

THE ATLAS OF INDIA 1823-1947/THE NATURAL HISTORY OF A
TOPOGRAPHIC MAP SERIES

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ABSTRACT The *Atlas of India* was the principal topographic map series of British India. Copper-engraved at four miles to an inch, new sheets were produced for almost eight decades, from 1827 to 1906. This paper follows its history, with an emphasis upon the earlier decades. It starts with the shift in the East India Company's policy between 1800 and 1823 from restricting access to openly distributing geographic information. It continues with a discussion of the ties between the Company and commercial cartographers, notably Aaron Arrowsmith and John Walker. Of significance in this respect is the conflict over the responsibility for map compilation and production between the commercial cartographers in London and the surveyors in India. Finally, with the transfer of production to India in 1870, this paper discusses the compromises made by the Survey of India as the *Atlas* competed for limited resources with other (lithographed) topographic map series at larger scales, until the *Atlas*' formal demise in 1906. However, *Atlas* sheets continued as the basis for many new maps until the Second World War and Independence in 1947.

Very few of the topographic map series generated by the great surveys of the nineteenth and twentieth centuries have had an active life as long as that of the *Atlas of India*. Begun under the auspices of the British East India Company in 1823, the last new sheets appeared eight decades later in 1906. This huge undertaking produced 79 full-sized and 280 quarter-sized copper-engraved sheets (Figure 1), at a scale of four miles to the inch, all in a variety of states and editions.¹ After 1906, *Atlas* sheets and their data continued to be used by the Survey of India until the end of the Second World War and (presumably) Independence in 1947. This paper is a 'natural history'² of this overwhelming and otherwise little-known cartographic venture, from its uncertain conception and elephantine gestation to its lingering demise. The focus, however, is on the *Atlas*' early decades, when the ground-rules for its existence were established. As such it constitutes an exploration of a number of broader issues - issues such as the transfer of technology from Europe to its colonies, the relationship between the compiler of a map and the information being mapped, and the nature of the commercial practice of cartography in early nineteenth-century London.

Like any other octogenarian, the *Atlas of India* witnessed its fair share of changes to its world. At its establishment in 1823 as the sole large-scale, printed map of India, the *Atlas* represented a compromise among the cartographic conditions then prevalent in India and London. First, it was a means for the East India Company to give all the disparate surveys of India a coherent image more in tune with the great national surveys which epitomized contemporary cartographic fashion in Europe. The *Atlas* adopted the form and visual rhetoric of the new topographical surveys, yet could not aspire to their accuracy, a compromise which I discuss elsewhere.³ Second, production of the *Atlas* sought to find a middle ground in a dilemma that had long troubled the Company's directors and officials: how could geographical information be circulated and used to the best advantage without letting it fall into the hands of a hostile power? Third, the *Atlas* constituted

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an institutional compromise in the same tradition as the contemporary mapping activities of the British Government. The Company had insufficient expertise to produce the *Atlas* entirely by itself, and so contracted out its production to commercial cartographers. The context of the *Atlas*' production underwent drastic change in the middle of the nineteenth century. By 1840, access to the East India Company's geographical archives was becoming more open; by 1860, topographic and cadastral maps were increasingly being published in India. Although it still kept its pride of place as the premier map of India, the *Atlas of India* became just one of two or three different series of published topographic maps. The *Atlas*, obsolete and too detailed to be updated, was reluctantly abandoned as a result of the 1905 reform of the Survey of India. Nonetheless, the form of the *Atlas* sheets was perpetuated until well into the Second World War, when old sheets were still being stripped together to form 'new' quarter-inch maps.

THE MAPPING OF INDIA: MANUSCRIPT vs. PRINTED, SECRECY vs. UTILITY

Just as the European governments of the eighteenth and early nineteenth centuries were highly sensitive about geographic information concerning their territories,⁴ so too was the British East India Company. Fearing the acquisition of strategic information by hostile nations, the Company restricted the distribution of geographic information by keeping a close tab on the production and copying of maps. The Company's Directors and their overseers in the British Parliament were worried, not so much that maps would fall into the hands of Indian princes hostile to the Company's expansion, but that the maps would be stolen by European rivals, i.e., the French, in the Game of Empire.⁵ Company orders against the widespread distribution of maps first appeared in a Bengal General Order of 1779, still in effect in the 1820s, which stipulated that the Surveyor General of Bengal "shall not furnish ... to any person whatever, copies of any maps or plans of the country, without an order in writing, from the [Military] Board or the Commander in Chief."⁶ Moreover, the aversion against map publication was self-reinforcing: once it was accepted that maps were to remain in manuscript, it was argued that the number of copies should be kept to a minimum to prevent the introduction of copyists' errors.⁷ Proposals for the publication of large- and medium-scale maps of British India were therefore routinely dismissed before 1823 and those maps remained in manuscript.

This is not to say that the Court of Directors in London was against the publication of *all* maps of India – it simply forbade those which might be of military use. The Company was a generous financier of any publications to do with India, China, and its other areas of interest; by the early 1840s it was devoting £2,000 each year to subsidize "Books, Maps, and Charts relating to India."⁸ As small-scale maps of India generally fell outside its proscriptions, the Court accordingly permitted them to be published and often opened up its map collections to certain commercial cartographers in London. For example, James Rennell made extensive surveys of the roads and rivers of Bengal between 1765 and 1777, at a scale of five miles to the inch. Copies of the original survey maps were taken back to England by Henry

Vansittart and Robert Clive, successive Governors of Bengal, much to the dismay of the Company's Directors who did not want the public dissemination of the material. Yet those same Directors also lent Rennell £250 to underwrite the engraving of those same maps for his *Bengal Atlas* (published 1780–81). The difference was that the published versions of Rennell's maps were at a much smaller scale than the original surveys – only ten or twenty miles to an inch – and their publication was not taken as being a breach of the Company's confidence.⁹ Subsequently, cartographers like Aaron Arrowsmith or those working on behalf of the Company's favorite book publishers produced many maps dedicated either to the Company in general or to specific members of the Court of Directors. Indeed, the Company was viewed by some as a possible source of funding even for projects unrelated to India, as when J. & A. Walker (unsuccessfully) sought Company patronage for a map of North America.¹⁰

After the European Peace of 1814, and with the increasing consolidation of Company power in India, the Court's proscriptions against map publication relaxed somewhat and it began to allow the printing of medium-scale maps. The Court made it quite clear, however, that it possessed proprietary rights in the information gathered by Company officers in India. In 1822 and 1823 it actively sought the return of maps of India by Charles Reynolds (Surveyor General of Bombay) and Robert Colebrooke (Surveyor General of Bengal) from their executors.¹¹ And in 1828 the Court made a specific order prohibiting Company officials from treating their maps as private property and publishing them on their own account, as Sir John Malcolm had done with his surveys of the Narmada Valley in western India.¹²

Until the early nineteenth century, the responsibility for making maps in India – but not necessarily the responsibility for conducting actual surveys – lay with the Surveyors General at the three centers of British administration in India (then called 'Presidencies'): Calcutta (Bengal), Madras, and Bombay. In 1814 the Directors assessed the efforts of these officers and found them wanting, in terms of both the cost and the quality of their maps. Three general maps of India received the Court's particular censure: Reynolds' of 1809 which was estimated to have cost well over £100,000 and which was still unfinished; Thomas Call's map, ca. 1780, which was made for an unspecified but nonetheless 'considerable' sum; and Colebrooke's of 1806, which had now been misplaced. The Court particularly objected to the fact that there had been no sharing of information between the Surveyors General at each Presidency which meant that these expensive maps were inherently flawed. Accordingly, the Court ordered the unification of the three offices into a single office at Calcutta. The new Surveyor General of India would neither conduct nor oversee surveys but would "receive and appreciate the surveys made by others ...," reduce them to a uniform scale, and produce large-scale provincial maps together with the "General Map of India." All these maps were to be updated as soon as new information was received. The Surveyor General of India was therefore to be an armchair geographer *par excellence*.¹³

The first Surveyor General of India, Colin Mackenzie, had little success in his attempts to create either the provincial or general maps which the Court had ordered. He arrived in Calcutta in July 1817, to find the office "in a woeful plight."

