated, evacuating cities along the route of the French army and destroying supplies. The French troops were ill prepared for a Russian winter and succumbed to lack of food, disease and harsh weather. Bonaparte was forced to retreat in December.

Minard gives the original force setting out from Poland as 422,000 men; only 100,000 reached Moscow and only 10,000 returned.

The map is notable not only for the devastating clarity with which it shows the cost of the campaign, but also for the fact that it conveys six types of information: geography, time, temperature, the course and direction of the army's movement, and the number of troops remaining. The widths of the gold (outward) and black (returning) paths represent the size of the force, with a scale of one millimetre to 10,000 men.



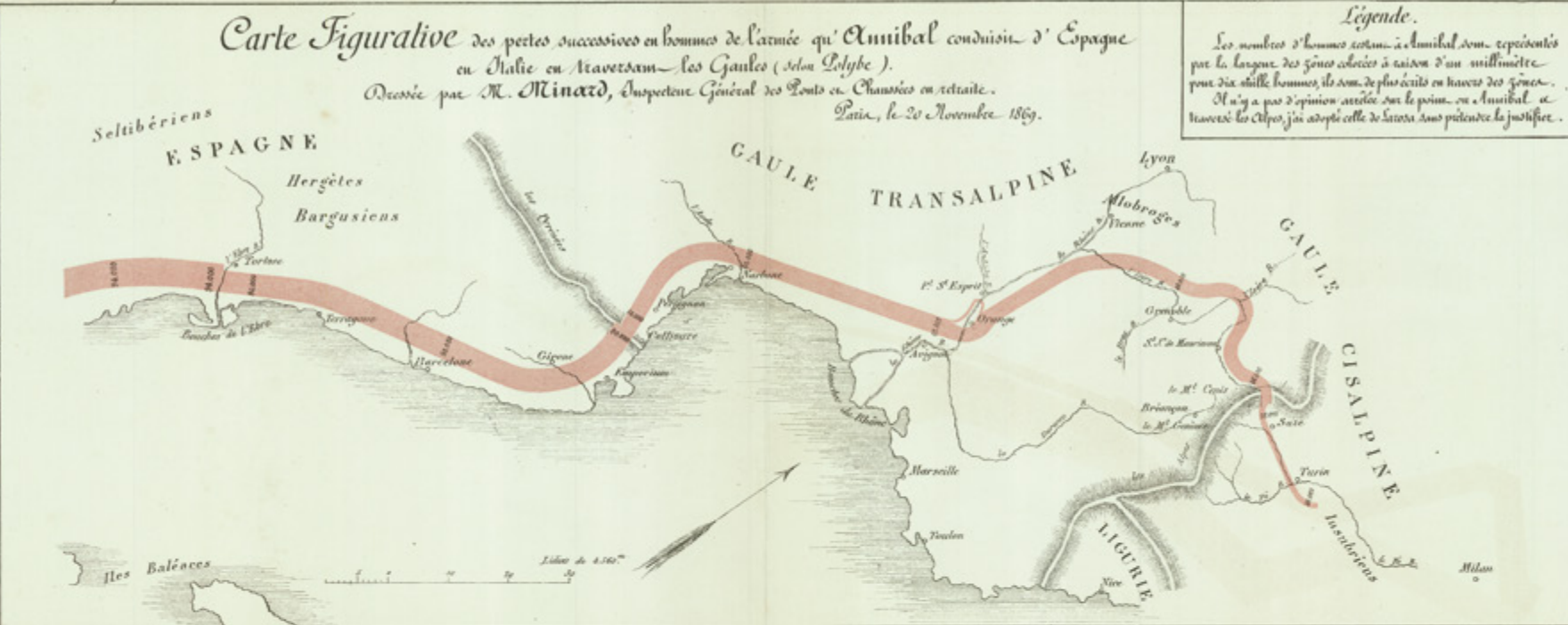
De la part de l'Auteur 125

Carte Figurative des pertes successives en hommes de l'armée qu'Annibal conduisit d'Espagne en Italie en traversant les Gaules (selon Polybe).

Dessiné par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite.
Paris, le 20 Novembre 1869.

Légende.

Les nombres d'hommes restants à Annibal sont représentés par la largeur des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en traces des zones. Le rouge désigne les hommes qui restèrent en Italie, le noir ceux qui en sortirent. Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Tiers, de Ségur, de Fozzard, de Chambray et le journal inédit de Juba, pharmacien de l'armée depuis le 28 Octobre. Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que le corps du Prince Néron ou du Maréchal Davoust qui avaient été détachés sur le Rhin et rejoignirent les Carthagois à Wisbeck, avaient toujours marché avec l'armée.



Carte Figurative des pertes successives en hommes de l'Armée Française dans la Campagne de Russie 1812-1813.

Dessiné par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite. Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par la largeur des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en traces des zones. Le rouge désigne les hommes qui restèrent en Russie, le noir ceux qui en sortirent. Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Tiers, de Ségur, de Fozzard, de Chambray et le journal inédit de Juba, pharmacien de l'armée depuis le 28 Octobre. Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que le corps du Prince Néron ou du Maréchal Davoust qui avaient été détachés sur le Rhin et rejoignirent les Carthagois à Wisbeck, avaient toujours marché avec l'armée.

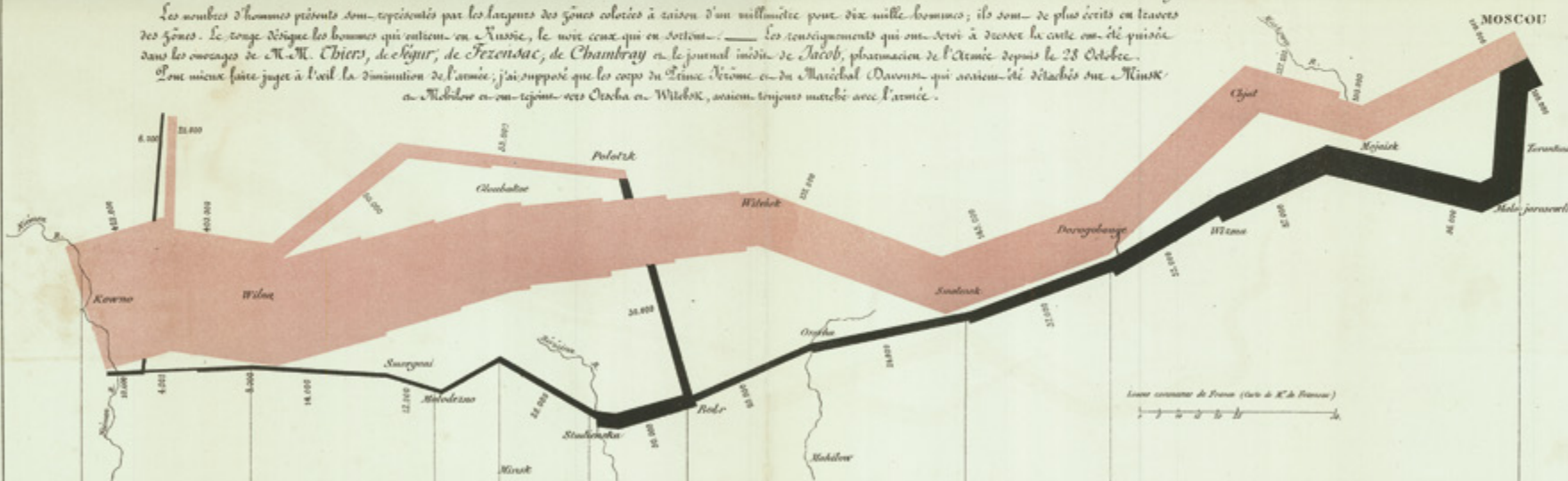
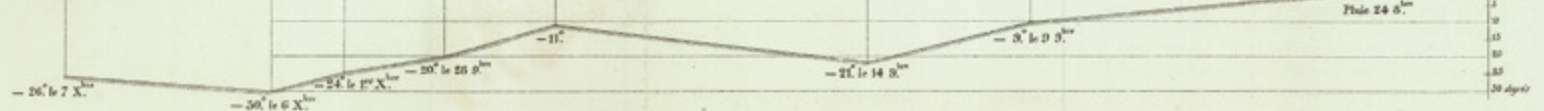


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.

Les Carthagois passent au gèle le Nilous, gèle.

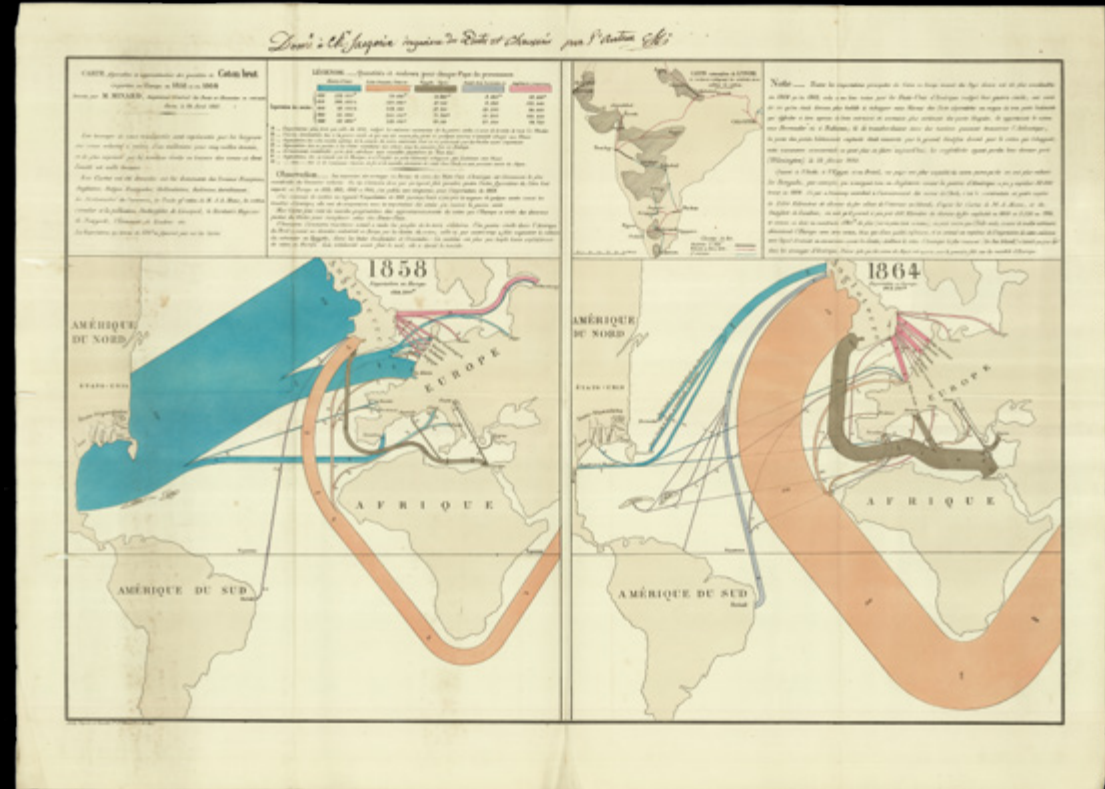
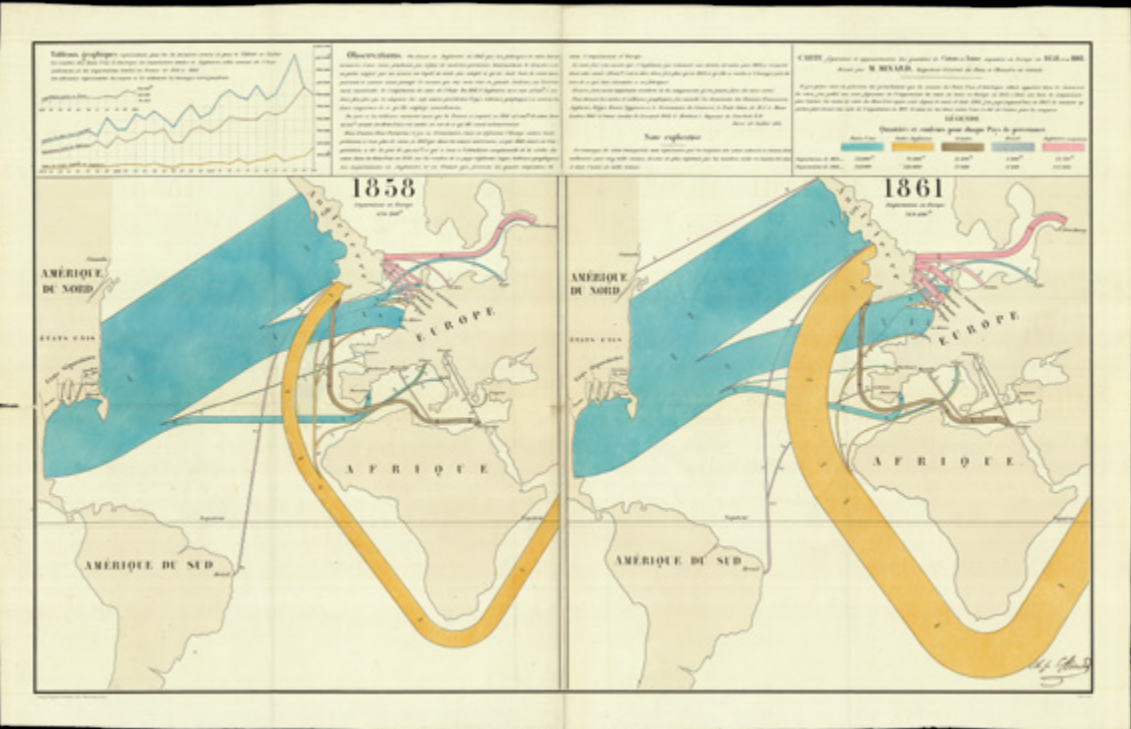


The upper map shows Hannibal's march through the Alps from Spain to Italy. Hannibal became the chief commander of the Carthaginian armies during the Second Punic War (218-201BC), the second major war between Carthage and the Roman Republic. His father, Hamilcar, had aimed to conquer the Iberian peninsula and Hannibal was determined to complete his father's work. After conflict with Roman interests in the area, Hannibal decided to attack Rome directly. Although the route over the Alps was treacherous, it would avoid Roman garrisons and he had no navy. It was tactically brilliant, but practically difficult. Minard gives the original strength of Hannibal's army as 94,000 men, dropping to 60,000 after passing through the Pyrenees and again to 25,000 after passing through the Alps. Minard drew on the works of the Greek historian Polybius, the only contemporary source for Hannibal's exploits, and Jean-Louis Larauza, author of 'Histoire critique du passage des Alpes par Annibal', who tried to ascertain the exact path taken by Hannibal's army. This was and is a source of some uncertainty, as shown by Minard's note on the map, which explains that he has chosen Larosa as the point at which Hannibal crosses the Alps because "there is no final opinion on that point".

The effects of the American Civil War

The map entitled 'Carte... des quantités de coton en laine importés en Europe en 1858 et 1861' shows two flow-maps of the Atlantic trade in wool and cotton, three years apart. The time period covers the beginning of the American Civil War, which was sparked by the slavery policies of the Lincoln presidency. By January 1861, seven of the southern states had seceded to form the Confederacy. The war between the Confederacy and the states who remained in the Union lasted until 1865, and had a devastating effect on American exports. The seven separatist states are marked on both maps. The Confederacy attempted to use 'cotton diplomacy', cutting off the cotton supply to force European powers to intervene in the war to save their domestic industries. In 1861, the Union had not yet implemented its wartime blockade of the South, and cotton and wool could still be exported, but Britain and other major customers were worried about the stability of the American supply, investing heavily in production in South Asia.

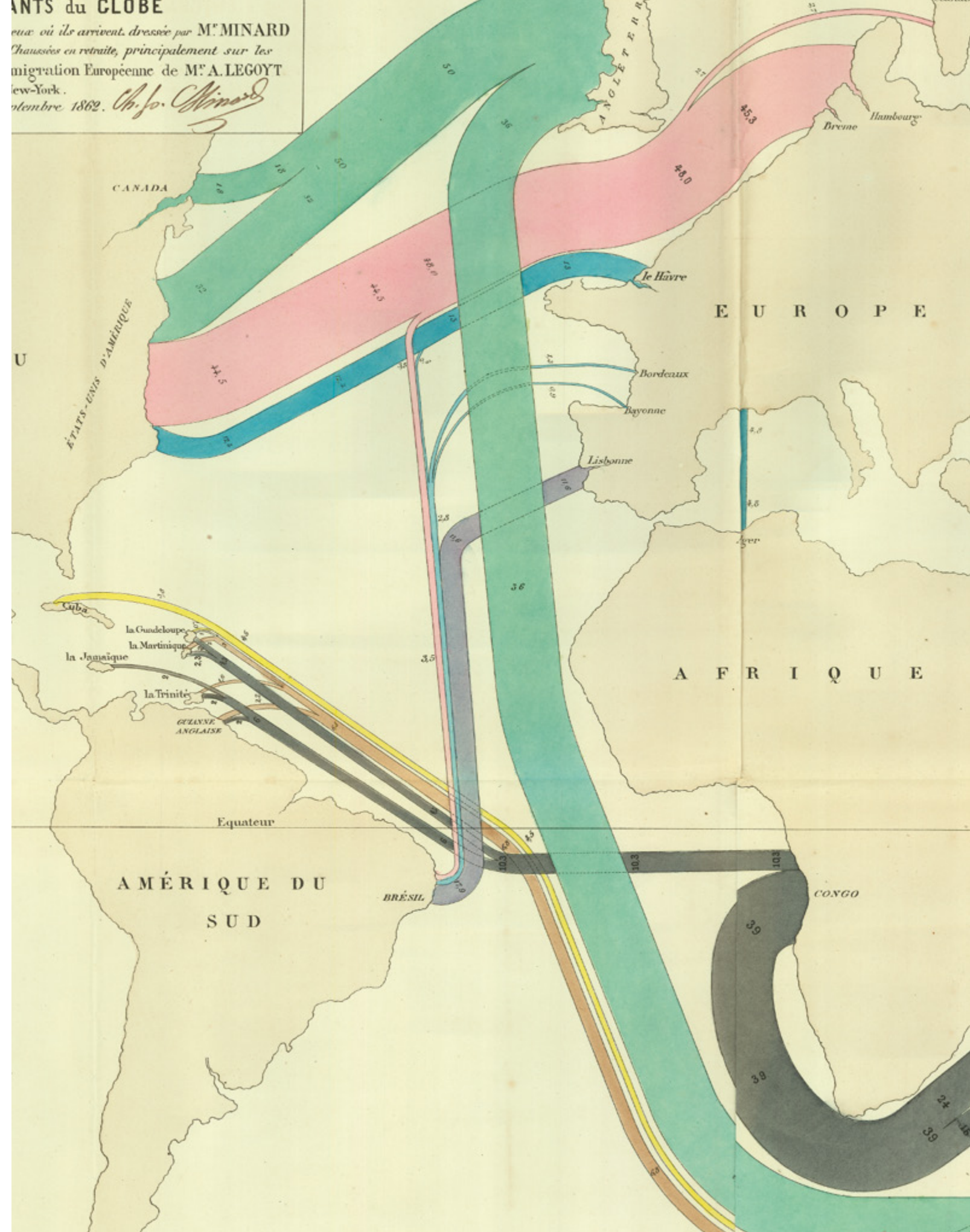
A line graph in the upper right corner shows the yearly export amounts of wool and cotton for America (blue). There is a sharp drop in exports from 1860, when the issues provoking the Civil War came to prominence. Comparing the two maps gives an even clearer picture of the change; by 1861 the amount of cotton and wool imported into Britain from the East Indies (yellow) had almost tripled, whereas the amount imported from America (blue) had only risen by a paltry 16,000 tons. Britain was then re-exporting the excess to other European countries (pink), at a rate three times higher than before the start of the Civil War.