There was no order to the maps (to which there had been few recent additions), no maps had accompanying memoirs by which to judge their worth, and the office was so understaffed that it could not keep up with the constant requests for new maps from other government officers.¹⁴ For Mackenzie, the only form of relief was the publication of an atlas of India. By an 'atlas' he meant a collection of large-scale maps - at two miles to an inch - along regular sheet-lines which would together form a complete topographical image of India. He did not cite Rennell's *A Bengal Atlas* as an example of the sort of atlas he had in mind, most probably because Rennell's data came from an out-dated mode of survey and because Rennell's maps were at scales five or ten times smaller than those of Mackenzie's own manuscript atlases based upon his surveys in southern India.¹⁵ Mackenzie had already proposed just such an atlas in 1808, without specifying whether or not it would be published; the Directors had assumed that it would be, and had accordingly rejected the proposal.¹⁶

Increasingly stricken by poor health, Mackenzie completed little work before his death in May 1821. Mackenzie's successor, John Hodgson, therefore had to face the same problems, and he suggested a similar solution: he began his atlas of India. He ordered the Assistant Surveyors General at Madras and Bombay to compile maps of their territories at both four and sixteen miles to an inch. The first batch of these maps, sent to England in late 1822, included twelve maps of Madras districts;¹⁷ the next batch, transmitted in November 1823, included a map of the Peninsula of India at sixteen miles to an inch and the first part of Hodgson's own "Atlas of the North-West of India."¹⁸ Hodgson's atlas was at half the scale that Mackenzie had proposed, and not surprisingly he found Rennell's *Bengal Atlas* to be the perfect model.¹⁹ The Indian Government agreed and wrote to London, requesting that the "Atlas of the North-West of India" be published.²⁰ In India, then, it was becoming quite clear that the old relationship between the secrecy and utility of geographic information was no longer adequate. Utility was beginning to outweigh secrecy in the minds of surveyors and administrators alike.

MAPPING INDIA FROM AFAR: AARON ARROWSMITH

While surveyors and mapmakers struggled to meet the demand for maps to India, the London cartographer Aaron Arrowsmith provided a partial solution to their problems when in 1822 he published his *Atlas of South India in Eighteen Sheets*, at a scale of four miles to an inch.²¹ Arrowsmith was a prolific cartographer who specialized in huge maps, each comprising several very detailed sheets, all meticulously compiled from the best possible sources,²² although like other commercial cartographers he did not limit himself to the legitimate acquisition of geographic data.²³ Arrowsmith's ties to the political establishments in Britain were those of the favoured artisan.²⁴ He was appointed 'Hydrographer to the Prince of Wales' and then, on George IV's accession, 'Hydrographer to the King.' Shortly after his death in 1823, a contemporary (who was not as unsympathetic as it might seem) described this title as being no different from that of "rat-catcher" to his Majesty, [as it] signifies no more than 'a tradesman with whom the King (individually) is

accustomed to deal'.²⁵ Arrowsmith's relationship with the East India Company was more equal, as he was a favoured recipient of the Company's geographical information. Indeed, on at least one occasion the Company even sent an Arrowsmith map to the Surveyor General in India "for a better arrangement of its sheets."²⁶ It would appear that Arrowsmith's tie to the Company was cemented sometime between 1804 and 1809. His first map of India, published in six sheets in 1804, was based primarily upon information which Arrowsmith received directly from Mark Wood (Surveyor General of Bengal, 1786-88) together with notes gleaned from the *Asiatic Researches*, the organ of the Asiatic Society of Bengal.²⁷ By 1809 Arrowsmith was able to publish a map of Malabar based on Colin Mackenzie's recent large-scale surveys which he could only have consulted in the East India House.²⁸

Arrowsmith published the first edition of his huge, nine-sheet *Improved Map of India* in 1816.²⁹ Although it did attract some criticism,³⁰ the map was generally well-liked and well-used by the Company's officers in India. Mackenzie thought very highly of Arrowsmith's "habits of arrangement and exactness" and cited the map as an example of the utility of publishing maps in order to relieve the problems of the extensive copying of manuscripts. Further noting its usefulness for showing the "whole of India in a general view," Mackenzie used the map to create a standard table of distances to be used for calculating travel allowances in India.³¹ Lord Hastings (Governor General of India, 1813-23) suggested that the map be used to plan the general route of a new road.³² Finally, when John Hodgson was asked to evaluate an updated version of Reynolds' map of India, he used two yardsticks: the highly accurate, geodetic survey of southern India by William Lambton; and Arrowsmith's *Improved Map of India*. Even though Reynolds' map was at twice the scale of Arrowsmith's, Hodgson nonetheless felt Arrowsmith's to be far superior in terms of its accuracy and level of detail. For Hodgson, the *Improved Map of India* was the best map of India yet published and stood comparison with maps of "some of the most civilized countries in Europe."³³ It is not surprising therefore that Hodgson wanted Arrowsmith to engrave his "Atlas of the North-West of India."³⁴

Arrowsmith's sources for the *Improved Map of India* included all the surveys completed by 1813, together with Colebrooke's general maps of India.³⁵ He also gave, below the title on the third sheet, a list of the suppliers of new information:

For the great additions and improvements in this [re]publication of the Map of India I have to express my grateful thanks for the great assistance I have received, to His Grace the Duke of Wellington for valuable materials collected during his Campaign in India, to Col. Allan, Genl. Kyd, Sir John Malcolm, Sir James Mackintosh, Dr. Buchanan, Mr. Sydenham, but chiefly to the Honble. the Court of Directors for their liberally permitting me the use of the truly valuable Map of Mysore by Col. Colin Mackenzie, Surveyor General of India.

Mackenzie's maps were certainly the best of all these sources as they were the most comprehensive and most extensive topographic maps yet prepared in India. But Arrowsmith could not do justice to Mackenzie's magnificent maps at the reduced scale of the *Improved Map of India*. Instead, he engraved them six years later, at four miles to an inch, to produce the *Atlas of South India*.

On 23 May 1822, Arrowsmith submitted to the Court of Directors preliminary copies of his *Atlas of South India*, together with "the first copy of a single sheet map of India." The Directors approved of the maps and permitted Arrowsmith to dedicate the Atlas to them. They also resolved upon buying forty copies of both the atlas and the single-sheet map.³⁵ Arrowsmith published the *Atlas of South India* with the marginal date of 2 July 1822, while the single-sheet map of India, entitled *Sketch of the Outline ... of India*, bore the marginal date of 14 May 1822.³⁷ In September, the Court bought the forty copies of each, for a total of £499 18s.³⁸ The *Sketch* is significant because Arrowsmith displayed on it the suggested sheetlines for an atlas of all India. In a comment beneath its title, Arrowsmith proclaimed:

Note. This map is intended to shew how many sheets of this size would be required for a Map of India on a scale of four English Miles to one Inch, any one of which may be engraved independent of another when materials offer, and may be united to the rest by keeping correctly to the lines as drawn on this Map. The sheets as far as No. 16 are already engraved on the above scale.

Arrowsmith thought 102 sheets would be sufficient; the first sixteen sheets (plus title sheet and index) constituted the *Atlas of South India*.

The timing of Arrowsmith's *Atlas of South India* was almost miraculous. An intensely detailed work, the *Atlas of South India* had clearly been in preparation for a long time, yet Arrowsmith submitted it to the Court just when a delay in replying to Calcutta's letters on surveying meant that the Directors had before them five years' worth of lengthy memoranda by Mackenzie and Hodgson on the necessity of a published, large-scale atlas of India. The wording of the Court's minutes about the *Sketch* and the *Atlas of South India* clearly indicate that the Court had commissioned neither. If one rules out serendipity, then the prime mover behind the creation of the *Atlas of South India* can only have been the Company's military secretary, James Salmond. The Company's permanent secretaries had immense power because they set the Court's agenda within their respective departments. They wrote the letters to India which laid out policy and "interpreted" the Directors' wishes on any given matter. While Salmond remains largely invisible to historians, there are several hints that he was the key individual in establishing the Company's mapping policy. He was certainly no enemy to the concept of a systematic survey and systematic map of India and, according to Clements Markham, spent upwards of twenty years in correspondence with Colin Mackenzie on the subject.³⁹ Markham also stated that Arrowsmith was "consulted" (implying it was by Salmond) with regard to the publication of the larger-scale maps coming out of India in the late 1810s. Thus, Arrowsmith might well have produced the *Atlas of South India* at Salmond's behest, so that the latter might more easily win over the Directors to the idea of publishing large-scale topographic maps of India, which was in turn part of a larger plan to undertake an expensive triangulation across all of the Subcontinent.⁴⁰

The choice of scale for the *Atlas of South India* seems to have been a compromise between the speed and expense of engraving, the availability of information,

and the nature of the maps themselves. The choice of scale was criticized by one correspondent of the *Asiatic Journal* who felt that Arrowsmith should have made use of the larger-scale maps of India then available, and which were being used for the creation of general maps in Madras itself.⁴¹ Another correspondent (so knowledgeable as to perhaps be Salmond himself) argued in return that the smaller scale was a compromise between the expense and speed of engraving and the nature of the maps required:

I believe the first idea of engraving an Atlas of India on a scale of four miles to an inch, originated with Col. Mackenzie ... He considered that scale amply sufficient for all practical purposes, and recommended it as a measure of economy ...⁴²

The bulk of Arrowsmith's information for the *Atlas of South India* came from Mackenzie's general maps of large regions of southern India at four miles to an inch.⁴³ Moreover, Arrowsmith had used the scale before, for his map of Scotland, and had found it "adequate to contain all the names and places and other particulars which appear on the several plans and maps which I consulted."⁴⁴

Whatever the reason for the *Sketch* and the *Atlas of South India* – whether they were simply commercial ventures, or whether they were part of Salmond's larger plan – and whatever the reason for the scale, the idea of an *Atlas of India* struck a chord with the Court. The Directors did not, therefore, object in October 1823 to having the following statement sent to the Bengal Government:

We are extremely desirous of forming and with as little delay as is consistent with accuracy, a complete Indian Atlas upon a scale of 4 miles to an inch, which we consider to be the best suited to general purposes, and which has been adopted by Arrowsmith in a recent publication, of which we transmit you in the packet three copies.

This map would appear to form an useful and judicious basis for a complete geographical delineation of India, and it is our intention to have the several sections into which the sketch map is divided, printed off by some eminent map engraver, as fast as correct and satisfactory materials shall be supplied to us.⁴⁵

The court, too, had accepted a new balance between secrecy and utility in its mapping activities, a balance that now tilted in favor of the publication of survey materials.

MAPPING INDIA FROM AFAR: JOHN WALKER

The Court was not, however, as anxious to pursue its *Atlas* project as has been suggested.⁴⁶ Aaron Arrowsmith died on 23 April 1823, at the age of 73, and the Court let the project lapse rather than awarding it to Arrowsmith's heirs. The project remained in abeyance until 1825, when another London cartographer, John Walker, suggested himself for the job. Walker was no stranger to the Company or to its map collections. Born in 1787, the son of the cartographer John Walker, he and his younger brother Charles were thoroughly trained in the techniques of map

production.⁴⁷ By 1825 John Walker, Junior, had already made several small-scale maps of India in conjunction with the Company's favoured booksellers, Messrs. Black, Kingsbury, Parbury, and Allen. In 1820 he drew and engraved for that company a highly detailed one-sheet map of India which was probably a reduced version of Arrowsmith's *Improved Map of India*.⁴⁸ In June 1823, James Horsburgh, the Company's Hydrographer, petitioned the Directors that Walker be allowed access to the Company's geographic materials in order to compile a "correct and convenient sized map of Hindoostan in three sheets" which was "much wanted by the young Gentlemen in the Company's service." The map was, once again, to be published by Kingsbury *et al.*⁴⁹ The Court agreed and directed that Walker should work under the supervision of Charles Wilkins, the Company's librarian who also supervised the Company's map collection.⁵⁰ The map itself was published in 1825, now in four sheets,⁵¹ and was accompanied by a gazetteer of places in India which was advertised as featuring entirely recalculated latitudes and longitudes and which therefore superseded all previous gazetteers.⁵² Finally, the Company contracted directly with Walker to make a "Map of the Burman Empire," for 80 copies of which the Court paid him £41 8s in March 1825.⁵³ And, in the following year, Walker lithographed a number of maps of parts of Burma, no doubt as part of the effort for Lord Amherst's Burmese War of 1824-1826.⁵⁴

Walker's proposal that he undertake the *Atlas of India* was reinforced by the receipt, shortly beforehand, of John Hodgson's second batch of maps from India, many of which were at a scale of four miles to an inch. The minutes of the Court's Committee of Correspondence record for 2 June 1825:

The Committee having adverted to the military letter to Bengal dated the 29th October 1823, in which the Court stated it to be their intention to cause such materials as might from time to time be received for the formation of a complete Atlas of India to be engraved by a map engraver.

And it appearing that the Court have recently received several surveys of this description which were transmitted by the Bengal Government at the request of the Surveyor General, as under mentioned, viz.

Captains Hodgson's and Webb's surveys of the Himalaya Mountains, etc.
Smith's (Palamau) to (Rewah)
Franklin's (Bundalkandh)
Cheape's Chittagong
Johnson's Bhopal

And the Committee having had before them a letter from Mr. Walker a map engraver, stating the terms upon which he would undertake to prepare those maps for publication, it was

REPORTED to the Court submitting that the necessary arrangements be adopted under the superintendence of the Military Secretary, for the engraving and printing by Mr. Walker of these materials with such as may be hereafter received according to the Court's intention, and that with a view of defraying the expense, copies of the maps so printed be disposed of to the public in the same manner as the Marine Charts which have been from time to time engraved by the Court.⁵⁵

The Court approved this report a few days later.⁵⁶ The close timing between the

receipt of Hodgson's maps and of Walker's proposition points once again to the hand of James Salmond. It is tempting to think that Salmond took the opportunity to force a revival of the lapsed *Atlas* project by prompting Walker to apply, thereafter linking the proposition to the new maps.

Salmond took a direct role in the creation of the *Atlas of India*: he supervised Walker's work and was responsible for requesting the loan of maps from the Company's librarian.⁵⁷ As the Committee of Correspondence's report had suggested, the first *Atlas* sheets were indeed "disposed of ... in the same manner as the Marine Charts": they appeared under the imprint of the Company's Hydrographer, James Horsburgh, who maintained an office at East India House. It must be stressed that Horsburgh was the publisher of the *Atlas* and did not actually have any hand in the creation of the *Atlas*, a fact which was to confuse John Hodgson when the first batch of sheets reached India (below).⁵⁸ When both Wilkins and Horsburgh died on consecutive days in May 1836, Walker was given charge of the Company's maps and was appointed to be the Company's Hydrographer, being kept on retainer;⁵⁹ thereafter the *Atlas* sheets were published under Walker's name.