The aftermath of the war is shown by ‘Carte... des quantités de coton brut importées en europe en 1858, en 1864 et en 1865’, which has maps for each of the title years. The Civil War ended and the United States restarted cotton exports in earnest in 1865. The map shows, however, that although European cotton imports had not recovered to pre-war levels by 1865 (530,600 as opposed to 634,200 tonnes), the market had moved to fill the gap left by the United States, using material from Egypt and India.

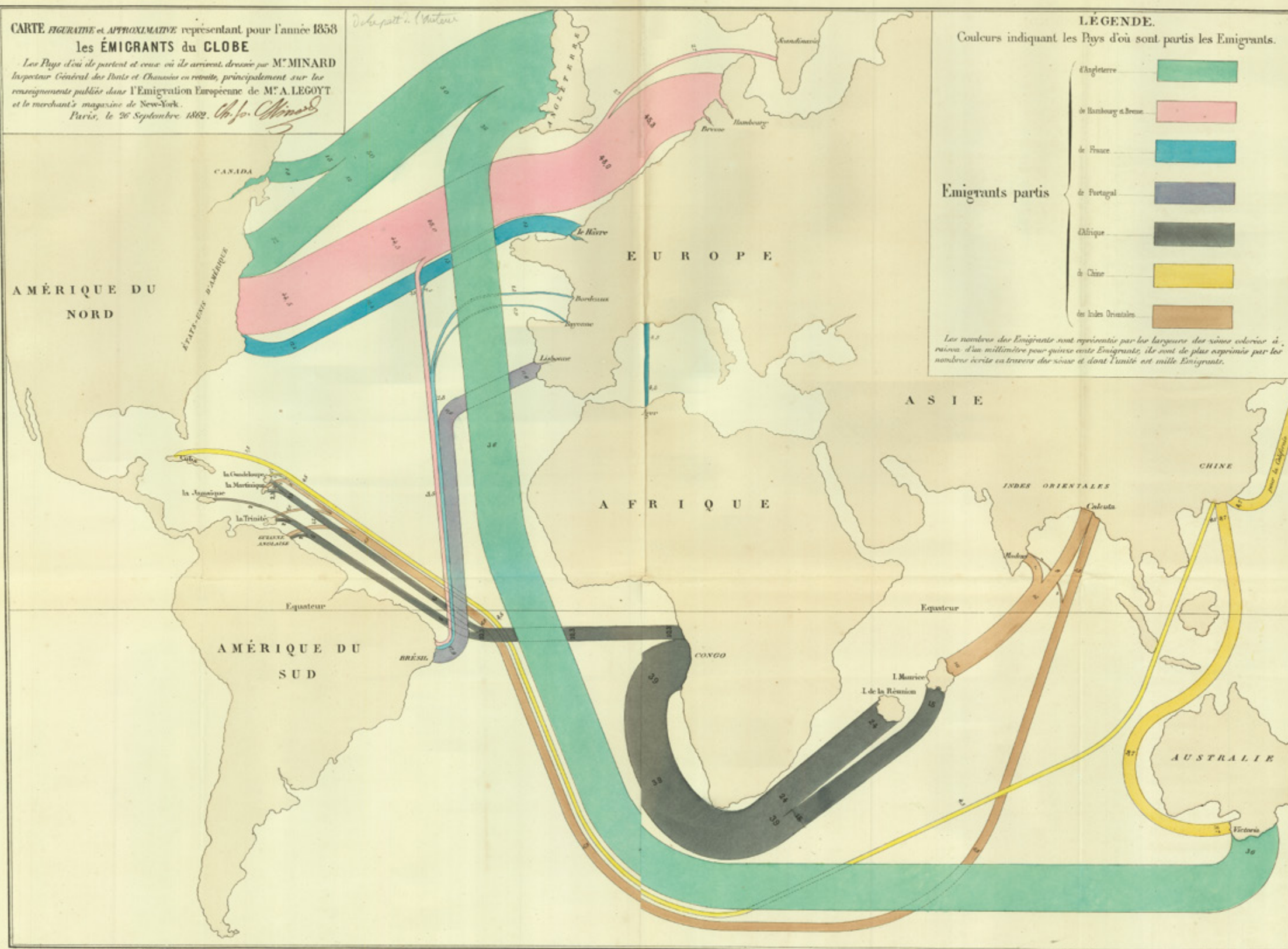
The map entitled 'Carte... représentant pour l'année 1858 les émigrants du globe' shows global emigration in 1858. It highlights an interesting demographic period after the abolition of slavery in Britain (1838) and France (1848), creating a dearth of workers in European colonies. The black lines coming out of Congo to Mauritius and La Reunion show the passage of workers from Africa to work on the sugar plantations owned by the French. The brown lines show the influx of indentured labourers from French settlements in India, to fill the void created by the end of slavery. A substantial number of African and Indian migrants also make their way to the West Indies. The small blue line across the Mediterranean shows French migration to Algeria, one of its richest colonies.

China became an important source of labour in the mid-nineteenth century. The southern areas of the country suffered from political and economic instability, thanks to the weakness of the ruling Qing dynasty and the ongoing Opium Wars with the British. Chinese immigration to Cuba began in 1847 after the abolition of slavery; the Spanish replaced



CARTE FIGURATIVE et APPROXIMATIVE représentant pour l'année 1853
les ÉMIGRANTS du GLOBE

Les Pays d'où ils partent et ceux où ils arrivent, dressée par M. MINARD
Inspecteur Général des Ponts et Chaussées en retraite, principalement sur les
renseignements publiés dans l'Emigration Européenne de M. A. LEGOYT
et le marchand's magazine de New-York.
Paris, le 26 Septembre 1862. *Ch. J. Minard*



African slaves with Chinese indentured labour. Similarly, Chinese workers were often shipped under contract by agents to California during the Gold Rush, where they faced harsh working conditions and routine violence. The Chinese population in Australia, also spurred by the Gold Rush, grew large enough for the government to initiate anti-Chinese legislation.

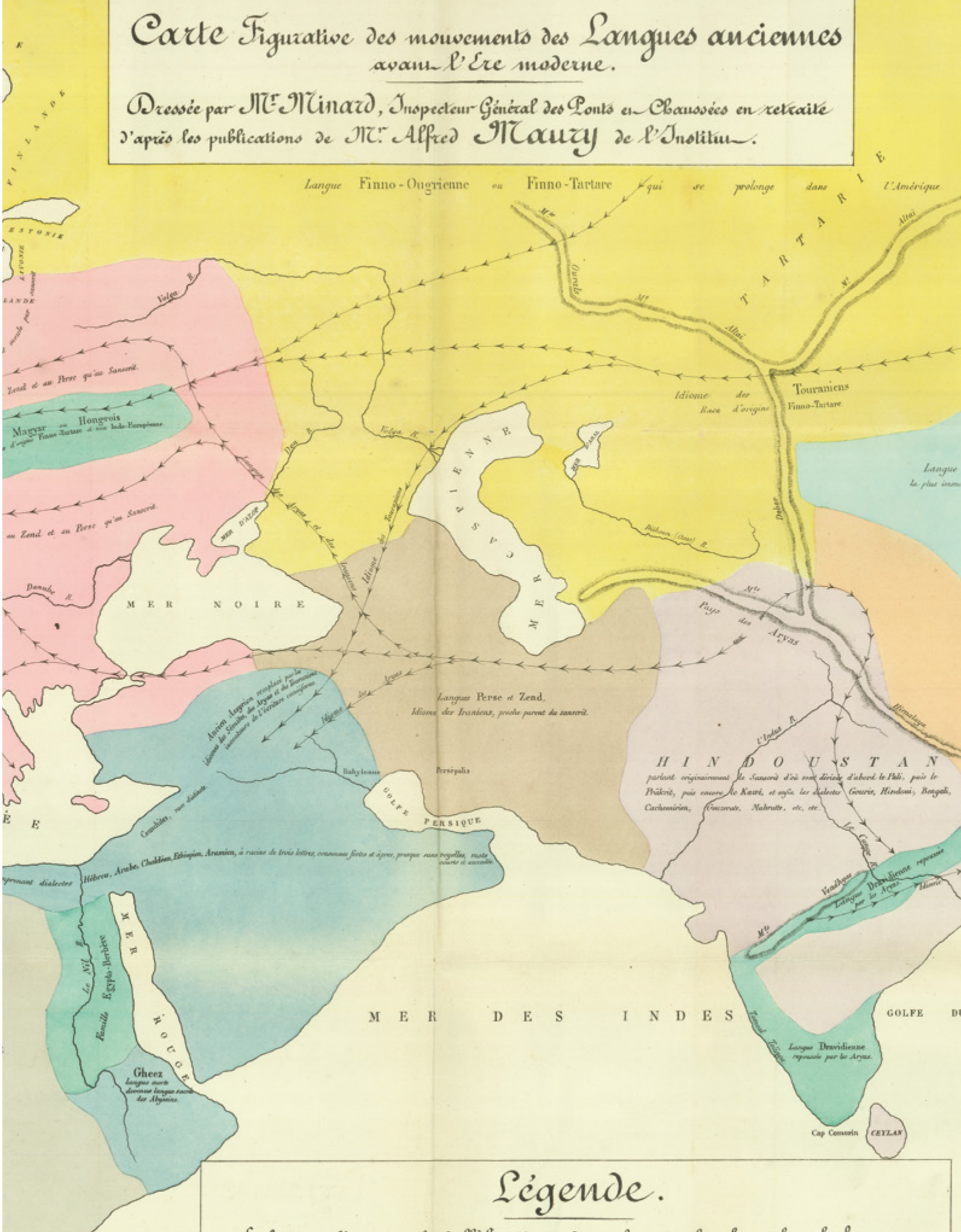
The spread of language

‘Carte figurative des mouvements des langues anciennes avant l’ère moderne’ shows the spread of ancient languages across the world. According to the note at the lower left corner, Minard based his map on an article by Louis Ferdinand Alfred Maury (1817-1892), a scholar specialising in archaeology and ancient languages, who served as director-general of the Imperial Archives, and librarian at the Tuileries.

The map shows the migrations of ancient peoples and consequently their languages. The areas are colour coded accorded to language family, with arrow lines showing their movement, annotated with further information. Minard notes, for example, that Chinese is “monosyllabique, intonation chantante” - monosyllabic with a singing intonation.

Provenance

François Prosper Jacqmin (1820-1889). Jacqmin was a railway engineer and worked for the Paris and Eastern Railway Companies, eventually becoming a professor at the École des Ponts et Chaussées in 1864. He received the Légion d’Honneur in 1874.



Presentation copy of Jules Marcou’s geological map of the United States

13 MARCOU, Jules

A Geological Map of the United States and the British Provinces of North America; with an explanatory text, geological sections, and plates of the fossils which characterize the formations.

Publication
Boston, Gould & Lincoln, 1853.

Description
8vo. (225 by 150mm) title, large engraved folding map, showing the geological make-up of the eastern United States, eight plates of fossils, old paper repair to map, ownership inscription to front free endpaper, blind stamped maroon cloth, title in gilt to spine.

Dimensions
620 by 820mm (24.5 by 32.25 inches).

The first geological map of the United States to stretch beyond the Mississippi as far as the Rocky Mountains.

Jules Marcou (1824-1898) was a French geologist, who spent the majority of his working life in the United States. Marcou first travelled to the States in 1847, under the direction of the Jardin des Plantes, in order to study the geology of the country. In the following year, he joined Louis Agassiz, professor of geology at Harvard, and accompanied him to the Lake Superior region, visiting the copper mines of the Keweenaw Peninsula, Lake Huron, and Niagara. After six months, he returned to Cambridge, Massachusetts, and sent minerals he had collected to Paris. In January 1849 Marcou directed his attention to the geology of New Jersey, Pennsylvania, and Virginia. Later he crossed the Allegheny Mountains, visiting the Mammoth Cave and other localities, and then traversed Canada. The results of his endeavours were published in the present work.

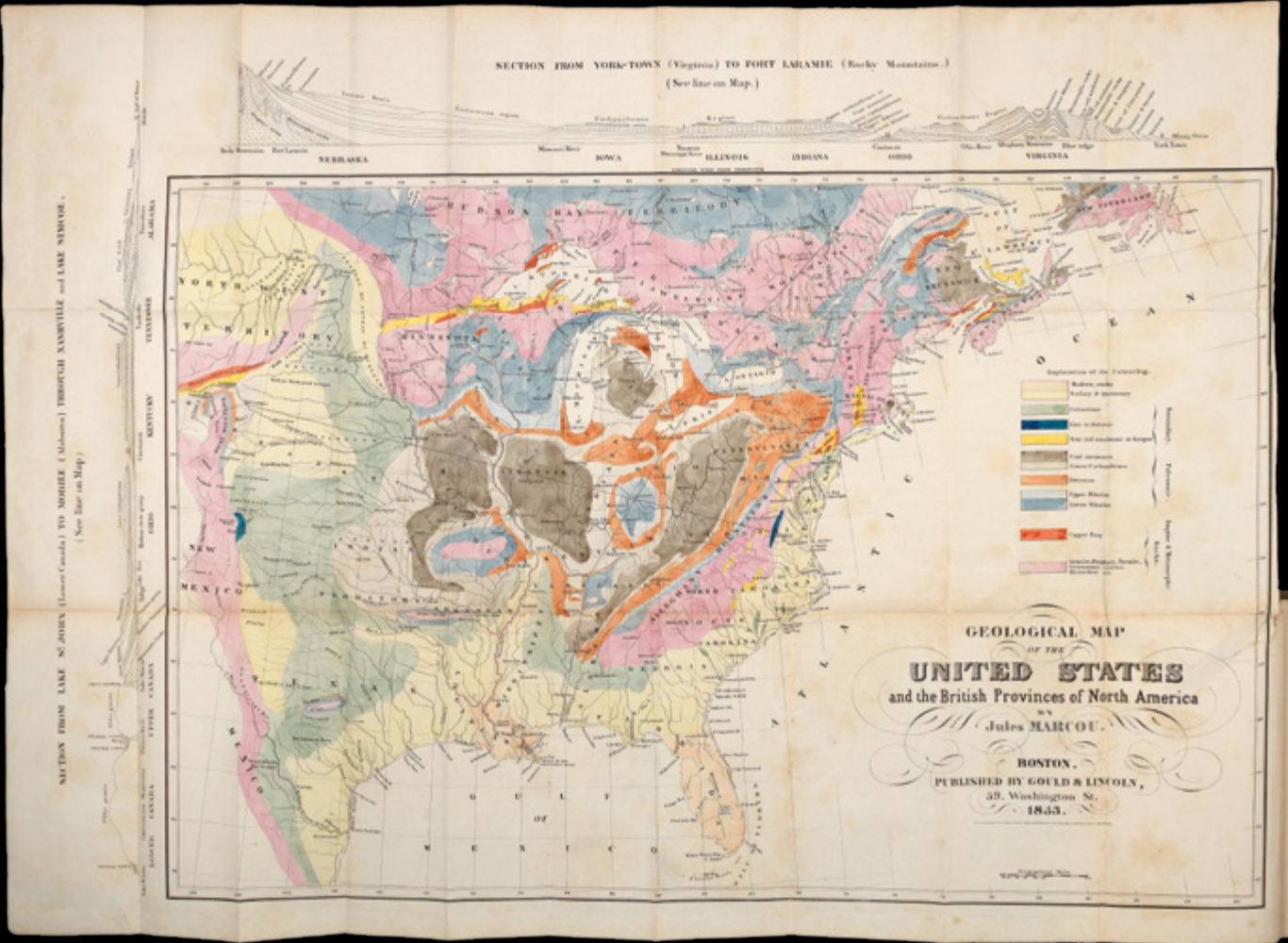
The work is dedicated to Louis Agassiz, and for the first time sets out the distribution of the strata, according to the nomenclature of Murchison (item 8) and de Verneuil, into lower and upper Silurian and Devonian. In this respect, the work is an important step in linking the latest geological work in the Old World and applying it to the New, something that Marcou would continue to do for the rest of his career. To the back of the work are eight plates of fossils sorted into their stratification.

The geological map extends, for the first time, beyond the Mississippi as far as the Rocky Mountains. The present example is finely coloured, as one would expect from a presentation copy, and clearly marks the 12 different strata listed in the key. To the left and above the map are two geological sections: the first stretches north to south from Lake St John, Canada, to Mobile, Alabama, through Nashville and Lake Simcoe; the second east to west from York Town Virginia to Fort Laramie at the foot of the Rocky Mountains.

Marcou would continue his exploration of North America, and in 1853 was the first geologist to traverse the continent. He would later become the head of the newly formed Museum of Comparative Zoology in 1861, subsequently heading the palaeontological division from 1861 to 1864. He is also credited with publishing, with his son, the first extensive carto-bibliography of the geology of the New World: ‘Mapoteca Geologica Americana’ (1884).