Walker was paid "by the piece" for the *Atlas*, using funds of the Company's Military and Political Department. That reimbursement, and the *Atlas* itself, was quite separate from the other cartographic work Walker did for the Company, which was paid for from the general fund allocated by the Court to buy and underwrite books and maps.⁶⁰ The range of Walker's additional work for the Company is evident from a few accounts surviving from the early 1840s. For the year ending 30 April 1842, Walker made and printed 40 copies of Alexander Gerard's map of Koonawur [Kinore] for £28, and also made a map of Kashmir for £25. In the following twelve months he was paid: £25 each quarter for "correcting marine surveys"; £64 for "inserting surveys into several charts"; £14/6 in June 1842 for "drawing and engraving [the] Map of Ariana [Afghanistan]" and printing 500 copies; and £122/5/6 for printing other maps.⁶¹ All this was in addition to his commercial practice of making maps for W.H. Allen (the relict of Messrs. Black, Kingsbury, Parbury, and Allen),⁶² the British Admiralty, and other sponsors.⁶³

THE DESIGN AND COMPILATION OF THE *Atlas of India* IN LONDON

Walker began work on the *Atlas of India* by creating his own sheet lines upon a version of Arrowsmith's own projection, as used for the *Atlas of South India*.⁶⁴ The projection's precise parameters were reconstructed in 1872 from the cartographer's manuscript notes and by cartometric analysis of the *Atlas* sheets by James Thomas Walker (no relation; then superintendent of the Great Trigonometrical Survey, subsequently Surveyor General of India, 1878-84). J.T. Walker found that the *Atlas* projection was based on the spheroidal figure of the earth established by William Lambton by his measurements of geodetic arcs in the Indian Peninsula between 1800 and 1818. Walker's central meridian (i.e. the meridian which appears as a straight, vertical line) was 76°30' east of Greenwich (Arrowsmith used 78°E for the *Atlas of South India*); J.T. Walker estimated that the *Atlas*' standard parallel (along which there would be no distortion) was 24°30' north. J.T. Walker was critical of these parameters, as the westerly meridian meant that errors would be that much larger towards the east and

as the standard parallel did not achieve the ideal division of the Subcontinent into two equal-halves. J.T. Walker also discovered that John Walker had used a slightly incorrect ruler, so that the scale of the sheets was not actually 1:253,440 but rather 1:255,561;⁶⁵ this error was, however, subsequently judged to have been "negligible against errors introduced by shrinkage of the paper."⁶⁶

Walker used a smaller sheet size than Arrowsmith. While also using the 'double elephant' sheet (27" x 40"), he did not fill the paper right up almost to its edges as Arrowsmith had done, but instead allowed a fairly substantial margin, so that the printed headline on each sheet was 24.4 inches tall by 38 inches wide, representing an area of 97.6 miles by 152 miles. The slightly smaller imprint meant that Walker's system needed a larger number of sheets than Arrowsmith's schema, a number increased yet further by Walker's intention to have the *Atlas* cover a larger area than Arrowsmith had anticipated in his *Sketch*. Walker wanted to cover more land beyond the Indus River, as well as Ceylon (even though it was a Crown Colony and not under the East India Company's control), Burma, and Malaya. The whole would entail 177 sheets (Figure 2). He subsequently added another row of six sheets across the northern edge, numbered 1A, 4A, etc. Ultimately, in about 1900, the eastern sheets were rearranged and renumbered to cover the Indian Ocean islands, giving a total of 184 numbered sheets (Figure 1).

It was a basic assumption of all concerned that there were insufficient materials at hand to complete the *Atlas of India* in any short period of time. Much of the Subcontinent still revealed great gaps when mapped at such a large scale. As Arrowsmith had noted on his *Sketch*, each atlas sheet could "be engraved independent of another when materials offer," an idea which was made explicit in the Court's initial announcement of the *Atlas of India* and in the Correspondence Committee's subsequent support of Walker's appointment to undertake the work. The order in which Walker produced the *Atlas* sheets depended therefore on the availability in London of suitable maps, which were defined as maps of sufficient accuracy and which could be easily reconciled with adjoining maps. At the least this required every map sent from India to London to possess at least one position whose latitude and longitude were accurately known. The perfect situation was for each new survey to be based upon the triangulation of the Great Trigonometrical Survey; if this was not the case, then it was held to be quite acceptable to correct a detailed survey when the triangulation finally coincided with it. The Court often reminded the surveyors in India of this need for control, no doubt at Walker's prompting.⁶⁷ Thus, the Court (or should it be Salmond?) thought it adequate for the Great Trigonometrical Survey to cover Bengal with chains of triangles which would then be used to correct Rennell's maps, despite the fact that Rennell's maps in the Company's possession were at five miles to an inch and did not show relief well.⁶⁸ Walker's production of the *Atlas* accordingly centered around collating the available material and reconciling it to the triangles as surveyed by the Great Trigonometrical Survey.

The Great Trigonometrical Survey was of paramount importance for the *Atlas of India*: Walker's first maps for the *Atlas* were not topographic sheets, but were rather diagrams at eight miles to an inch of the triangulation by William Lambton

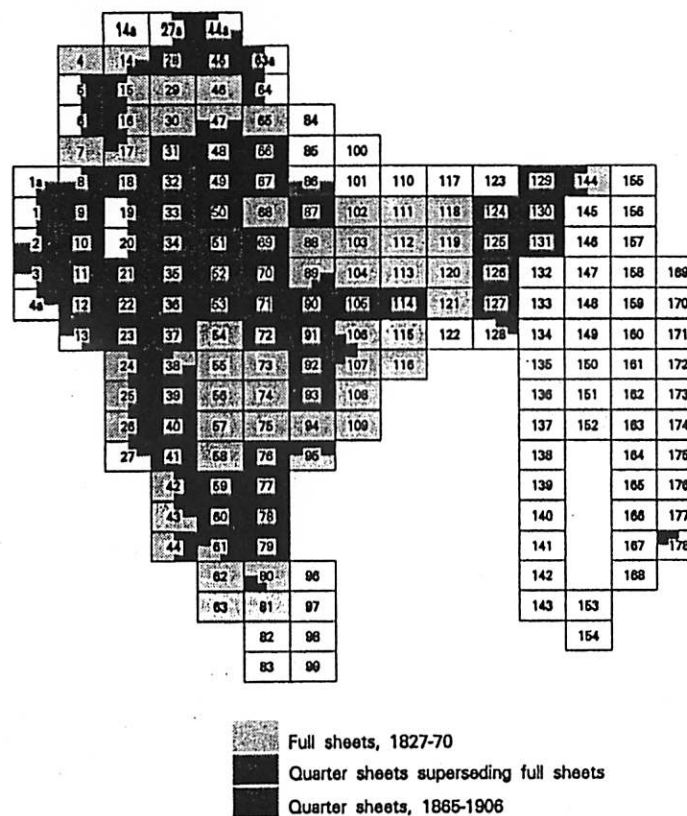
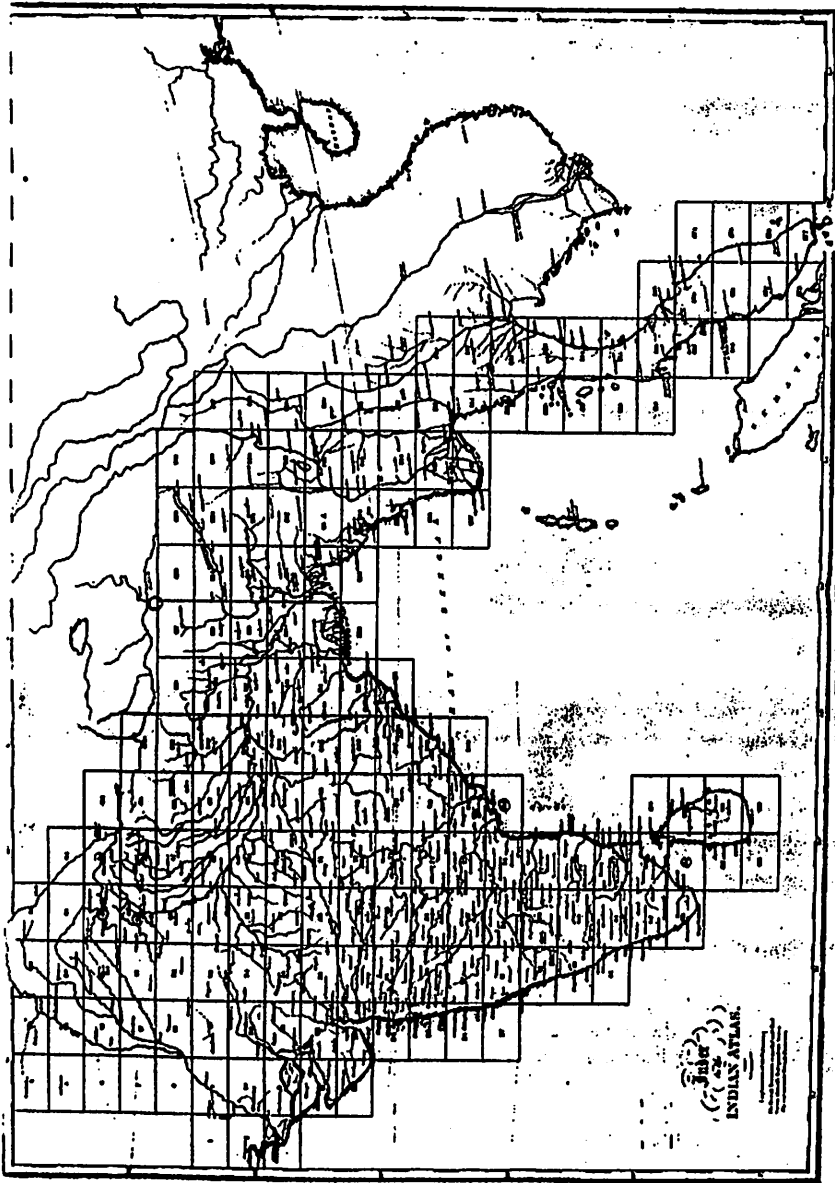


FIGURE 1. The final, published extent of the *Atlas of India*, according to the sheetlines of ca. 1900. Markham, *A Memoir on the Indian Surveys*, London: Allen & Co., 1878, 2nd. ed., opposite 406, presents a map of the actual geographic coverage of the *Atlas* to that date.

and George Everest in southern India.⁶⁹ That these maps were consciously made as an integral part of the *Atlas* is clear from the references made to them in 1830, when the Court was deciding whether to underwrite the publication of Everest's memoir on the geodetic work of the Great Trigonometrical Survey.⁷⁰ Not only was the memoir itself considered to constitute "part of the materials for the *Atlas of India*," but copies were sent to the same institutions as those to which the Court had sent the maps (implicitly respecting the Great Trigonometrical Survey) "already published for the *Atlas of India*."⁷¹ The memoir itself included less-detailed, lithographic copies of the maps of 1827 which were, of course, made by Walker.



Walker's first *Atlas* sheets *per se* were based upon some of the maps of Hodgson's second batch, as listed by the Correspondence Committee. Sheets 47, 48, 65 (Figure 3), and 66, were based on Hodgson's and Webb's work in the Himalayas; sheets 69 and 70 on Johnson's map of Bhopal. Thereafter, Walker concentrated on the southern Peninsula, tying the surveys by Mackenzie and others to Lambton's triangulation (Figure 4)), and on northeastern Bengal and Assam, using materials acquired during the Burmese Wars.⁷² As the production of the *Atlas* depended upon the availability of good surveys at sufficient scale, and that such surveys were still scarce in British India at this time, it should be no surprise that few of Walker's early *Atlas* sheets were filled right up to the margins. Instead, they generally consisted of large white spaces holding in the surveyed area (as in Figure 3). Of the 41 sheets published by 1851, only 10 had complete coverage, all of which were of the southern Peninsula and were based on Mackenzie's work. Moreover, four of those 10 sheets contained very little land and two were about half-sea.⁷³

The cost of engraving the *Atlas* sheets can be gauged from a number of references. In particular, Walker's earliest bills for the *Atlas* survive, and indicate a cost of between £129 8s and £142 15s for drawing, engraving and printing each sheet.⁷⁴ These figures are in line with Walker's report to Parliament in 1851 in which the total cost for drawing and engraving 41 sheets plus five revised editions was £5,844, which translates to a cost of between £134 7s and £142 10s for one sheet.⁷⁵ In 1898, however, Walker wrote to the Court that drawing and engraving the first 29 plates of the *Atlas* cost "somewhat less than 100 guineas" (£105) apiece,⁷⁶ but as he was then trying to show the cheapness of map printing in London, this apparent aberration may be dismissed as propaganda.

It is quite likely that the Company did not profit from the sale of the early *Atlas* sheets. Walker noted in 1851 that handcolored sheets were sold to the public at 4s per sheet. Discounting the cost of coloring, this price would entail the Company having to sell 20,220 sheets to the public (or 712 copies of each) to recoup the £5,844 expended to that time. Such large sales would also have been in addition to the sheets taken for the Company's own use. But few copies of sheets were printed, and fewer were made available to the public. One of Walker's bills was for the printing of only 125 copies of the *Atlas* sheets,⁷⁷ and of those few, about 90 were sent to the Indian Governments: the Court sent 40 copies of each sheet to its respective Presidency and 20 copies to the other Presidencies, plus a few to the minor Governments of St. Helena, Prince of Wales Island, etc. An 1830 list of the distribution of the sheets received in Madras shows that half of the sheets which showed part of the Madras territories had been given to the Assistant Surveyor General's office (240 out of 440 copies of 10 sheets) while only one or two copies of all 16 sheets received had been circulated to other members of the administration.⁷⁸ If the Indian Governments wanted more than their initial allowance of sheets, they had to request them explicitly from the Court.⁷⁹ Court approval was also necessary before the Indian Government could give out copies of *Atlas*

FIGURE 2. Sheetlines for the *Atlas of India* by John Walker, 1827; each sheet was to be produced separately, as soon as sufficient materials were available. By permission of the American Geographical Society, University of Wisconsin-Milwaukee.



sheets to a civilian.⁸⁰ Both internal distribution and public sales of the *Atlas* would therefore appear to have been limited – at last in the early period of the *Atlas*' history – so that it is likely that the Company lost a substantial amount of money on the project. Not that the Company set out to create a commercial cartographic venture: the public sale of the *Atlas* sheets was intended simply to help defray the costs of production.

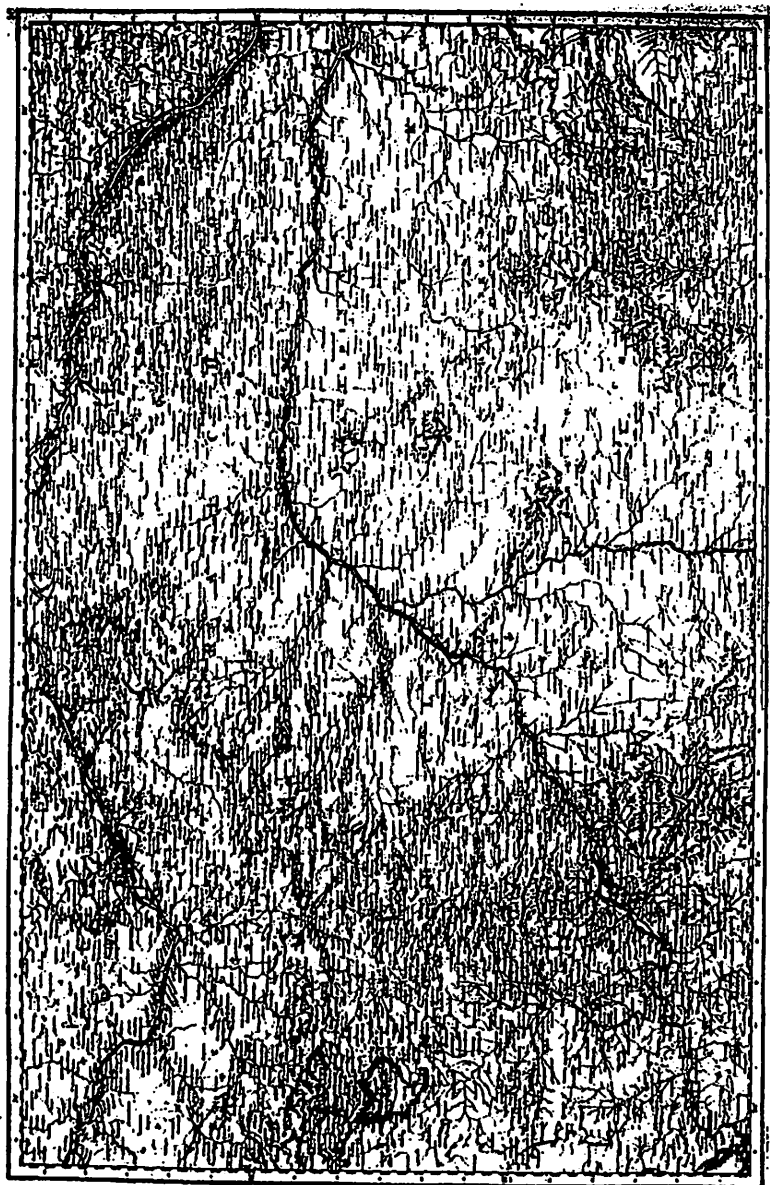
THE DESIGN AND PRODUCTION OF THE *Atlas of India* IN INDIA

The Court's letter to India of October 1823 which described the establishment of the *Atlas of India* was followed by a series of dispatches in which the Surveyor General of India was enjoined, for example, that "no delay may ... take place in your endeavours to form the most perfect Indian Atlas which the means within your reach will enable you to frame."⁸¹ Unfortunately, such commands were ambiguous. The Court intended them to refer only to the prosecution of new surveys so that a complete *Atlas* would be able to be finished as soon as possible. But the orders were interpreted as meaning that the compilation – if not the actual production – of the *Atlas* should also be done in India.