We are unable to trace another example complete with the memoir appearing at auction in the last 60 years.

Provenance
Inscribed by the author to Edouard de Verneuil (1805-1873), French palaeontologist and president of the Société géologique de France. Verneuil paid a visit to the United States to study the history of the palaeozoic rocks in the mid 1840s.



John Snow’s seminal work containing his cholera map

14 SNOW, John

On the Mode of Communication of Cholera.

Publication
London, John Churchill, 1855.

Description
8vo. (225 by 142 mm), two large folding lithographed maps by C. F. Cheffins, the second printed in three colours, letterpress tables, 16pp. publisher’s catalogue at end, small crease and tiny clean tear to edge of first folding map, occasional light spotting, light soiling on title, original blind-stamped ripple-grain plum cloth, Edmonds & Remnants binders’ ticket, lacking front free endpaper.

References
“John Snow”, Dictionary of Scientific Biography, (New York: Scribner, 1970); Diana H. Hook and Jeremy M. Norman, The Haskell F. Norman Library of Science and Medicine, (Jeremy Norman & Company, 1991), 1969; Hans Sallander, Bibliotheca Walleriana: the books illustrating the history of medicine and science collected by Dr. Erik Waller, and bequeathed to the Library of the Royal University of Uppsala; a catalogue (Stockholm, 1955) 9036;

The text contains the substance of all of Snow’s articles published since the first edition of 1849, “together with much new matter” (Preface, p. iii), making this essentially a new work. Within the work Snow provides detailed historical and statistical evidence for his conviction that cholera is a contagious disease that attacks the alimentary canal and is communicated primarily through contaminated water. His examination of the patterns of infection of the London epidemics, correlated with a survey of the water sources in each neighbourhood, was particularly conclusive.

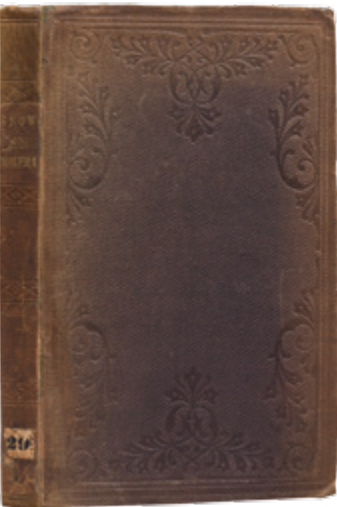
“In the great London epidemic of 1854, Snow’s genius as an epidemiologist and statistician reached fruition. By meticulous survey he established [in the present work] that the areas supplied by water from the Southwark and Vauxhall Water Company, obtained from the fecal-contaminated Thames, were infected nine times more fatally than the areas supplied by the Lambeth Company, which supplied water from an upstream source. Even more dramatic was the affair of the Broad Street pump [first described here], which he showed by careful plotting to be in the centre of a cholera outbreak in his own parish of Soho. Within a few hundred yards of this pump, some 500 fatal cases occurred in ten days. Snow found that a sewer pipe passed within a few feet of the well, and his belief that contaminated water was the source of infection was vindicated when he persuaded the parish councillors to remove the pump handle” (DSB), resulting in a dramatic drop in the number of cholera cases. Thirty years before Koch’s discovery of the cholera vibrio, Snow reasoned that the disease was propagated by a living organism, and recommended hygienic precautions such as boiling water of suspicious origin, washing the hands frequently, and decontaminating soiled linen. “Snow’s writings and practice were a very considerable influence upon the great sanitary reformers such as Sir John Simon and Sir Edwin Chadwick in the later part of the century” (DSB).

The first map in the work focuses on Broad Street and the surrounding area: public water pumps are marked together with stacked bars symbolising each cholera victim, which graphically illustrates the centre of the cholera outbreak near the Broad Street pump. It is the first use of a spot map in epidemiology.

We are only aware of one other example to come up for sale in the last 40 years: the Haskell F. Norman copy, Christies, 1998, and 2010.

Provenance

Richmond Physical Society, stamp on some leaves including title and verso of maps.



Premier Cru

15 SERRES, Unal

Carte Vinicole du Département de la Gironde dressée sur la données de Mr Duffour Dubergier Président de la Cambre du Commerce de Bordeaux par Unal Serres Dessinateur Géomètre de la Ville de Bordeaux.

Publication
Bordeaux, P. Chaumas Libraire Proprrre.
Editeur Fossés du Chapeau rouge 34, 1856.

Description
Hand-coloured lithograph map, dissected and mounted on linen, inset plans of the Médoc, key to map lower right, and table of wine classifications lower left.

Dimensions
950 by 820mm (37.5 by 32.25 inches).

Scale
(approx.) 5mm to 1km.

References
BL Cartographic Items Maps 5.b.10.

Large and detailed plan of the 1855 Bordeaux wine classification.

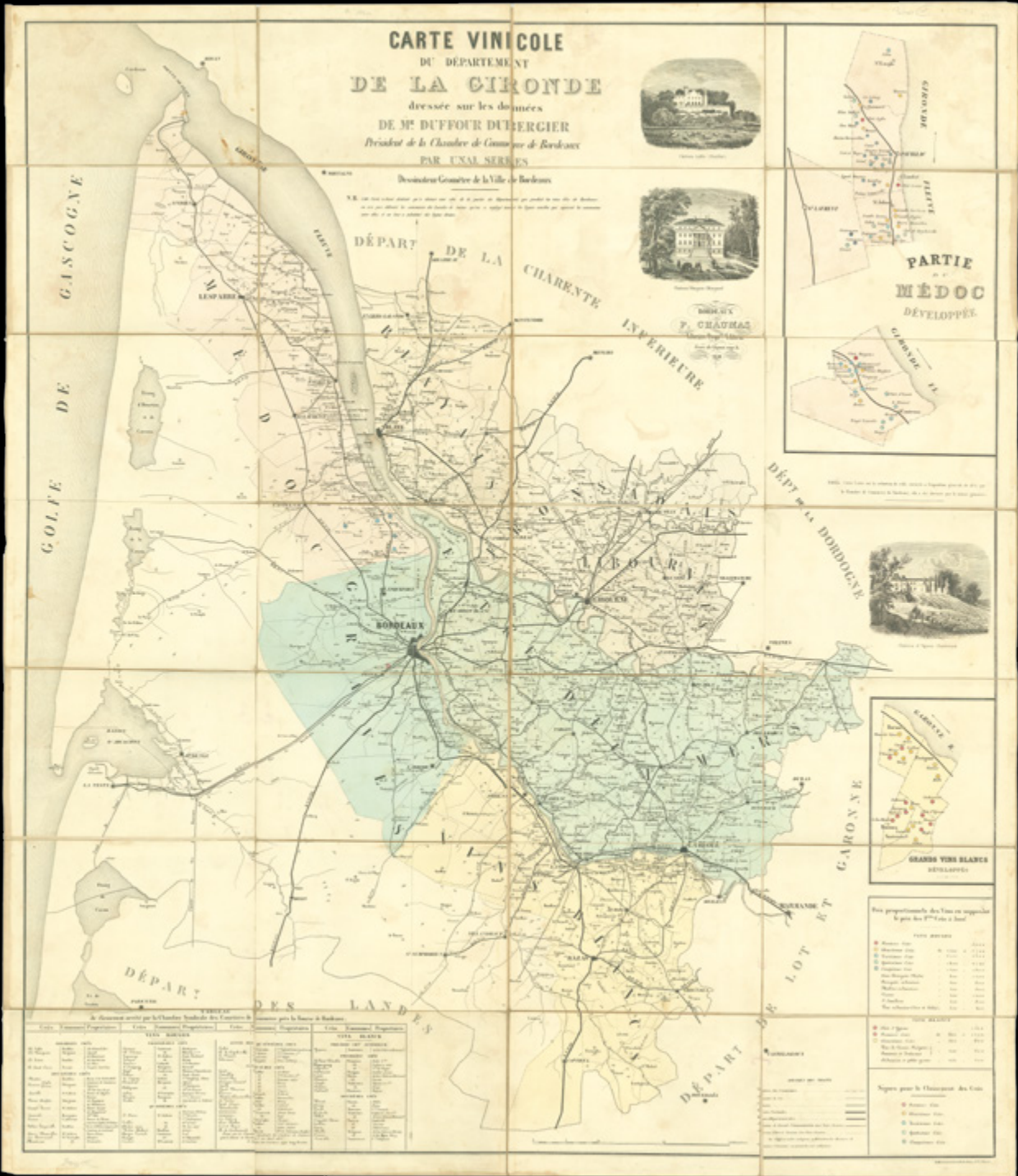
The Bordeaux Wine Official Classification of 1855 resulted from the 1855 Exposition Universelle de Paris, when Emperor Napoleon III requested a classification system for France’s best Bordeaux wines which were to be on display for visitors from around the world. Brokers from the wine industry ranked the wines according to a château’s reputation and trading price, which at that time was directly related to quality.

The wines were ranked in importance from first to fifth growths (crus). All of the red wines that made it on the list came from the Médoc region except for one: Château Haut-Brion from Graves. The white wines, then of much less importance than red wine, were limited to the sweet varieties of Sauternes and Barsac and were ranked only from first great growth to second growth.

A note to the right of the plan reads: “This map is a reduction of the one used at the General Exhibition of 1855 by the Bordeaux Chamber of Commerce; it is drawn by the same surveyor”. The surveyor in question was Unal Serres, a local cartographer, whose other known works include a plan of Bordeaux. Serres has dedicated the map to Mr Duffour Dubergier, the head of the Bordeaux Chamber of Commerce. Dubergier ordered the official classification of Bordeaux wines on 5th April 1855.

To the upper right are inset plans of the Medoc region with the châteaux marked and coloured by crus, together with vignette views of Château Lafite, and Château Margaux. Below is an inset plan of the white wine region, together with a vignette view of Château d’Yquem. To the lower right is a key to the crus, with the price range of each marked. To the lower left is a table of crus with their names, regions, and owners listed.

OCLC records four institutional examples: British Library; Bibliothèque Nationale de France; Hamburg University Library; and Chicago University Library.



Knipe's geological map of Scotland

16 KNIPE, J[ames] A[lexander]

Geological Map of Scotland, Lochs, Mountains, islands, Rivers and Canals. The Railways and the Principal Roads and the Site of the Minerals, by J. A. Knipe. Author of the *Geological Map of the British Isles*, Inscribed to H.R.H. Prince Albert. London. 1858.

Publication
London, Edward Stanford 6, Charing Cross, Glasgow, Richard Griffin & Co, 1858.

Description
Lithograph map, dissected and mounted on linen, fine original hand-colour, folding into brown cloth boards, lettered in gilt.

Dimensions
1090 by 850mm (43 by 33.5 inches).

References
BL Cartographic Items Maps 7335.(3); Toland 11. 1859 1st ed. 2nd issue state 1. Christopher Toland, Kevin Ryder and Hugh Torrens, 'The Life and Works of James Alexander Knipe (?1803-1882). British Itinerant Geological Map Maker', *Earth Sciences History* 32 (2013), pp.279-312.

Knipe's rare geological map of Scotland.

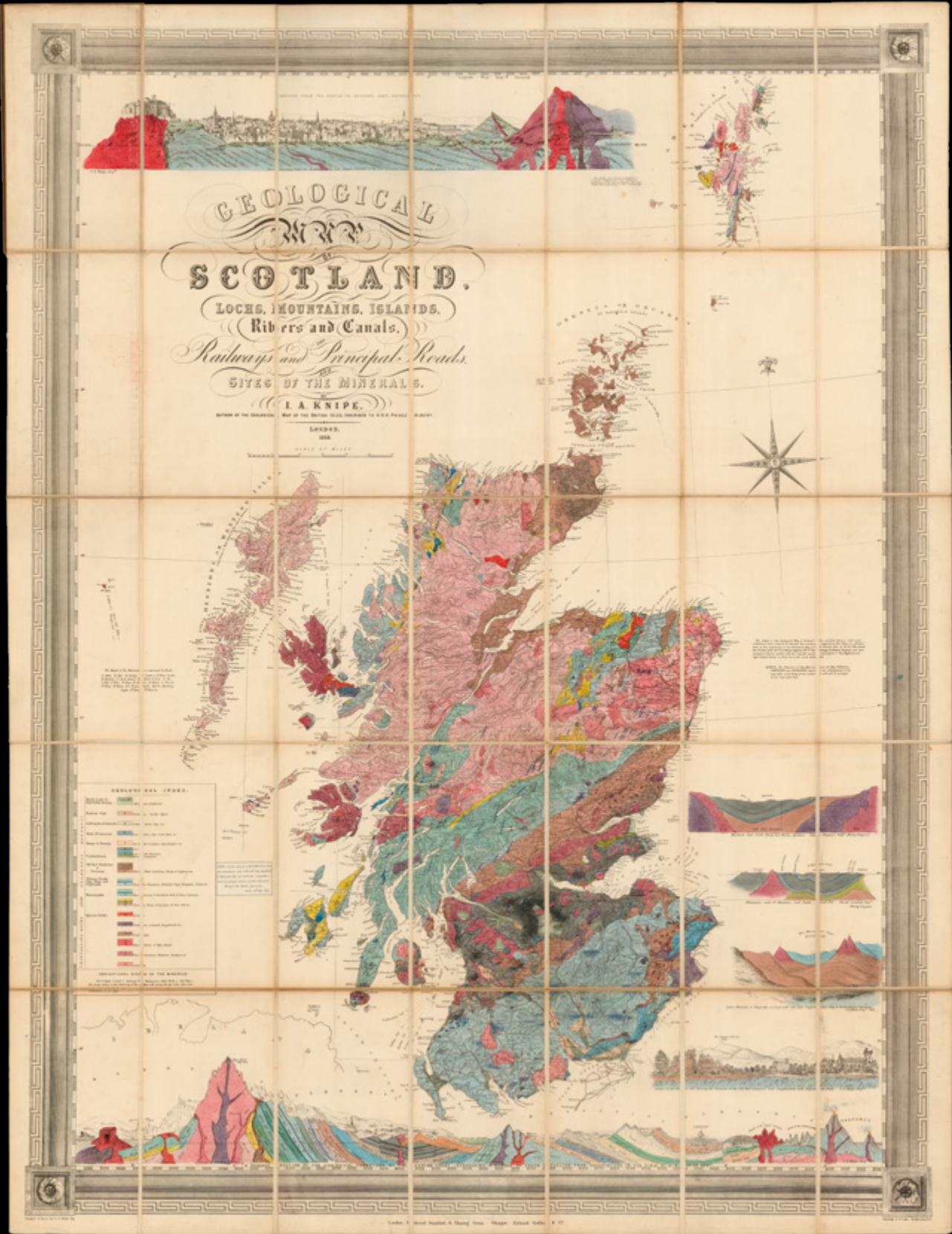
To the left of the map is an extensive key providing information on geological composition, including marsh, shale, limestone, several sandstones, coal, clay, slate, quartz, granite, porphyry, iron, copper, and lead. Below the map there is a section of geological formations, stretching from the Isle of Lewis to the Isle of Wight, and including examples of Hypozoic, Alaeozoic, Mesozoic, Cainozoic, and Volcanic formations. Other sections include the River Jed, The Maidens Paps Roxburgh, Pittenween and St Monance coal fields, Muirkirk coal field, and a section from Edinburgh Castle to Arthur's Seat.

The present map "was the first large-scale geological map of Scotland to have appeared since Macculloch's 1836 map, and the first attempt to bring together the wealth of detailed geological information that had appeared (primarily in the 'Prize Essays and Transactions of the Highland Society of Scotland') during the intervening twenty-six year period since [John] Macculloch completed his mapping in 1832" (Toland, Ryder and Torrens).

The map was generally favourably received, with The Glasgow Herald noting on 23rd February 1859: "Both the geographer and geologist will find Mr Knipe's map deserving of their attention... [the map] supplying a desideratum in Scottish geology". Knipe would go on to published revised editions in 1859, 1861, 1864, and 1878. However, despite theses efforts it would appear - due to the few surviving examples - that the map was not a commercial success.

The present example is the first edition. The title bears the date 1858, although the imprint bears no date, and a pasted on printed label to the right of the key reads: "Note: it is the opinion of Sir R Murchison, that the sedimentary rocks of the N.W. from Cape Wrath to Sleat-point, Skye, are Cambrian (Greywacke), their true position, however, is under discussion. Meeting of the British Association, Leeds, 28th Sepr., 1858". The absence of an imprint date suggests an early impression of the map.

Rare; Toland's paper on Knipe lists five institutional examples of the first edition: Bristol University; British Library; British Geological Survey; Natural History Museum; and Yale University.



Greenough recognises his debt to William Smith

17 GREENOUGH, George Bellas

A Physical and Geological Map of England and Wales By G.B. Greenough Esq. F.R.S. (on the basis of the original Map of William Smith 1815) Revised and Improved under the Superintendence of a Committee of the Geological Society of London, from the maps of the Geological Survey of Great Britain, 1836-63 and the Maps and Documents contributed by Sir R. I. Murchison, Professor Phillips, Joseph Prestwich, R. Godwin Austen, and others. [together with]: Memoir of a Geological Map of England, to which is added, an Alphabetical Index to the Hills, and a List of the Hills Arranged according to counties. By George Bellas Greenough F.R.S.

Publication
London, Published by the Geological Society, July 1865.

Description
Large engraved map with fine contemporary hand colour, in four sections dissected and laid on linen, together with, 8vo., xi, 29pp., booklet, later half green morocco over marbled paper boards.