Valentine Blacker had taken over as Surveyor General from John Hodgson in late 1823, at which time the Indian Government had directed him to continue Hodgson's work on a general map of India.⁸² Blacker's first efforts were hampered because of the poor state of his office in Calcutta (it did not even possess a copy of Rennell's *Bengal Atlas*⁸³). Upon the receipt of June 1824 of the Court's orders of October 1823, Blacker interpreted them as awarding him responsibility for creating the *Atlas*. He began by establishing a projection and sheetlines. The projection (like Arrowsmith's, a variant of Bonne's) was that recently adopted by the French *Dépôt de la Guerre* for the new topographic map of France, and his sheet size was fractionally smaller than Arrowsmith's.⁸⁴ Blacker had the tables for both the projection and the sheetlines lithographed for circulation, but no copy has survived.⁸⁵ It was also Blacker's intention to have the maps printed in India to reduce errors caused by transmission of maps to England, particularly with respect to topography.⁸⁶ Blacker had started work on three sheets covering parts of Bengal before his early death in March 1826.⁸⁷

Hodgson was reappointed Surveyor General. He promptly began a new plan for the *Atlas* in which the surveys were to be compiled (at four miles to an inch) into sheets one degree square, which "when bound ... will not be a size too large to be conveniently carried."⁸⁸ The Company's archives contain a series of such

FIGURE 3. *Atlas of India*, sheet 65 (SW portion). One of the first batch of sheets, published 1 May 1827, this was engraved by "John Walker" rather than by "J. & C. Walker." Most of the detail is approximate; the valley of the Bhagirathi River was surveyed by Captains John A. Hodgson and James D. Hervet in 1817 as they searched for the headwaters of the Jumna and Ganges rivers. Just above the Gurkha town of Gangotri they found one source for the Ganges: the issue of the Bhagirathi from a large glacier. The hearsay basis for British knowledge beyond immediately surveyed regions is illustrated by the annotation for the town of Chaprung on the "supposed course of the Sutlej R." (modern Zanda, Tibet; top right): "Is the residence of a Zoompoong or Killadar. There is said to be a Stone Fort here capable of containing 1000 men." The border with Tar[tary] marks the ridge of the Himalayas, the modern boundary between India and China. By permission of the American Geographical Society, University of Wisconsin-Milwaukee.



maps for the Bombay Presidency, dated from 1827 to 1833.⁸⁹ It would appear that Hodgson saw the degree-sheets as an intermediary stage in the production of an *Atlas*, because he also continued the production of Blacker's sheets. Several such sheets of parts of Bombay and Madras presidencies have survived in London. These illustrate the division of responsibility for sheet compilation between the Assistant Surveyors General: two of the sheets cross the border of the Bombay and Madras presidencies and are duplicated; the sheet constructed in Bombay shows only Bombay territory, with Madras territory left blank, and *vice versa*.⁹⁰ Walker however did not make use of either the degree sheets or Blacker's atlas sheets: the Madras sheets duplicated the information already derived from Mackenzie's surveys in southern India, while the Bombay sheets were criticized for insufficient or inadequate control.⁹¹

Hodgson had considered in private that the Court's orders might mean that the *Atlas* was to be produced in London,⁹² but he soon satisfied himself that he was in fact responsible for the task. Imagine his surprise, therefore, when the first batch of Walker's *Atlas* sheets reached Calcutta in October 1827. He wrote a feverish letter to the Indian Government, asking for the issue to be clarified. Seeing James Horsburgh's name on the sheets, Hodgson became incensed because a hydrographer

however eminent in his own line can have little idea of the varied modes necessary to be used in geographical researches and operations in the interior of this vast country, who never marched with armies, nor has effected surveys in every diversity of country and climate, who has not been compelled to have recourse to the various shifts and inventions which necessity alone suggests to officers actually engaged in a laborious and difficult service and who must even be ignorant of many terms and allusions used in the unpremeditated journals and field notes of the oriental surveyors.⁹³

For Hodgson, the Surveyor General of India and his assistants were the only people with sufficient experience, knowledge, and authority to compile the *Atlas* correctly. Moreover, Hodgson argued that the Surveyor General was the only person who could then supervise the publication of the *Atlas* sheets. He took lithographic impressions of the three sheets of the 'Blacker Atlas' so far completed for Bengal to demonstrate that the maps could also be adequately printed in India. He had pushed in 1822 for the introduction of lithography as a means to cut down his office arrears. But a lithographic press had already been ordered for printing official forms and documents; Hodgson was able to use this press and printed his

FIGURE 4. *Atlas of India*, sheet 58, published 1 Aug 1827. Based upon surveys directed by Colin Mackenzie, this shows the Tungbhadra River, being the border between the "Ceded Districts" of Mysore to the south and the Territories of the Nizam of Hyderabad to the north. The base near Bellary was measured in 1803; it was initially drawn on Mackenzie's manuscript maps of the surveys, and (like everything else on the maps) copied precisely by John Walker. Although dated 1827, this sheet was kept in print until 1898 when a new state was published "with additions to 1893" (mainly in the Nizam's territories); this copy was probably pulled later in the century, in line with the rest of the NYPL's collection. By permission, Map Division, The New York Public Library, Astor, Lenox, and Tilden Foundations.

first test maps in February 1823, including a few copies of the sheets of his "Atlas of the North-West of India."⁹⁴ Now, in 1827, Hodgson suggested that similar technology would suffice for the *Atlas* if printed in India. If it did not, then an engraving shop might easily be established within the Surveyor General's Office, using a qualified engraver (plus journeymen) from England who would also then take on local youths as apprentices.⁹⁵

The Indian Government agreed to question London on the issue of just who was to produce (or at least to compile) the *Atlas*.⁹⁶ But the Court of Directors had already realized that there was a duplication of effort when it had received a description of Hodgson's cartographic work.⁹⁷ In late 1828, the Court finally wrote to Calcutta, giving an explicit statement that the *Atlas* was to be compiled and engraved in London using survey materials sent from India.⁹⁸ Hodgson had returned to England for his health before that letter reached India; when it did, the acting Surveyor General disagreed with the propriety of the Court's orders, but nonetheless felt compelled to acquiesce to them.⁹⁹ Hodgson's successor, George Everest (Surveyor General, 1830-43), was too wrapped up in the triangulation of India to care either way about the production of the *Atlas of India*. Production of *Atlas* sheets in India therefore dragged to a halt.

THE *Atlas of India* AND MAP PUBLICATION IN INDIA, 1840-1905

The end of the preparation of the *Atlas* in India did not mean that map production in general also ended there. Indeed, it became increasingly apparent throughout the 1830s that the *Atlas* itself was at too small a scale, and would take too long to be produced, to be useful for many purposes. It would still be necessary to have many manuscript maps made to order.¹⁰⁰ The Company's administration in India was also becoming increasingly receptive to the fact that restrictions on map publication were unnecessary for security. Or rather, it became apparent that maps were not the only means of disseminating military knowledge. One story which seems to have widely circulated among Company officials, in both England and India, described the visit by Lord William Bentinck (Governor General, 1828-35) to the French Dépôt de la Guerre in Paris, where Bentinck found on open display a map which accurately showed the supposedly secret disposition of the Company's troops in India.¹⁰¹ The result of the continued demand for large-scale maps in India, together with the declining bias against their publication, meant that large-scale maps began to be published in India itself.