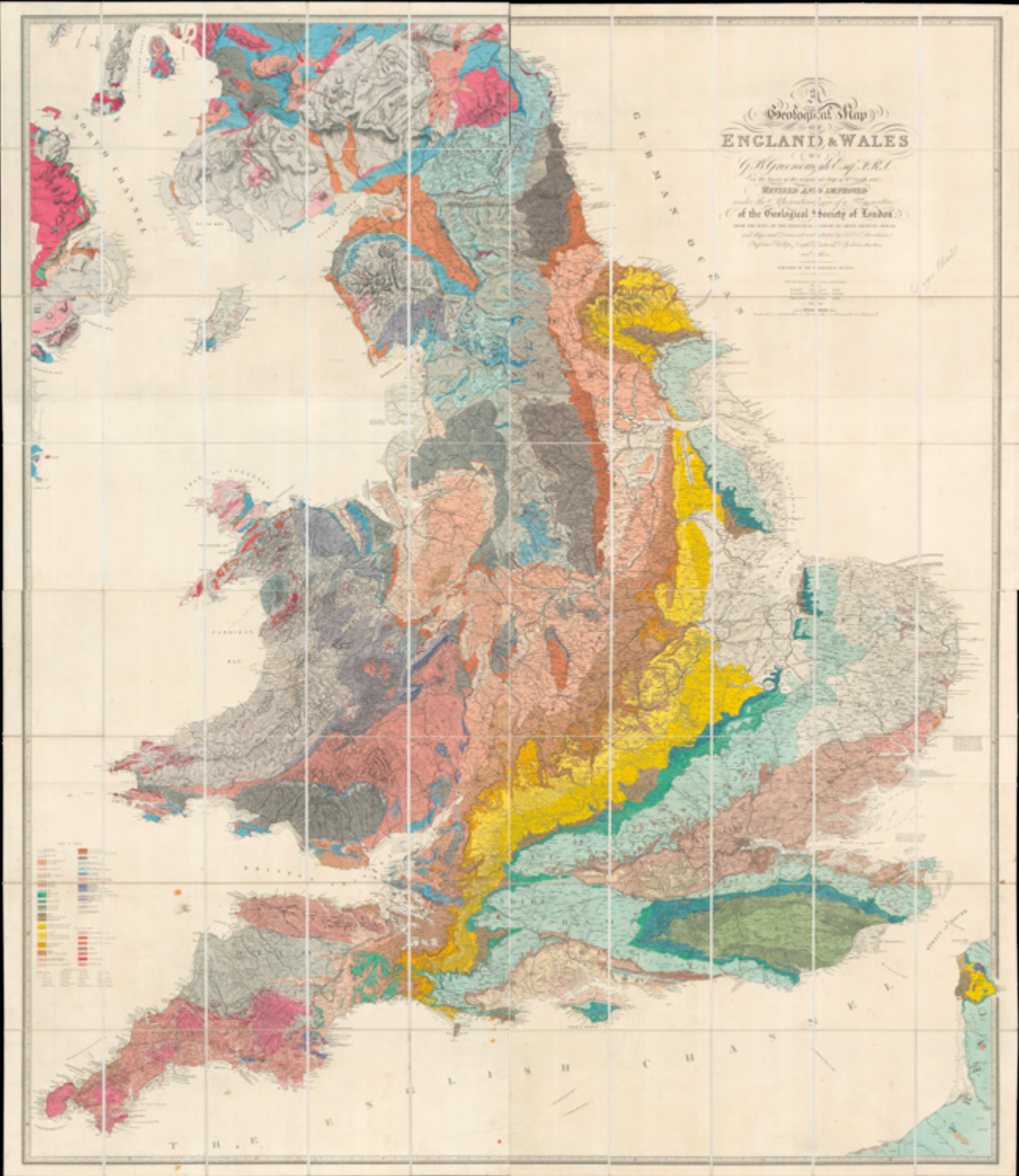
Dimensions
1950 by 1670mm (76.75 by 65.75 inches).

References
John Farey, Philosophical Magazine, 3 May 1815; G. L. Herries Davies, Whatever is Under the Earth: The Geological Society of London 1807-2007 (London: Geological Society of London, 2007); Simon Winchester, The Map That Changed the World: A Tale of Rocks, Ruin and Redemption (London: Penguin, 2002).

The present third and final posthumous edition, published in 1865, was the only edition that credited the map’s debt to William Smith. Please see item 9 for a full description of Greenough’s map.

It has been greatly revised and updated to include the latest information from, among others, the Geological Survey of Great Britain (1836-63), Roderick Murchison, Professor Phillips, Joseph Prestwich, and R. Godwin Austen. The work also comes with the rare ‘Memoir’ (Introduction), in which Greenough sets out the various improvements to the map’s design and the numerous sources on which he drew. One of the most striking differences is in the use of colour and pattern (something of a pet project of Greenough’s) to represent different geological information, in order, “to make the [ie colours] of a geological map speak to the mind as well as to the eye”. (Memoir, p. viii).

OCLC records five institutional examples: Bristol University Library; the Natural History Museum; National Library of Scotland; Leeds University Library; and The British Library.



An unrecorded atmospheric pressure map of India

18 [THE IMPERIAL METEOROLOGICAL DEPARTMENT OF INDIA]

India Barometric Variation Indicated by the Distribution of Atmospheric Pressure at the Period of Greatest Height and Lowest Depression, In Winter and Summer Respectively.

Publication
London, Edward Stanford, [c1880].

Description
Lithograph map, original hand colour, part of title in manuscript, key in manuscript and inserted to lower right.

Dimensions
790 by 680mm (31 by 26.75 inches).

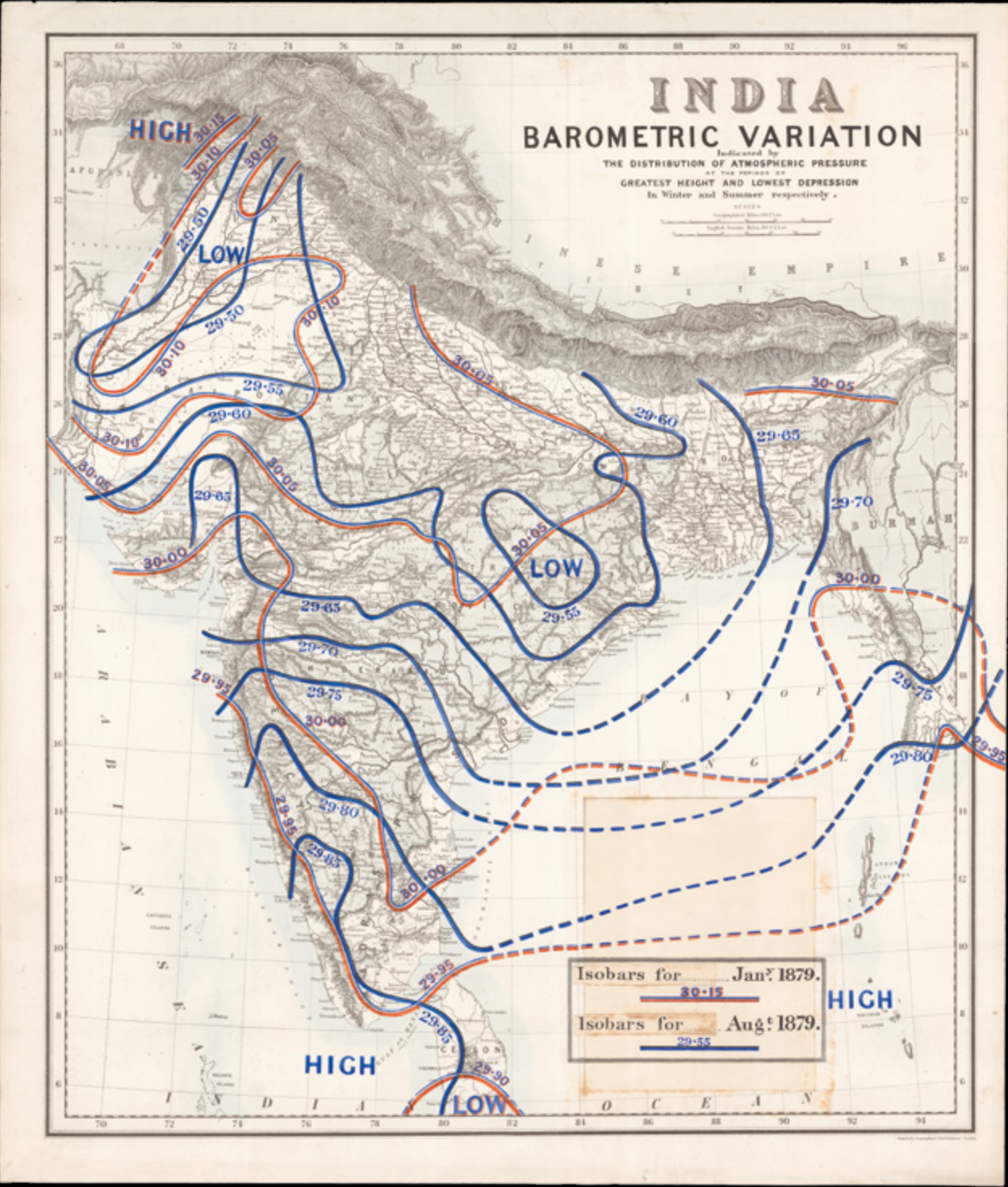
Unrecorded map of India showing barometric pressure, by the use of isobars.

The map was most certainly produced by the Imperial Meteorological Department of India. The department was founded in 1875, in reaction to several natural disasters, most notably a disastrous tropical cyclone that struck Kolkata in 1864, killing 70,000 people, and the subsequent failures of the monsoon rains in 1866 and 1871. It was hoped that by bringing all meteorological work in the country under a central authority, further severe weather episodes could be predicted and prepared for. Weather forecasting was in its infancy at the time. The British Meteorological Office had been set up in 1854 under the direction of Robert Fitzroy, with the first gale warning service begun in October 1859, and the first weather map being published in October 1861.

The first Meteorological Reporter of India was Henry Francis Blanford (1834-1893). Blanford used the resources of the new department to make long-term weather forecasts; most notably by discovering the link between the condition of the snow in the Himalayas and its affect on rainfall in the rest of India. Using this insight, he was able to predict a deficient monsoon in 1885.

The present map shows the variation in atmospheric pressure, at its greatest height and lowest depression, during the summer and winter months. During the summer months highs can be seen over much of northern and central India with the south experiencing relatively low pressure; this pattern is reversed in depths of winter. These types of maps must have aided Blanford in his understanding of the broad weather patterns across the subcontinent and greatly assisted in his longer forecasts.

We are unable to trace any institutional examples of weather maps of India of this size, published in the nineteenth century. The University of Manchester, hold two maps by George Philip and Sons, dated 1900, with the title 'India Empire: Climate', and showing summer and winter weather respectively.



Distribution of malaria in British India

19 [PUBLIC HEALTH COMMISSIONER OF INDIA]

India Distribution of Malaria.

Publication
London, Stanford Geographical Establishment, [c1880].

Description
Lithograph map, original hand colour, part of title in manuscript, key in manuscript and inserted to lower right.

Dimensions
790 by 680mm (31 by 26.75 inches).

Scale
69.1 statute miles to 1 degree of latitude.

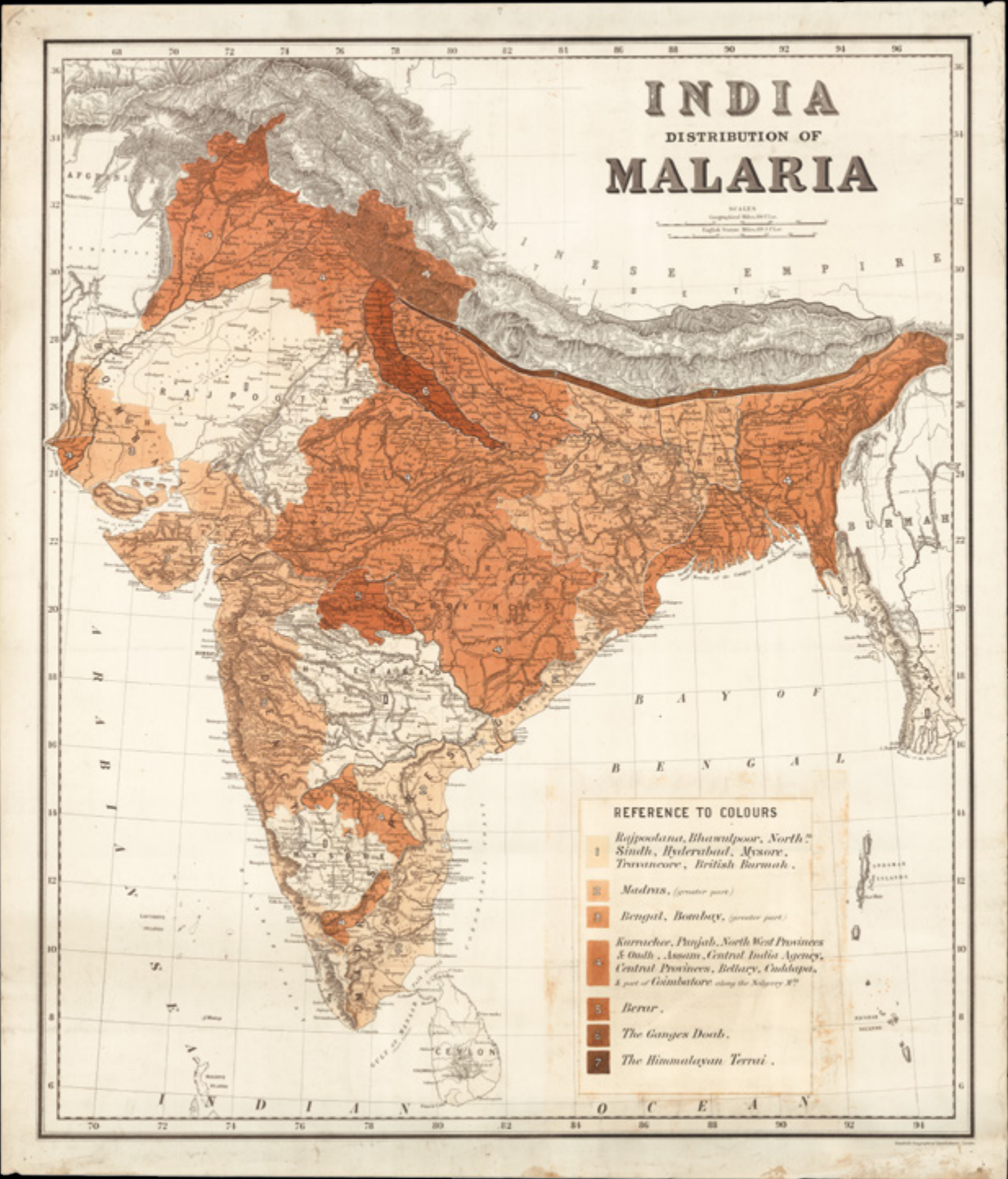
Unrecorded map of India showing the national distribution of malaria. Malaria was the second biggest killer in colonial India after cholera; from 1800 to 1921, an estimated 20 million people died of the disease. Although malaria was already endemic in India, the nineteenth century saw a dramatic spread of the disease. A key cause was the establishment by the British government of a railway system and irrigation network, without providing adequate drainage systems to combat floods and excess rainfall. The lack of drainage created stagnant water in which mosquitoes could breed. The high death rate, the resulting economic effects and the risk to the lives of British officers serving in vulnerable areas like the Punjab, encouraged new research on malaria control. In the 1840s, attention was paid to proper drainage and chemoprophylaxis was started with quinine. The colonial government would get through some nine tons of the drug annually by the 1850s.

The present map was produced around 1880, most probably under the auspices of the Public Health Commissioner of India, which had been established in 1869. The map shows the distribution of malaria throughout India and British Burma, with seven degrees of severity: from (1), a pale wash showing a low concentration of the disease; to (7), a dark brown wash showing a high concentration of the disease. The key to the lower right lists the regions and their position on the malaria scale. These are: 1: Rajpootana, Bhawalpoor, Northern Sindh, Hyderabad, Mysore, Travancore, British Burmah; 2. Madras (greater part); 3. Bengal, Bombay (greater part); 4. Kurrachee, Punjab, North West Provinces & Oudh, Assam, Central India Agency, Central Provinces, Bellary, Cuddapa, & part of Coimbatore along the Neilgerry Mountains; 5. Berar; 6. The Ganges Doab; 7. The Himalayan Terrai.

The map shows that the states south of Hyderabad, apart from a few localised areas, were generally free of malaria. The disease is concentrated in the north, with 'Rajpootan' (Rajasthan) a notable exception. Particularly badly affected areas include Delhi, Lucknow, and a long strip along the feet of the Himalayas.

The map is part of the attempts of the British in India to gain a better understanding of the spread and cause of the disease towards the end of the nineteenth century. At about the time the map was produced, Surgeon Major Sir Ronald Ross joined the Indian Medical Service. In August 1897, he demonstrated the life cycle of the malarial parasite, and showed that anopheles mosquitoes carried the protozoan parasites called "plasmodia". He was later knighted and given a Nobel Prize in Medicine in 1902. This discovery changed malaria research and focused malaria control programs on the eradication of mosquitoes.

We are unable to trace any institutional examples of malaria maps of India, on such a large scale, published in the nineteenth century.



“One of the foundation studies of modern social science”

20 GUERRY, André-Michel

Essai sur la Statistique Morale de la France.

Publication
Paris, Chez Crochard, Libraire, Rue et Place de l'École-de-Médecine, 1883.

Description
Folio (360 by 250mm), six engraved maps, loose sheet with manuscript notes and figures in contemporary hand, printed paper over boards.

References
Michael Friendly, 'A-M. Guerry's Moral Statistics of France: Challenges for Multivariable Spatial Analysis', *Statistical Science* 22 (2007), pp.368-399.

André-Michel Guerry (1802-1866) was a French statistician. He began his career in law, becoming an advocate and working at the Ministry of Justice. He worked on the first French national crime survey and was so interested that he left to become a full time criminologist and statistician. The 'Essai' began as an 1829 poster with three maps of France, with the départements colour-coded according to the crime rate, property crime and literacy rate: the first maps to show crime rates. After more research, Guerry presented the full findings in the 'Essai' to the Académie des Sciences in 1832. It is a comprehensive analysis of both criminals and the way in which they committed crime; for example, looking at the breakdown of criminals by sex and age, and then considering whether more crimes happen at certain times of year. The work won the Prix Montyon, and was published the following year.

The book contains six maps of France: showing crime rate against people; crime rate against property; literacy rates; number of illegitimate births; charity donations; and suicide rates. Guerry's results were “startling for two reasons. First he showed that rates of crime and suicide remained remarkably stable over time, when broken down by age, sex, region of France and even season of the year; yet these numbers varied systematically across départements of France... Second, he overturned some widespread beliefs about the nature and causes of crime and its relation to other observable factors, such as education and poverty” (Friendly). He was also interested in recording the motives behind crimes - finding, for instance, that poisoning was often motivated by adultery and murder by hatred - and the 'Essai' contains “perhaps the first content analysis in social science” when he classifies suicide notes left in Paris according to the reasons given for death.

Guerry's work was important because it provided a “launching pad for much of modern social science”, raising the “possibility to conceive, for the first time, that human actions in the social world were governed by social laws” (Friendly).



“Very poor, lowest class... Vicious, semi-criminal”

21 BOOTH, Charles

Descriptive Map of East End Poverty, Compiled from School Board Visitors' Reports in 1887.

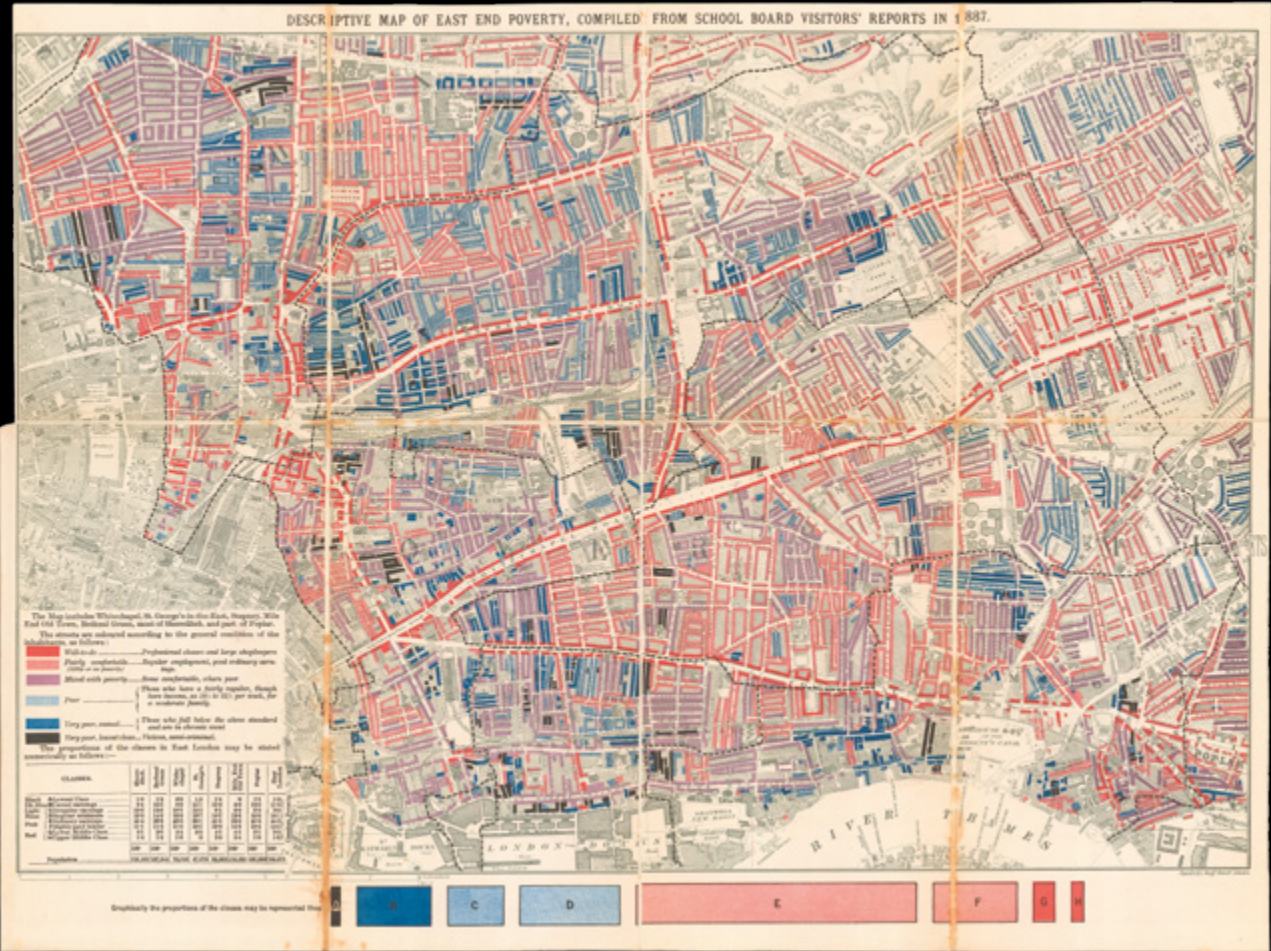
Publication
London, McMillan & Co., 1889.

Description
Lithograph plan, printed in colours, dissected and mounted on linen.

Dimensions
375 by 490mm (14.75 by 19.25 inches).

The first of Charles Booth’s famous poverty maps of London to be published in his seminal work ‘Labour and Life of the People, Volume 1: East London’. The areas it covers include Hoxton, Bethnal Green, Whitechapel, Mile End Road and Limehouse. When the full survey was published in 1891 this map was dropped for one matching the other three in the set. However, this early map has the same features, with the streets colour-coded according to the degree of wealth of the inhabitants, ranging from black (“Very poor, lowest class... Vicious, semi-criminal”), through shades of blue and purple (“Poor”, “Mixed”, “Fairly Comfortable”), to red (“Well to do”). Booth’s highest class, yellow (“Wealthy”), does not appear on this map.

Booth (1840-1916), owner of the Booth Shipping Line, acted in response to an 1886 Pall Mall Gazette article that claimed that 25% of Londoners lived in poverty. Booth regarded this figure as wildly exaggerated, so recruited a team of volunteer researchers to compile an analysis of social conditions based on field visits and interviews with local police, clergy and employers. The reception of his survey, published as ‘Life and Labour’, was such that Booth completed two more surveys, titled the ‘Second Series’ (1891), and ‘Third Series’ (1902, covering Religious Influences), with a ‘Final Volume’ (also 1902) with his conclusions.



Cholera map of Kolkata

22 *Plan of the Town of Calcutta. Red dots indicate cholera deaths for the year 1887.*

Publication
[Calcutta 1887].

Description
Chromolithograph plan, cholera deaths marked by red dots.

Dimensions
320 by 205mm (12.5 by 8 inches).

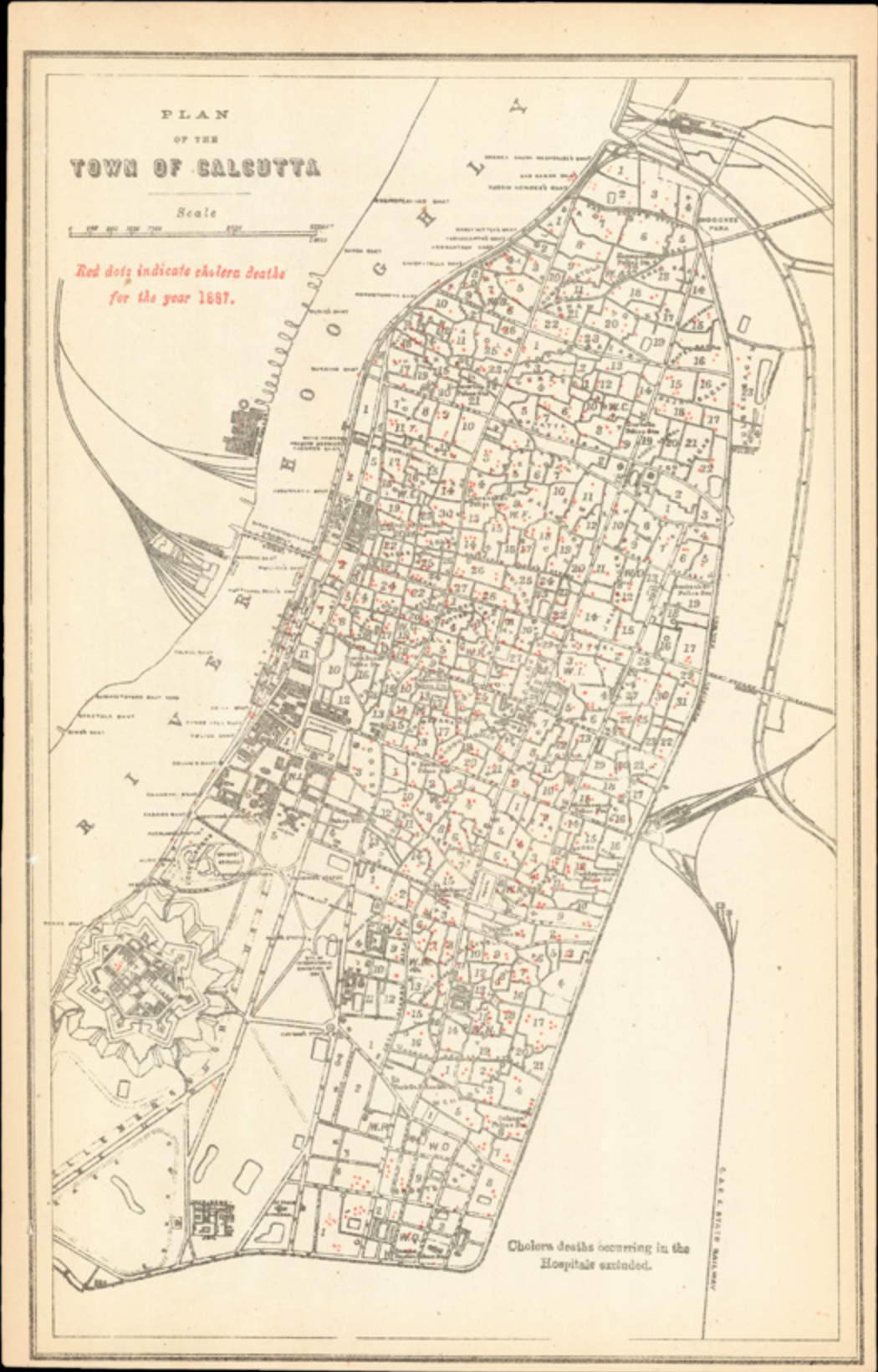
Scale
2.25 inches to 1 statute mile.

Cholera map showing the outbreak of the disease across the city of Kolkata in 1887.

The nineteenth century saw the use of cartography in order to track and chart the spread of infectious diseases, especially cholera. There were two international cholera pandemics between 1817-1824 and 1829-1851. Both originated in India, most probably around the Ganges delta. The first pandemic consumed much of Asia, reaching as far as Syria in the west and Japan in the east. The second outbreak spread further and included much of Russia, Europe, and parts of the Americas. Throughout the nineteenth century, cholera would cause more deaths, more quickly, than any other epidemic disease. Some three years after the end of the second pandemic, John Snow would publish the second edition of his seminal work: ‘On the Mode of Communication of Cholera’, which incorporated his work on the Soho epidemic (item 14).

Cholera was first recorded in Jessore, Bengal, near Kolkata, in 1817. The local conditions were ideal for the epidemic, as the region was densely populated, with a moist, tropical climate, with poor sanitary conditions. Cholera lingered around Kolkata for the rest of the nineteenth century, occasionally spiking into severe outbreaks. The year 1887 was not an especially bad year for cholera in Kolkata, although, as the map shows, the ‘normal’ situation was still quite grim. A note to the bottom right of the plan states: “cholera deaths occurring in the Hospitals excluded”; their inclusion would have skewed the distribution of the disease, which was fairly evenly spread throughout the city. Kolkata’s medical department worked ceaselessly to stamp out the disease, but did not make headway until the early twentieth century.

The present map was obviously extracted from a medical report or pamphlet, issued in Calcutta, although we have not been able to trace the identity of this publication. Cholera maps printed in India are very rare, and the present map is a fine example.



Epidemiological map depicting the spread of the 1892 Cholera Epidemic across Russia

23 [CASTELLI, C. de]

[Russian Map of the Spread of Cholera].

Publication
[St Petersburg, c1893].

Description
Lithograph map in two colours.

Dimensions
360 by 410mm (14.25 by 16.25 inches).

This rare map depicts the spread of the Russian Cholera Epidemic of 1892, which officially claimed 267,800 lives. The map is one of only a handful of cholera maps to have been printed entirely in Russian Cyrillic, and was lithographed in St. Petersburg not long after the outbreak by C. de Castelli.

The map embraces the western two-thirds of the Russian Empire, extending eastward just past Lake Baikal. The Russian Cholera Epidemic of 1892 was part of the Fifth International Cholera Pandemic (1881-96), and as shown here by a series of red arrows, the epidemic first entered Russian territory from Persia. From there it travelled across the Caspian Sea, through the Caucasus and then up across the Steppes to infect Kiev, Moscow, St. Petersburg and Warsaw. Next, the epidemic wheeled eastwards, travelling across Siberia, almost as far as Irkutsk.

Russia was especially vulnerable to cholera, because of the poverty and lack of hygiene in both rural areas and urban slums. The Tsarist regime's implementation of health standards and medical systems was irregular and often poorly coordinated. Russia had also suffered during both the Third (1852-60) and Fourth (1863-75) International Cholera Pandemics.

The outbreak motivated the Russian authorities to call a Cholera Conference, held in St. Petersburg in December 1892, during which new medical regimes were agreed. Nevertheless, the epidemic continued into 1893, killing a further 30,000 people.

Cholera maps printed in Russian Cyrillic are extraordinary, and the present work is extremely rare – we cannot trace even a reference to the map, let alone the location of another example. It was evidently extracted from an unidentified book or portfolio that featured a series of other like epidemiological maps (of which the present map is No. 18). The only other map from this series we have been able to trace is a map of the Russian Influenza Epidemic of October 1889 to March 1890, in the Library of Congress.



24 ADDAMS, Jane, GATES STARR, Ellen, KELLEY, Florence and Samuel Sewell GREELEY

[The Hull-House Maps] 1. Wage map no. 1, Polk to Twelfth [together with] 2. Nationalities map no. 1, Polk to Twelfth.

Publication [New York, Thomas Y. Crowell, 1895].

Description A pair of lithograph maps, printed in colours, a few areas of discolouration at folds.

Dimensions 360 by 1120mm (14.25 by 44 inches).

References Mary Jo Deegan, 'The Hull House Maps and Papers', in Gwendolyn Mink and Alice O'Connor (eds.), Poverty in the United States: An Encyclopedia of History, Politics and Policy (Santa Barbara, Denver and Oxford: ABC-CLIO, 2004), vol. I, p.386; Robert Holland, Chicago in Maps, (New York: Rizzoli, 2005), pp.160-163; Kathryn Kish Sklar, 'Hull-House Maps and Papers: social science as women's work in the 1890s', in Martin Bulmer, Kevin Bales, and Kathryn Kish Sklar (eds.), The Social Survey in Historical Perspective 1880-1940 (Cambridge: Cambridge University Press, 1991), pp.111-147.

“the single most important work by American women social scientists before 1900”

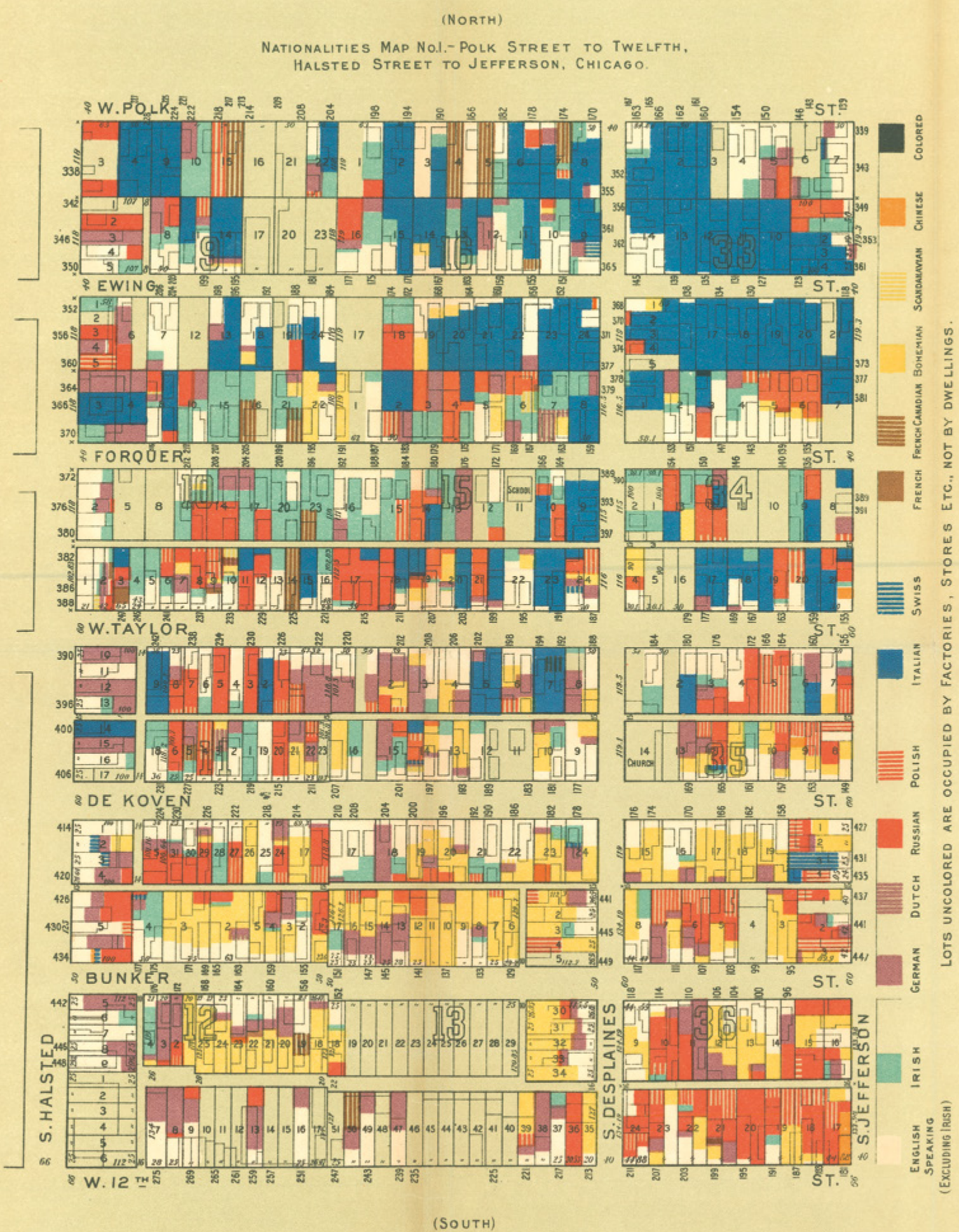
The Hull House maps were groundbreaking in both sociology and cartography, pioneering the method of mapping “social and demographic characteristics of a population within a geographical area” over time to initiate social change (Deegan). The maps document socioeconomic data from slum neighbourhoods in the midst of immigration into the United States. As increasing numbers of people moved to America in search of financial security, the rapid influx and lack of available housing led to overcrowding and poor living conditions.