Commercial lithographic printers in Calcutta had been filling at least part of the market for maps of India since the mid-1820s, catering to Indians as well as to the British.¹⁰² Their operations also indicate that the Company's servants did not keep maps as secret as Company regulations stipulated. John Hodgson made it explicit to the Assistant Surveyor General at Madras that his maps should be kept "under [his] immediate inspection and that nothing ... is made public by private lithographers."¹⁰³ Another surveyor asserted that the geographical information contained in the *Madras Gazette* and similar private publications had been "obtained by stealth" from Government records.¹⁰⁴ Just as the Court of Directors had to turn to commercial cartographers in London to find the necessary expertise to engrave

and print the *Atlas of India*, so now in the 1830s the surveyors in India turned to the commercial printers of Calcutta to help them to copy maps cheaply and effectively. The process was begun by George Everest, who employed the French émigré Jean-Baptiste Tassin to make diagrams showing the progress of the Great Trigonometrical Survey for in-house use.¹⁰⁵

It should not be thought that all surveys in India were now automatically transformed into printed maps. Under Everest, topographic surveys were only of secondary importance. As H.T. Prinsep, the chief secretary to the Indian Government wrote, "if by devoting himself to triangulation [Everest] has ever made any discoverable in geognosy or science they are yet wrapped up in his own morose and impenetrable self with no prospect of ever benefitting the Indian or English public."¹⁰⁶ Prinsep accordingly established a 'Geographical Committee' at Calcutta whose task was the creation of those maps which Prinsep felt Everest should have been making. Meanwhile, Thomas Best Jervis of the Bombay Engineers spent 1837-39 in London, trying to persuade the Directors to give more attention (and money) to the mapping of India. One of his proposals was the establishment of an official map publication facility within the Surveyor General's office. His arguments were basically the same as those of Hodgson ten years before: a cartographer in London who lacked experience of the conditions of surveying in India could not possibly be equipped to compile the resultant materials into a satisfactory large-scale map of the Subcontinent. Although he identified no explicit error in an *Atlas* sheet, Jervis was sharply critical of Walker's work overall. Jervis also argued that it would be cheaper to lithograph or engrave the maps in India, even if the maps were to be at a larger scale.¹⁰⁷

Walker put up a spirited defence to Jervis' allegations and proposals. Walker's principal point was that the expense of Jervis' proposed establishment of thirty English engravers was simply too great: £6,000 per year, plus the cost of equipment, copper plates, and subordinate workers. The engravers would have to be paid even when sick and even if there was no work for them to do. In contrast, the London cartographic firms had a hiring policy based solidly on the sweat-shop practice of piece-work:

There is not a shilling expended on an establishment, and the only outlay is for work actually executed. If much be required to be done, any number of engravers and printers can be taken on at a day's notice and discharged whenever the work is completed.¹⁰⁸

With respect to the criticism that no London cartographer could ever appreciate the Indian surveys, Walker replied by citing the fundamental cartographic assumption of the period, that he did not even need to know the details of the Indian surveys because the act of relating even mediocre topographic surveys to the Great Trigonometrical Survey would (it was assumed) remove all their errors and irregularities. Walker went one step further by citing Jervis' own surveys in western India as being so bad that it was impossible to reconcile them with the Great Trigonometrical Survey, and deduced therefrom that an appreciation for the nature of the Indian surveys was not necessarily automatic for a surveyor in India.¹⁰⁹

Walker's points were accepted by the Court, both because of their logic and for the fact that Walker was allied with several powerful members of the Court's secretariat (the Military and Chief secretaries among them) against Jervis and the Board of Control (the Company's parliamentary overseer). The Court sent a strongly worded letter ordering the abolition of Prinsep's Geographical Committee as being quite contrary to the Court's desire that the *Atlas of India* be compiled and published in London and reiterated its desire that all maps in general be engraved and published in England.¹¹⁰ With respect to a plan for publishing a new chart of the Bay of Bengal, the Court wrote:

We are ... well aware of the necessity for such a work and only differ from you with respect to the advantage of executing it at Calcutta instead of transmitting the materials to England in conformity with what has hitherto been the constant practice. It can be done in this country at smaller expense and at least as well, for a surveyor is not always to be considered the person best qualified to compile a general chart from his own surveys.¹¹¹

These are the same points as Walker made with respect to Jervis' proposals for topographic mapping; they may also indicate Walker's reluctance, as the Company's Hydrographer, to let chart making get out of his control. The Court nonetheless allowed the Indian Government the option of lithographing some copies for immediate use, on the condition that the originals of the map be sent home for proper engraving. As a result, Calcutta stopped production of the map with just one of the three sheets published. When Prinsep insisted that the map be completed, the Directors replied, in turn, that the cost of lithography in India was prohibitive:

We have lately had a proof of the expensiveness of lithography in India in Mr. Tassin's new map of the Provinces of Bengal, Behar, and Benares, for 100 copies of which no less than 6,800 [rupees] was paid by your order altho' we have been assured that for an equal sum a copper plate and 1600 impressions of the same map might have been obtained in England.¹¹²

But the dam had already been broken. Through the 1840s, the Company's officials in India ignored the Court's orders and published maps in India. Everest's successor, Andrew Scott Waugh (Surveyor General, 1843-62) was equally fixated upon the triangulation of India, but cadastral surveys were proceeding apace and were increasingly being printed.¹¹³ In 1846, H.L. Thuillier was appointed Superintendent of Revenue Surveys, in which capacity he established the first official lithographic press within the Surveyor General's Office, in 1851. This press was initially used for revenue surveys, but subsequently other maps were printed on it; in 1854-55 it was used to print the first Indian postage stamps. More and more topographic maps were published; William Coldstream identified what he called an "Old Style One-inch Sheet," a style of topographic map derived from revenue surveys made between 1838 and 1846.¹¹⁴ John Walker also began to lithograph sheets of the topographic surveys of Hyderabad (at one inch to a mile) in the late

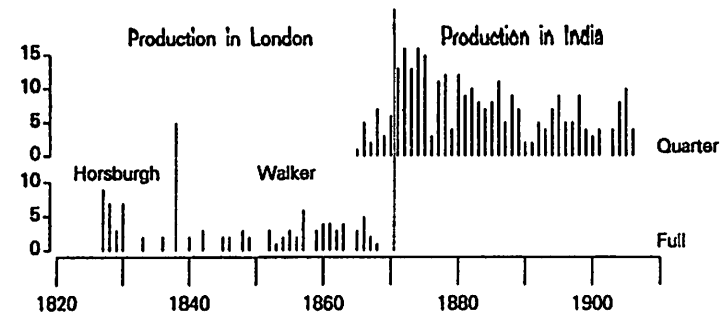


FIGURE 5. Annual publication rates of new sheets (including later, redated issues and second editions) of the *Atlas of India*, 1827-1906.