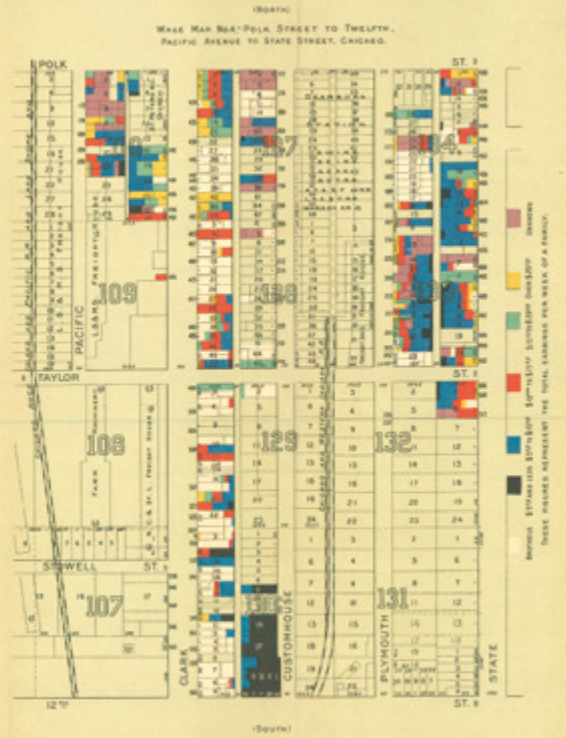
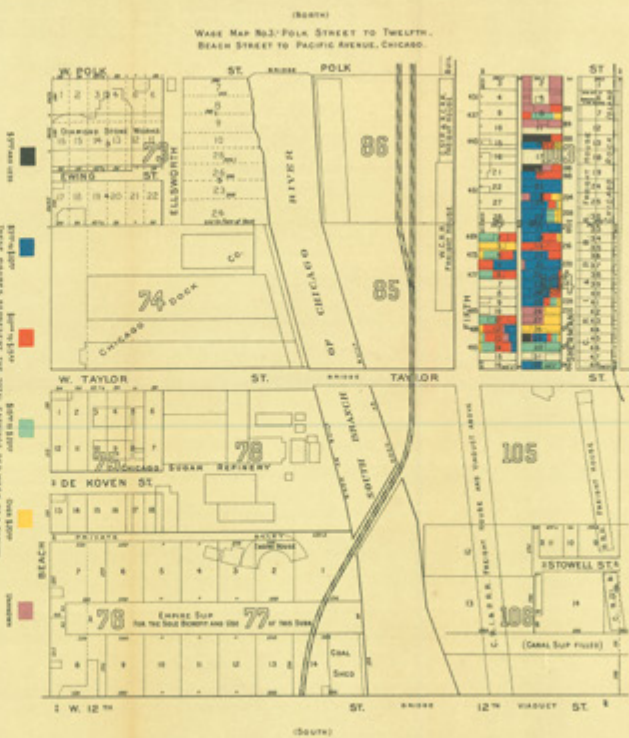
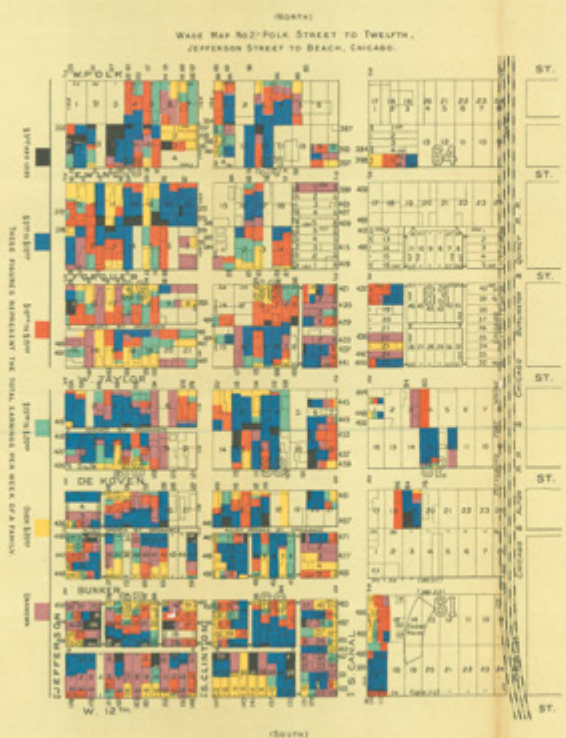
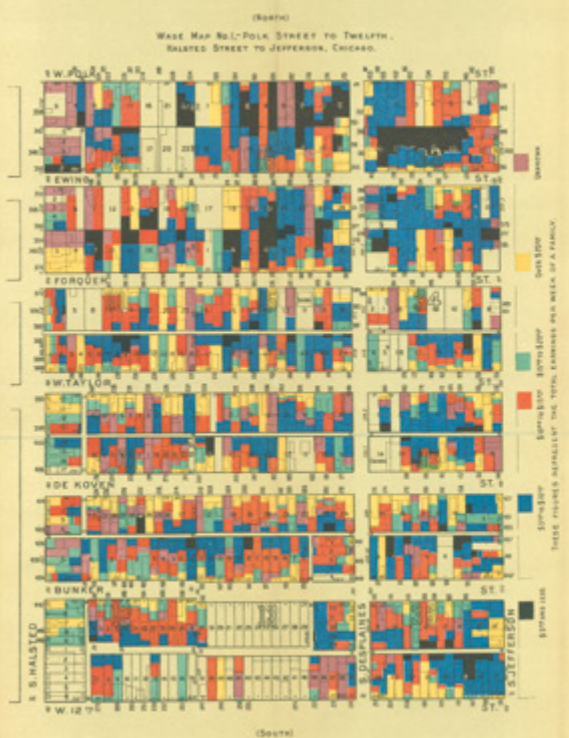
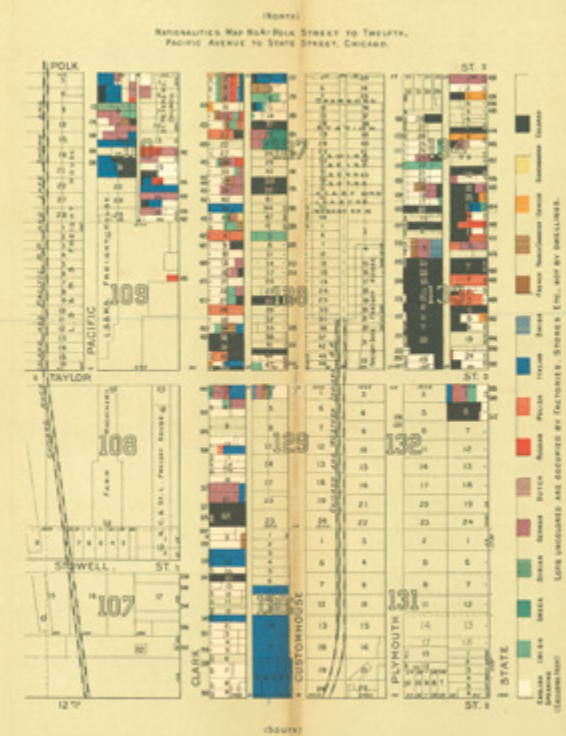
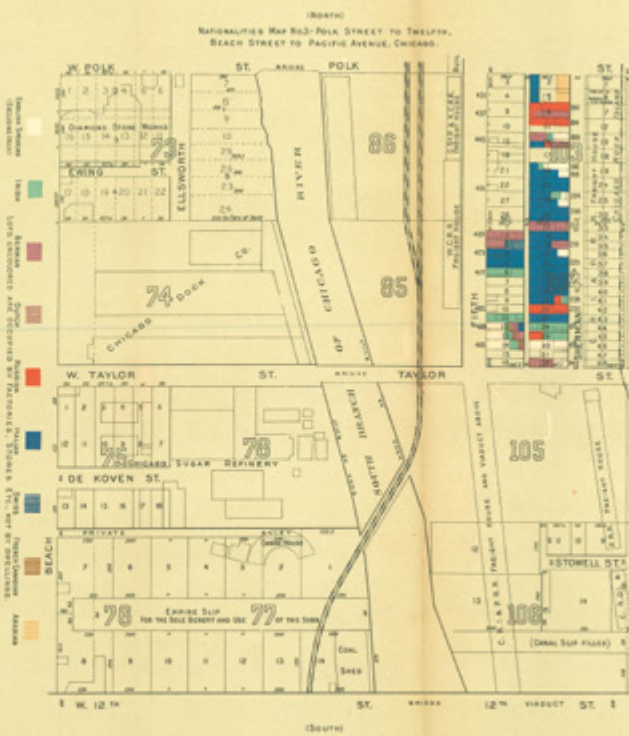
Hull House was set up to counter this trend. It was opened by Jane Addams and Ellen Gates Starr in 1889, two social reformers and activists who decided to start the house after visiting a similar institution, Toynbee Hall, in Britain. Settlement houses were charity centres which aimed to alleviate poverty and encourage social diversity by housing middle class volunteers amongst working class recipients. A place where integration into American society was taught through various skills and language classes, Hull House illustrated the burgeoning social concerns circulating throughout the late nineteenth century.

The Hull House Maps and Papers project was led by Florence Kelley. As well as the Hull House project, she also worked on the report of the smallpox epidemic in Chicago in 1893, and helped enforce the provisions of the Illinois Factory Inspection Law (she was the first female factory inspector in America). The team based at Hull House collected data by visiting and questioning the inhabitants of the neighbourhood, helped by four workers from the Bureau of Labor (the research was part of a wider project on slums commissioned by Congress in 1892). The book eventually produced was a collection of essays on topics ranging from labour unions to the function of art in the community. The highlights, however, were the maps, inspired by Charles Booth’s poverty maps of London (items 21 and 26).

There are two sets of maps covering the same four sections of Chicago: one showing the nationality of the inhabitants of each buildings, and one showing the weekly household income. The maps can be juxtaposed to show both the variety of people emigrating to America, and also how successful they were. Hull House then used these maps as the basis of discussion for future projects. For example, by comparing the first wage and nationality maps showing Halstead Street to Jefferson, it is clear that the strips of English-speaking people along De Koven and West 12th tended to earn in the highest income bracket, above 20 dollars per week, suggesting the importance of the language lessons offered by the House.

The maps are also an important example of the growth in research work done by women in centres like Hull House, while social science as a discipline was still forming in traditional academic institutions. They were “the single most important work by American women social scientists before 1900” (Kish Sklar).





Jewish East London

25 ARKELL, George E

Jewish East London.

Publication
London, George Bacon, 1899.

Description
Chromolithograph map.

Dimensions
380 by 560mm (15 by 22 inches).

References
Peter Barber, London: A History in Maps
(London: British Library and London
Topographical Society, 2012), p.236.

Detailed map of Jewish immigration in late Victorian London.

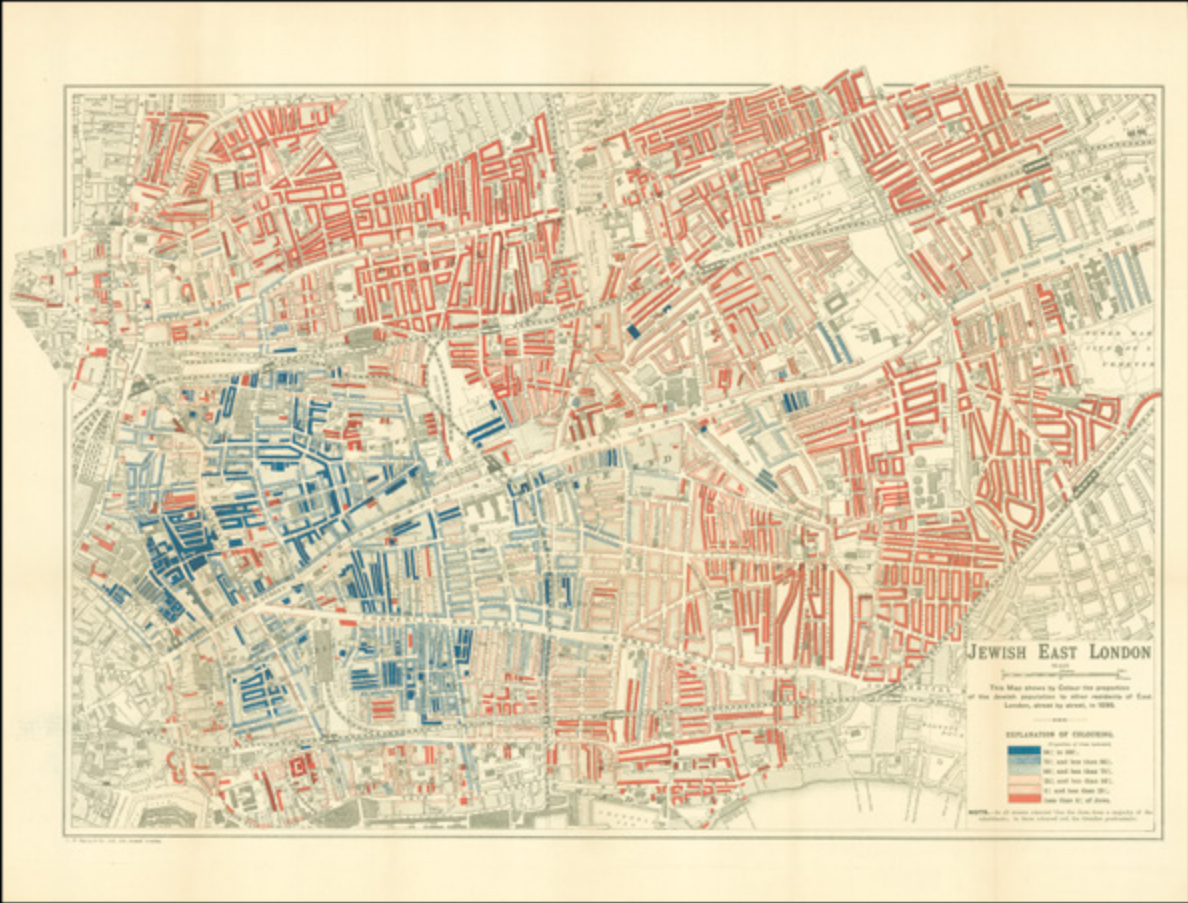
The map was the work of George Arkell, who was responsible for Booth’s seminal maps of London poverty, and like them, the information was taken from School Board visitors’ statistics. The map stretches north to south from the Hackney Road to the Tower of London, and west to east from Fenchurch Street Station to Tower Hamlets.

The Tsarist persecution of the Jewish population in Russia and Poland in the latter half of the nineteenth century caused many to emigrate, and those that moved to London often sought refuge in the East End. It is estimated that some 7,000 Jews a year arrived from 1881 to 1900. Their arrival - like most emigrants or refugees - bred a great deal of resentment among the indigenous population. Although the work that accompanied the map attempts to give an balanced account of the Jewish present in the East End, to the casual observer it might give the impression of an East End dominated by the new arrivals. It is a sea of red and blue: red denotes a concentration of less than 5% of Jews; and dark blue denotes an area between 95-100% Jewish. Arkell used the same colour scheme as the Booth poverty maps, where dark blue was used to denote areas verging on “vicious, semi-criminal poverty”.

Arkell’s map may, therefore, have inadvertently “fuelled the racism that let to the passing of the 1905 Aliens Act aimed at reducing Jewish immigration to a trickle. In fact, at the time the overall Jewish presence in Stepney was only 18% and it never seems to have exceeded that percentage” (Barber).

The map was produced for inclusion in ‘The Jew in London’, a study of the Jewish population in the city by Charles Russell and Harry S. Lewis, commissioned by Toynbee Hall, an East End settlement house.

George Edward Arkell (1857-1926) was born in Pimlico, the son of a London cab driver. There can be few better basic qualifications for mapping London. He worked originally in publishing, but by this period was employed as a private secretary. He conducted numerous interviews for Booth – speaking to tailors, hatters, boot-makers, wood-workers and others – and toured the poorer streets (escorted by policemen) to make notes.



“Quite the most important thematic maps of the Metropolis in the nineteenth century”

26 BOOTH, Charles

Life and Labour of the People in London.

Publication
London, 1902.

Description
18 volumes 8vo. (210 by 140mm), half titles, tables, and folding maps, 5 folding coloured lithographed maps contained in separate wallet, pasted exlibris, original vellum lettered and decorated in gilt, with library number in manuscript to spine.

Dimensions
1050 by 1250mm (41.25 by 49.25 inches).

Scale
6 inches to 1 statute mile.

References
Ralph Hyde, *Printed Maps of Victorian London 1851-1900* (Folkestone: Dawson, 1980), p.252.

The definitive edition of Charles Booth’s seminal work on London poverty; the last edition to include Booth’s highly important map of London poverty.

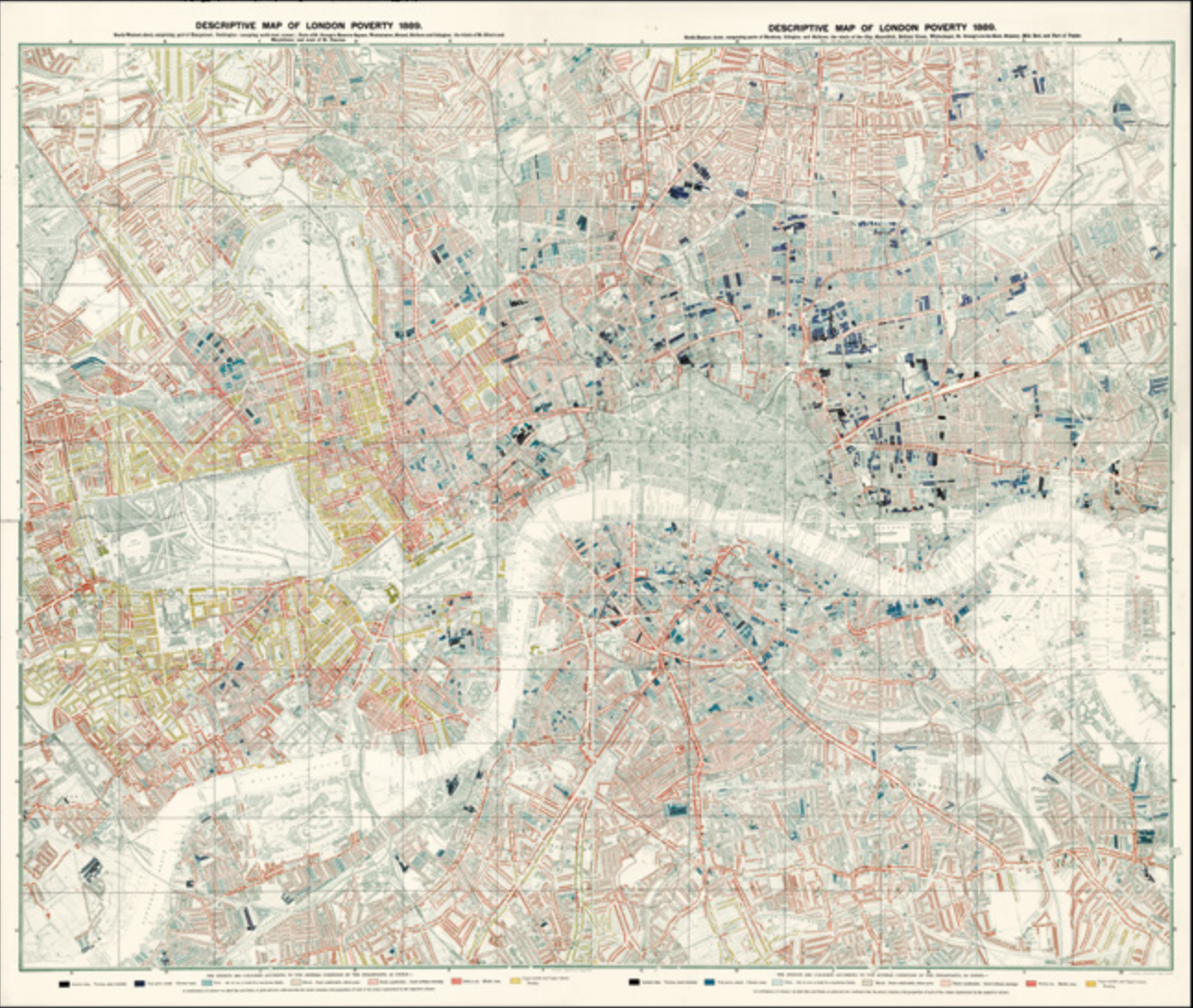
The work is split into four sections: First Series: Poverty, first five volumes, each text volume bears notes to the original date of publication, 1889-1891; the seminal map is housed in volume five and is dated 1889; Second Series: Industry, five volumes, each volume of which bears notes to the original date of publication, 1895-1897; Third Series: Religious Influences, seven volumes, dated 1902; Final Volume: Notes on Social Influences and Conclusion, 1902.

This monumental work contains: “Quite the most important thematic maps of the Metropolis in the nineteenth century were those which accompanied Charles Booth’s Monumental survey.” (Hyde)

A fascinating map of fundamental importance to British social reform. Based upon Stanford’s ‘Library Map of London’. The colouring of the map depicts, by street: “The Lowest Class. Vicious, semi-criminal” (black); “Very Poor, casual. Chronic Want” (blue); “Poor. 18s to 21s a week for a moderate family” (light blue); “Mixed. Some comfortable, others poor” (purple); “Fairly Comfortable. Good ordinary earnings” (pink); “Well-to-do. Middle class” (red); “Upper-middle and Upper classes. Wealthy” (yellow).

Charles Booth (1840-1916), shipowner and writer on social questions, began his long and successful career as shipowner at 22, when he joined his eldest brother Alfred as partner in Alfred Booth & Co. He grew up with the Trade Union movement, and in general sympathised with its early aims, but regarded its later developments with misgiving.

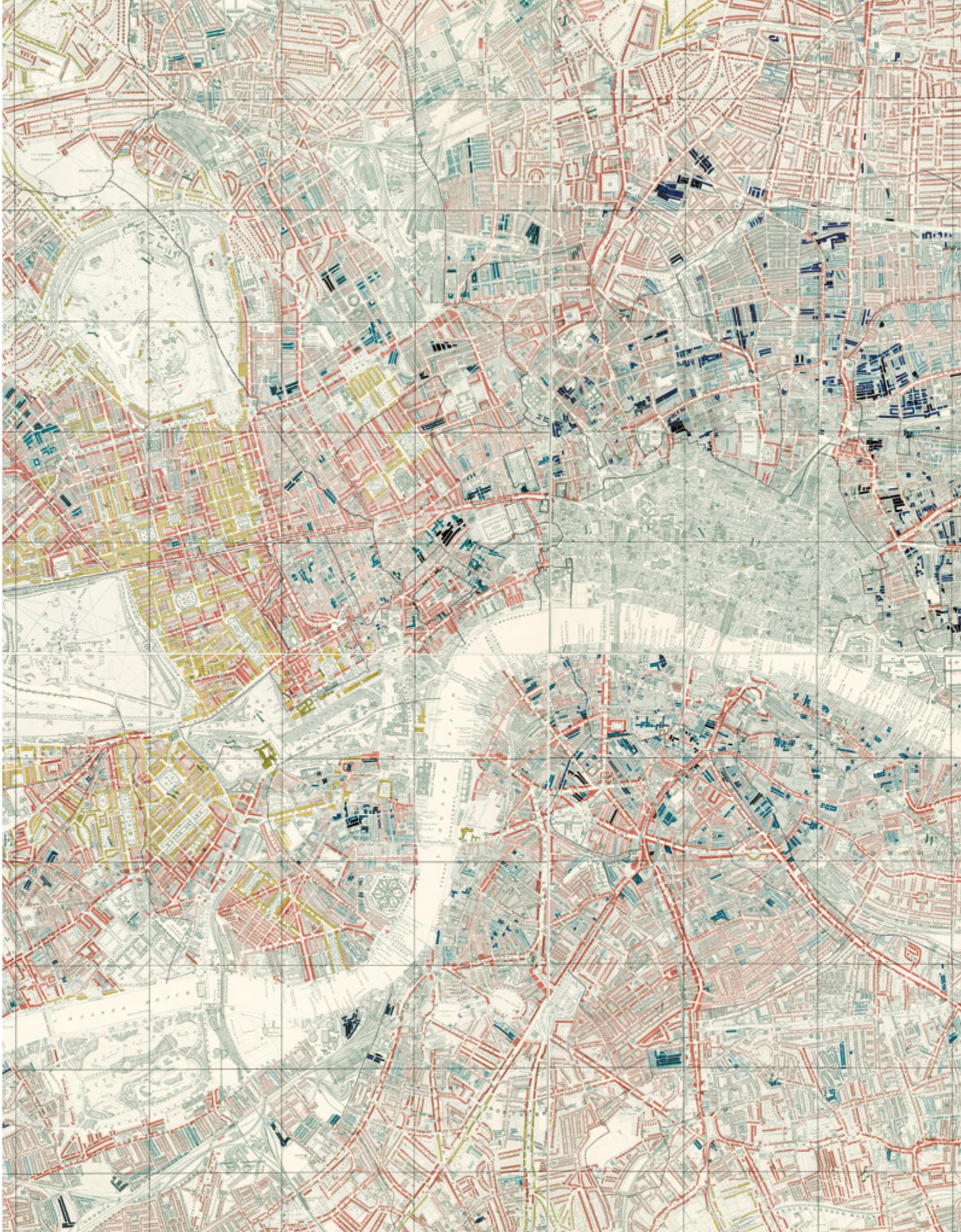
Booth had always taken an interest in working-class welfare, but it was not until he was past middle age that the works which established his reputation as a writer on social questions began to appear, including his ‘Inquiry into the condition and occupations of the people of London’, the earlier part of which appeared, along with this map, as ‘Labour and Life of the People’ (1889), and the whole as ‘Life and Labour of the People in London’ (1891-1903). Booth’s works appeared at a critical time in the history of English social reform. A lively interest was being taken in the problems of pauperism, and it was recognized that benevolence, to be effective, must be scientific. ‘Life and Labour’ was designed to show “the numerical relation which poverty, misery and depravity bear to regular earnings and comparative comfort, and to describe the general conditions under which each class lives”. Among the many who helped him to compile his material, and edit it, were his wife’s cousin, Miss Beatrice Potter (Mrs. Sidney Webb) and (Sir) Graham Balfour for the earlier volumes, and Ernest Aves for the later. It was not part of Booth’s plan to analyse economic changes or to trace the course of social development. His objective was to give an accurate picture of the



condition of London as it was in the last decade of the nineteenth century. In this light, his 'Life and Labour' was recognized as perhaps the most comprehensive and illuminating work of descriptive statistics which had yet appeared.

Booth married Mary, only daughter of Charles Zachary Macaulay, and granddaughter of Zachary Macaulay, in 1871. There were three sons and four daughters of the marriage. He died 23 November 1916 at his home, Gracedieu Manor, Whitwick, and was buried at Thringstone, Leicestershire.

Provenance
Ex libris of Hammersmith Reference Library.



The ethnographic composition of Eastern and Central Europe

27 *Maps of Poland [together with] Poland. General Sketch of History 1569-1815.*

Publication
London, The War Office and Foreign Office, 1916-1920.

Description
Eight chromolithograph folding maps, all housed in original green paper portfolio, title to upper cover, contents to inside paste-down, ethnographic map with tears to folds skilfully repaired [together with] 8vo. (215 by 140mm) booklet, 30pp., green paper wrappers, title to upper cover, rubbed.

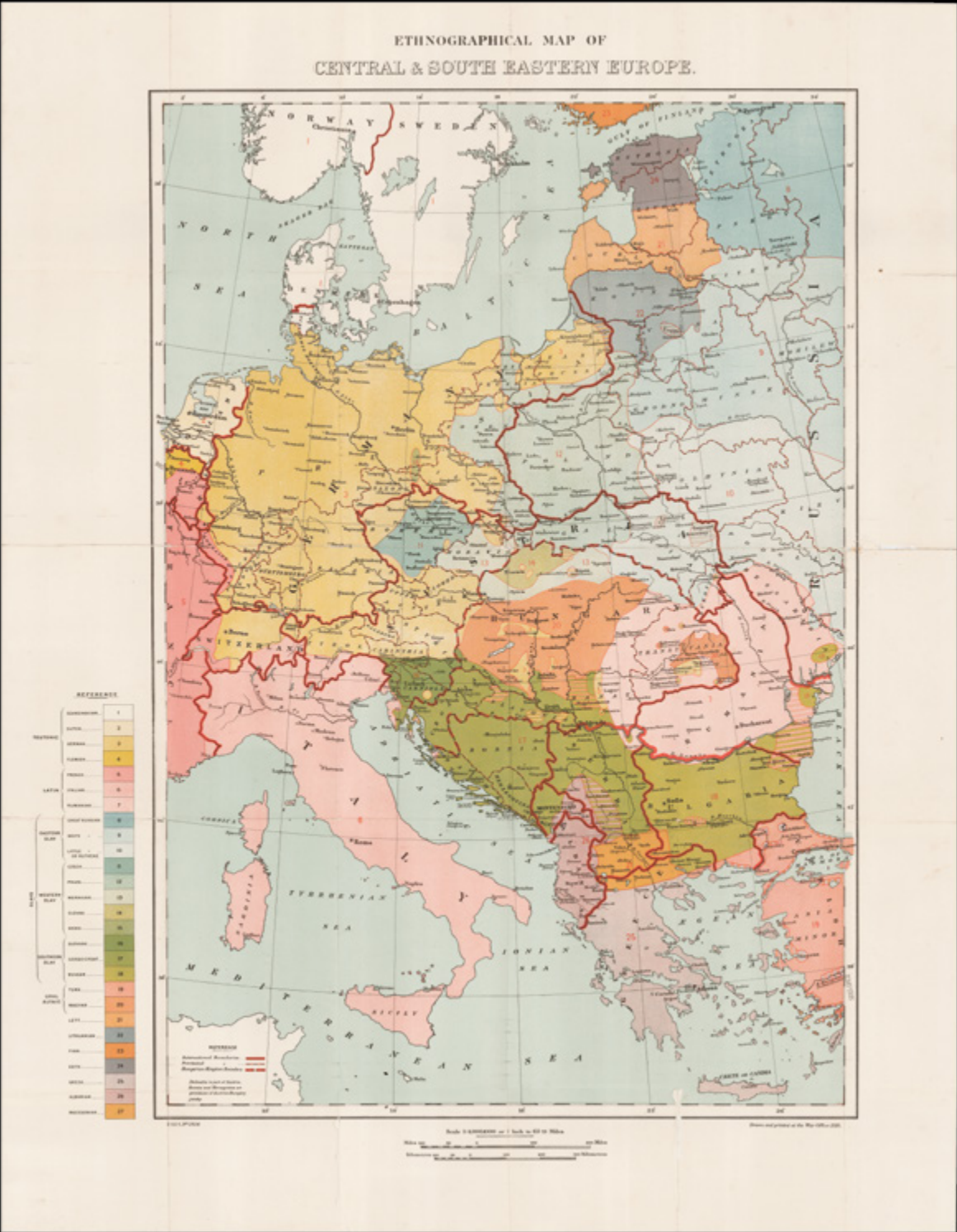
Dimensions
(Regional Maps 1-6) 595 by 510mm (23.5 by 20 inches). (Ethnographical map) 870 by 680mm (Partition of Poland Map) 440 by 390 (17.25 by 15.25 inches).

Rare complete set of maps of Poland and Eastern Europe, detailing Poland’s historical boundaries and Central Europe’s ethnographic make up.

In preparation for the peace conference that was expected to follow World War I, in the spring of 1917 the British Foreign Office established a special section responsible for preparing background information for use by British delegates to the conference. Maps of Poland is Number 49 in a series of studies produced by the section, most of which were published after the conclusion of the 1919 Paris Peace Conference. The work contains a collection of eight foldout maps. Six of the maps are sheets from the General Map of Europe, compiled at the Royal Geographic Society under the direction of the Geographic Section of the General Staff, and printed in 1915 by the Ordnance Survey. The maps are of regions around six major cities, in or near, what would become the newly independent Polish Republic: Berlin, Warsaw, Minsk, Vienna, Krakau (Krakow), and Jitomir (Zhytomyr, Ukraine). Also included are an ‘Ethnographical Map of Central and South Eastern Europe’ and ‘Partitions of Poland’, a colour-coded map that shows how Poland was partitioned among Austria, Prussia, and Russia in 1772, in 1793, and again in 1795, when it disappeared completely from the face of Europe. Four other studies in the series deal with different aspects of the Polish question: Poland: General Sketch of History 1569–1815 (Number 43); Russian Poland, Lithuania and White Russia (Number 44); Prussian Poland (Number 45); and Austrian Poland (Number 46).

“This 1916 [ethnographical] map illustrates the ethnographic make-up of Central Europe for a high-level strategic audience such as the War Committee. It identifies ethnicities through spoken native language and represents them by colour, with the aid of an explanatory key. The map gives a good indication of the complex cultural intersections in Europe, and how incongruously they sat within the internal borders of the Austrian-Hungarian Empire. Ethnic tensions within Austria-Hungary had provided one of the sparks for war.

The War Committee required such information to assess current and future situations arising in the turbulent central region, and maps such as this one influenced the American president Woodrow Wilson, when in 1917 he formulated his 14 points. These prioritised the right to ‘national self-determination’, which led to the break-up of the Habsburg Empire, and appeared to legitimate the national conflicts which continue to this day.” (British Library)



Comparative Geography

28 WHITHAM, Paul P[age]

Map of China United States
Superimposed Drawn to same
scale. United States Dept. of
Commerce Bureau of Foreign &
Domestic Commerce .

Publication
Peking, July, 1919.

Description
Lithograph map, with outline hand colour
and manuscript annotations.

Dimensions
250 by 305mm (9.75 by 12 inches).

References
Roberta Allbert Dyer, Bankers and
Diplomats in China 1917-1925: The Anglo-
American Experience, (Routledge, 2013),
pp.93-94; Joan Hoff Wilson, American
Business and Foreign Policy: 1920-1933,
(University of Kentucky, 2015), p.204;
Dwayne R. Winseck and Robert M. Pike,
Communication and Empire: Media,
Markets and Globalization 1860-1930,
(Duke University Press, 2007), p.293.

An interesting map of China, with the United States superimposed on top, by Paul Whitham, an American engineer and trade commissioner. After the First World War, there was significant American interest in China, following the invasion of the country by Japan and the domestic May Fourth movement protesting American foreign policy and the treaty of Versailles. The American Group and two Consortiums were set up to support long-term, large loans to the Chinese government, in the interest of preventing political instability. Whitham was one of several American political and economic figures working on deepening the ties between the two countries. He “believed that American influence in China would depend on the United States’ ability to provide financing for American concerns”. The United States wished to continue having commercial influence: Whitham was concerned that American businesses, unlike European ones, were not willing to make loans to or invest in Chinese commerce (Dyer). He prepared the Whitham Report on American plans for post-war China, which included ambitious plans for American collaboration with Japan, Britain and France on a national rail network, new technical advisory boards with foreign members, and a reformed Banking Consortium (Winseck and Pike).

As the map’s legend notes, both countries are drawn to the same scale. The existing rail network (6,500 miles of track) is shown by a black and white dashed line, and the augmented network proposed by Whitham (21,000 miles) is shown by a thinner dashed line. The United States is outlined in red and China in green. Whitham wished to convey the potential for infrastructure development in China: a country in which the inhabited part “is roughly half as large as the inhabited part of the United States, yet it supports five times as many people... China must feed about 23 percent of the world’s population from about 7 percent of the world’s arable land” (Fairband and Golman).

Unfortunately, Whitham’s report did not have the desired impact. His proposals were backed by Frank Bosworth Brandegee, a Connecticut senator, who brought the report to the attention of the Department of Commerce, the Secretary of State and President Woodrow Wilson. Wilson was unconvinced, replying “I am of the belief that the public interests would not be conserved by the transmission to the Senate of the report requested”.



A groundbreaking geological map of Australia

29 **EDGEWORTH DAVID, Sir T[anatt] W[illiam]**

A New Geological Map of the Commonwealth of Australia (Including New Guinea), Together with a Volume of “Explanatory Notes”.

Publication
Sydney, [map] Commonwealth Council of Scientific and Industrial Research; [book] Australasian Medical Publishing Company, 1931 and 1932.

Description
Chromolithograph map in four sections, dissected and mounted on linen, [together with:] booklet 8vo (iv), 177, (1) pp., 11 tables, (of which nine are folding, one is full page and one is half page), plus ten figures, maps set into the text, original paper wrappers, ownership stamp to upper cover, original green buckram slipcase, publisher’s label pasted to upper cover.

Dimensions
1600 by 1975mm (63 by 77.75 inches).

References
Norman Abjorensen and James C. Docherty, Historical Dictionary of Australia, (Rowan & Littlefield: Sydney, 2014), p.124; National Library of Australia, Australia in Maps: Great Maps in Australia’s History from the National Library’s Collection, (NLA, 2007) 88.

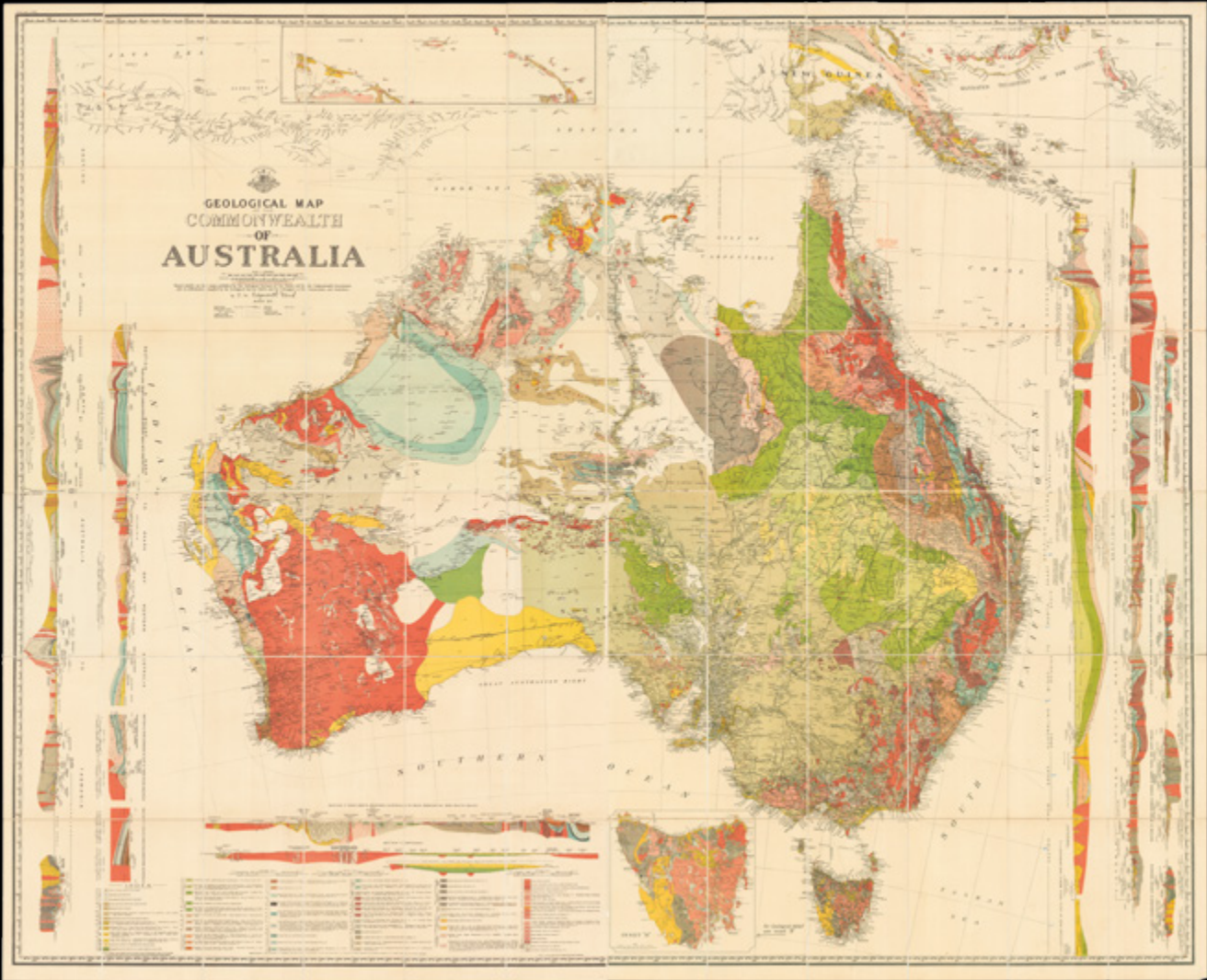
First edition of Edgeworth David’s comprehensive geological map of Australia.

The map is the final published work of Sir Tanatt Edgeworth David (1858-1934), a Welsh Australian geologist and explorer. Edgeworth David was a formidable character, emigrating to Australia in 1882 after he was appointed Assistant Geological Surveyor at the New South Wales Department of Mines. After being made professor at the University of Sydney, he led an expedition which proved that coral atolls were built on a platform. By now a well respected geologist, he used his influence to raise money for Ernest Shackleton’s 1907 expedition to the South Pole. He then joined Shackleton’s team, even though he was about to turn fifty, and eventually led the successful expedition to the magnetic south pole while Shackleton’s expedition was forced to turn back from their attempt to reach the geographic pole. During the First World War, he was involved in the creation of and then commissioned into the Australian Mining Corps.

Edgeworth David’s great work had been in his mind since he came to Australia, and there was pressing contemporary need for greater geological data on the continent after the discovery of gold in Australia in 1851. Edgeworth David began work in 1922 by plotting data onto a 1921 base map. He compiled the results of other geological surveys alongside his own, as well as undertaking new expeditions. Although finished by 1928 and sent to England for corrections, Edgeworth David continued to correct it until it went to print in 1930. The map and accompanying text was intended to be the first part of Edgeworth David’s monumental work ‘The Geology of the Commonwealth of Australia’ but, unfortunately, he died before he managed to complete the accompanying book. The work would eventually be published by the work’s co-author Professor Browne in 1950.

The map features two inset maps of the Admiralty Islands and New Ireland plus another of Tasmania, there are also numerous geological cross sections to the overall edges of the maps. As well as the geological information the map also provides information railways, telegraph lines, cable routes, state boundaries, roads, tracks, lighthouses, and altitude.

Provenance
Ownership stamp of Lieutenant Colonel A. Delmé-Radcliffe DSO.



“The best ever graphic synopsis”

30 BECK, Harry

Map of London's Underground Railways. A new design for an old map. We would welcome your comments. Please write to Publicity Manager, 55, Broadway, Westminster, S.W.1.

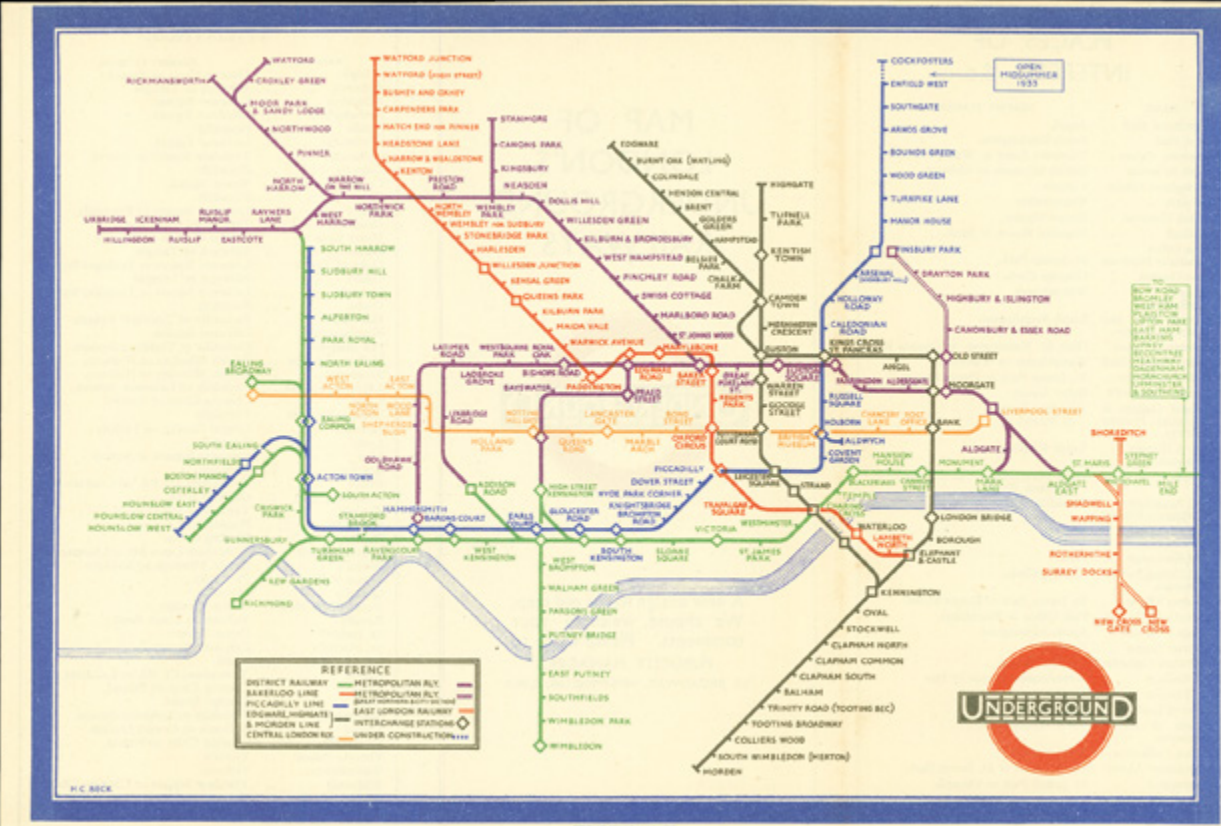
Publication
London, London Transport, 55, Broadway, Westminster, S.W.1, [January, 1933].

Description
Chromolithograph plan, title, list of places of interest and theatres to verso.

Dimensions
142 by 202mm (5.5 by 8 inches).

References
Stephen Bayley, '20 designs that defined the modern world', via cnn.com.

A fine example of Beck's iconic map of the London Underground System. The map was designed by the 29 year-old engineer Harry Beck. Abandoning the restrictions of a geographically correct layout, the map actually constitutes a diagram of the network, showing relationships rather than distances to scale. By using only verticals, horizontals and diagonals, and adopting a clear colour scheme, Beck created a design classic, both easy to use and aesthetically appealing. After the positive public response to the limited trial run issued in 1932, the design was formally adopted in 1933, becoming an essential part of London Transport's campaign to project itself as a modern, rational and efficient system. The design remains in use to this day, having become essential to the comprehensibility of complex transport networks all over the world. The present example is the first state of the map issued in January of 1933: the interchange stations are marked with a diamond; the Piccadilly Line is under construction between Enfield West and Cockfosters, due to be opened mid-summer of 1933.



Beck's tube map poster from 1939

31 BECK, Harry

[London Underground Map].

Publication
London, Waterlow & Sons, [1939].

Description
Chromolithograph plan, backed on linen.

Dimensions
640 by 820mm (25.25 by 32.25 inches).

A poster of Beck's iconic map of the London Underground System.

The plan shows both the Central Line under construction from Liverpool Street to Ongar, and from North Acton to Denham; and the Northern Line from Finsbury Park to Alexandra Palace, High Barnet, and Bushey Heath. The extensions to the network were part of the 'New Works Programme' (from 1935 to 1940), a major investment programme by London Transport. The plan can be dated by the text below Highgate "(from Summer of 1940 only)". By June of 1939 the Northern Line extension from Archway to East Finchley had been completed, although excluding Highgate station as shown on the plan. The extension to High Barnet, shown here as under construction, would not be open until 14th April 1940.



Bomb Alley

32 The Kent Messenger

Where the Doodle Bugs Crashed in Kent. Summer 1944. This Map, exclusive to the "Kent Messenger", indicates where each flying bomb crashed in the Kent Section of the South East Region. It vividly portrays how Kent earned the name of 'Bomb Alley.'

Publication
1944.

Description
Lithograph map, traces of old folds, news article to the left of map.

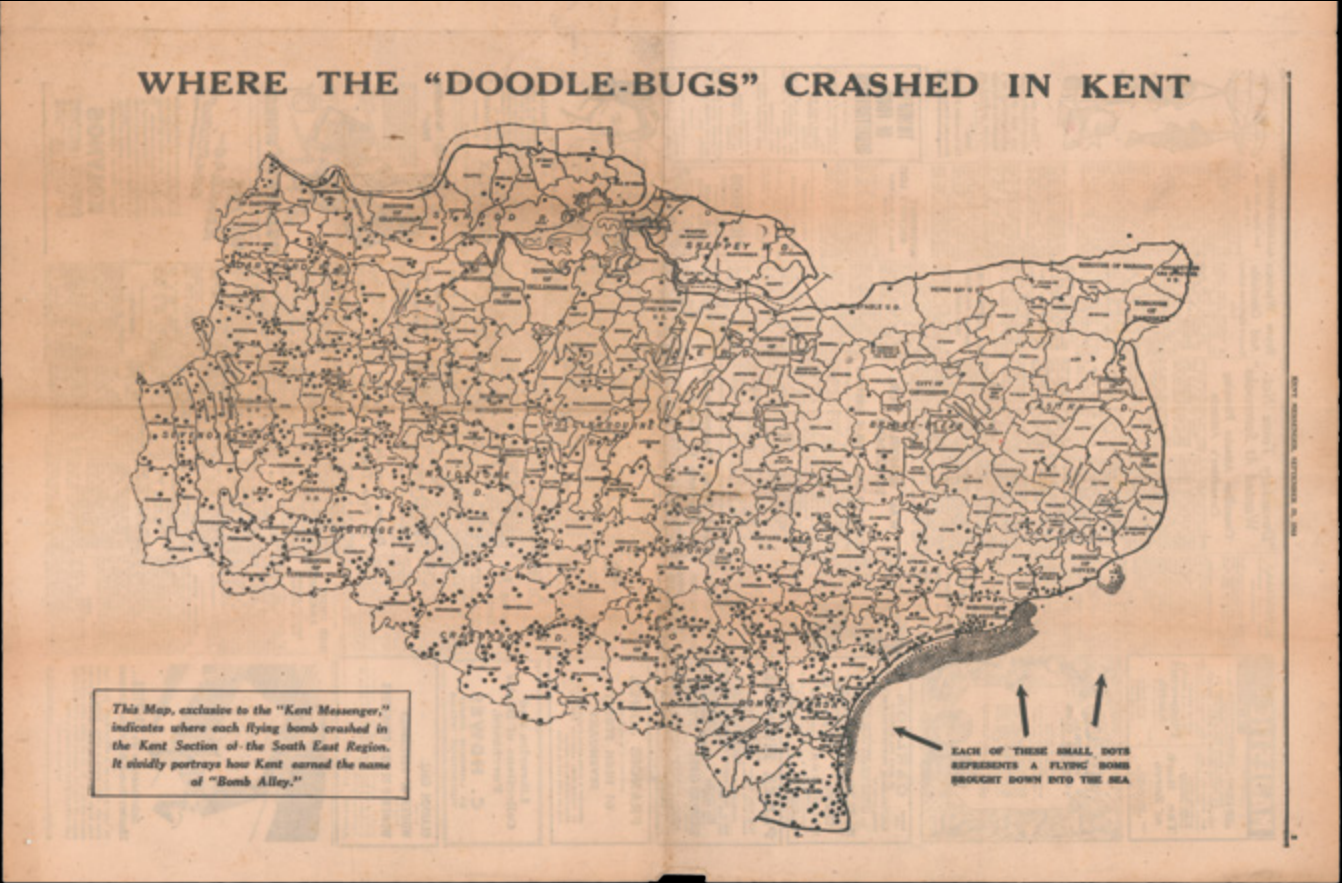
Dimensions
490 by 680mm (19.25 by 26.75 inches).

References
BLMC Maps 3059.(2.)

An unusual and detailed map of Kent depicting the crash sites of the German V-1 flying bomb, nicknamed "doodlebugs" because of their erratic flight paths and distinctive buzzing sounds. As the inscription notes, Kent became known as "Bomb Alley" during the Blitz, because it was the direct route for enemy bombers and targeted missiles on their way to London. The first V-1 was launched at London on 13 June 1944, one week after the successful Allied landing in Europe, and landed in Bromley. At its peak, more than one hundred V-1 bombs a day were fired at southeast England - 9,521 in total - decreasing in number until October 1944, when the last V-1 site in range of Britain was overrun by Allied forces.

Although London was the target of this onslaught, as Hitler's aim was to decrease morale in the capital, it was hard to fire V-1s accurately, and the ones that fell short often landed in Kent. As the article on the map points out, 200 more bombs actually fell on Kent than the Greater London area. The article goes on to emphasise the role played by Kent anti-missile guns in stopping many V-1s before they made it to London (they could only be shot down over open country) and the debt owed to them by Londoners.

A copy is held in the British Library.



The Marshall Plan

33 Österreichisches Institut für Bildstatistik

Die Marshallhilfe für die Steiermark.

Publication
Vienna Freytag-Bernd & Artaria [1950].

Description
Chromolithograph map.

Dimensions
390 by 480mm (15.25 by 19 inches).

A rare statistical pictorial map of Styria in Austria showing how much money from the Marshall Plan was invested in different regions in the following industries: iron and steel, iron ore mining, coal mining, electrical production, machine manufacturing, paper products, wagon making, glass, conversion of state buildings, lumber mills, agriculture, and on building of streets and bridges. Each ‘coin’ represents one million schillings of investment.

The Marshall Plan, or officially European Recovery Program, was an American initiative to help rebuild Western European economies after the end of World War II.

The map shows most of the money was invested in the north, as the south and the west remained almost completely underfinanced until 1950.

We could only trace one other institutional example, in the David Rumsey Map Collection at Stanford.



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