1840s.¹¹⁵ Finally, illustrating how fast perceptions of map publication were changing, the Company itself began the active distribution of its geographic information. During the 1840s (and perhaps later), Walker regularly sent maps recently received from India to the Royal Geographical Society, on behalf of the Court of Directors, to disseminate the most recent geographical discoveries in South and Central Asia.¹¹⁶

The Indian Mutiny of 1857 led to the abolition of the Company and the granting of increased independence in daily operations to the central and provincial governments in India. It increasingly became the rule rather than the exception for large-scale topographic maps to be printed in India. The *Atlas of India* was still the principal medium-scale topographic map for India, although progress had never been particularly fast (Figure 5) and had seriously atrophied by the time of the Mutiny, when Walker was 70 years old. At Thuillier's urging, Walker agreed in 1864 to produce the *Atlas* in the form of quarter-sheets and so hasten their compilation, engraving, and eventual publication. In India, Thuillier (now Surveyor General) simultaneously established new topographic map series of each province at one inch to the mile, called the 'Standard Sheets.' The initial attempts at publishing these with lithography were unsatisfactory, so Thuillier adopted helio- and photozincography instead.¹¹⁷

The scope of map-printing in India was finalized in 1870. John Walker's health broke down in 1868, by which time he had published some 92 sheets, including 17 quarter-sheets.¹¹⁸ Responsibility for the *Atlas* was briefly passed on to two commercial firms, T. Connell and Malby & Sons. Their sheets, together with some of those started by Walker but as yet unpublished – thirty in all – were given the anonymous imprint: "Published by Order of the Secretary of State for India in Council."¹¹⁹ But these engravers did not work on the *Atlas* for long and did not actually publish any sheets. Instead it was decided that the entire production of the *Atlas of India* should be moved to India. J.T. Walker took all the existing plates and a team of British copper-engravers out to India to establish a print shop specifically for the *Atlas*. The first sheets (125 SE and 87 SW) to bear the imprint of H.L. Thuillier (as Surveyor General) were dated November and December 1870. Before 1878 a number

of sheets were published in India with Walker's, Connell's, or Malby's names as engravers: the plates had been begun in England and finished in India, but the original names were neither replaced nor augmented.¹²⁰ When Thuillier retired in 1878, the *Atlas* was not as close to completion as has been suggested,¹²¹ and the Survey of India continued to produce new quarter-sheets (Figure 5) in addition to updated versions of existing sheets. The final extent of the *Atlas* is given in Figure 1; while Burma was kept as part of the *Atlas* schema, it was actually given its own quarter-inch map series as a result of the Burmese War of 1885-87.

The *Atlas* sheets continued to have long gestation periods. Just as Walker's name had appeared on sheets up to six years after his death, so now the fact that Thuillier had retired in 1878 did not prevent his name from appearing on new sheets even in the 1890s, sheets which had evidently been begun during his tenure. In an effort to hasten the publication of new sheets, a number of compromises was permitted in the production process. As there were several other larger-scale printed map series, the *Atlas* lost its place as the pre-eminent map series for India, so that it was no longer necessary to cram in as much detail as possible. The *Atlas* sheets were therefore simplified, and in particular the number of placenames was reduced, although the density of type remained high even so.¹²² The second compromise is illustrated by an 1875 index sheet to the *Atlas* which defines two types of sheets: the complete and only partially complete, which category included partially surveyed sheets and 'preliminary editions.'¹²³ The engraving process followed a set order: the 'outline' (roads, rivers, graticule) and 'writing' (placenames, etc.) were done first, then the relief hachures were engraved. Between the two stages, prints were made to create 'Preliminary Editions.' Almost all the preliminary sheets I have seen are lithographs, indicating that the image was transferred from copper to stone for printing, so that the engraving process would not be yet further delayed. Most of the preliminary sheets were followed within six to eighteen months by the proper sheet - now with relief hachures and another engravers' name in the margin - but for two sheets (43 NE and 62 NW) the preliminary issues were not superseded.

Further compromises were made in the production of *Atlas* sheets using lithography and photozincography. First, as early as 1881 but most commonly after about 1895, those of Walker's full sheets which were still in production were increasingly printed as lithographs. For some of the sheets, such as sheet 131, the transfer to stone was permanent and new information was added to the stone and not to the copper plate. For other sheets, and this includes many quarter-sheets as well, the copper plate was updated but each new image was transferred to stone or zinc for printing. The British Library has several sheets for which it has two copies: one printed from copper, one from zinc.¹²⁴ Conceivably, this process might have been adopted in an effort to prolong the life of each plate, as was the conversion of copper plates to electrotypes (as with the 1895 state of 39 SW). In a related development, some sheets published in the mid-1880s were prepared as lithographs rather than copper plates right from scratch, presumably as an experiment (sheets 47 SW and SE, 49 NW). Similarly, the British Library possesses two such lithographed sheets (4 NW and the second edition of 6 SE¹²⁵) showing restricted information

about Afghanistan; these were probably not engraved as the attendant expense would not have been justified for maps with a limited distribution. The third use of lithography for the *Atlas* involved transferring images from the plates of old full sheets to stone in order to create new quarter-sheets. In addition to the actual map detail, the cartographers also transferred the full sheet's marginalia, including the full sheet's original publication date. The first example (Sheet 49 SW) was created in 1886, perhaps as an experiment as it was replaced by a copper-engraved version in 1895. In 1888-89, two quarter-sheets (28 SW and SE) were similarly prepared by electrotyping and subsequently went through several states. Thereafter, ten more quarter-sheets were eventually stripped from full sheets to stone in 1899-1905; still in print after 1905, these quarter-sheets were designated in Survey of India catalogues as having been prepared "from old material."¹²⁶ All these variations mean that a thorough cartobibliography for the later period of the *Atlas of India* would be almost impossible to produce.

The fourth set of compromises over the production of the *Atlas* in India was the continued production of several of the old full sheets. Several of Walker's early sheets - particularly those of Assam - were quickly discarded after 1870 as being too simple and too out-of-date and were replaced by quarter-sized sheets. But there were still many full sheets in print in 1905. Of special interest are those sheets which had been only partially replaced by quarter-sheets. Sheet 89 is one example: sheet 89 SE was first published in 1898, but for the rest of the area, the updated full sheet had to suffice. Sheet 61 was unique in this respect: first published in 1833, by 1894 it was complete and continued to be updated through 1902; on the 1903 update, however, all the areas covered by the newer quarter-sheets (61 NW [preliminary], NE, and SE) had been erased, leaving the full sheet to show only the SW and parts of the NW quadrants.

THE DEMISE OF THE *Atlas of India*?

Increasing criticisms of the Survey of India throughout the 1890s led to the establishment of the Indian Survey Committee in 1904-5.¹²⁷ The Committee found the Survey to be in a sorry state in general and it reserved its main criticisms for the Survey's map publication and the Standard Series in particular. Photozincography, which had come to be the Survey's main reproduction method, was found to be an "inferior method," producing "rough and coarse" maps which were at times "almost illegible."¹²⁸ In contrast, the Committee had the utmost respect for the *Atlas*, although it noted that some of the earliest sheets were poorly engraved in comparison with subsequent refinements in the engraving process. Unfortunately, the Committee also found much of the detail to be obsolete and alteration of the original plates would seriously injure the relief hachures. More important, place names had changed greatly since the time of many of the original surveys; many places no longer even existed. "Nearly all" the place names in Bengal and Madras would have to have been replaced if the *Atlas* was to be continued. But to update the names, let alone the details, would be prohibitively expensive.¹²⁹ Production of the *Atlas of India* was therefore halted. In place of the *Atlas* and the one-inch Stan-

dard Sheets, the Survey Committee suggested that the Survey of India should produce topographic maps at both one-inch and quarter-inch scales, each map to be bounded by regular lines of latitude and longitude. The new maps were in turn to be based upon entirely new surveys. It was debated whether these maps should be engraved in England (as good engravers in India were still few and far between), but the cost would be too high. To save money, therefore, it was decided to use heliograph, and also to forgo the use of hachures and rely only on contours ("as in the American maps") for relief.¹²⁹

If we adopt a rather restricted view that a map series' existence is determined by the continued appearance of new sheets, then the demise of the *Atlas of India* might indeed be said to have been sudden. Four new quarter-sheets were in production at the time of the 1905 reforms: these and some new states of other sheets were published in 1906.¹³¹ Thereafter no new *Atlas* sheets were published. Yet, from a more realistic perspective, the *Atlas* clearly suffered a long senility and even after death its organs were donated to 'new' maps. The key problem was that the new topographic surveys ordained by the Survey Committee and their resultant maps could not of course be accomplished overnight: until the new maps could be published, therefore, the *Atlas* stayed in print well beyond 1905. None of the new maps were published before 1915, and the existing *Atlas* sheets continued to be issued, remaining the source for smaller-scale maps as late as 1919.¹³² Sometime during or after 1917, a new state of sheet 48 NE was even published.¹³³ By 1917, however, the sheets covering Hyderabad in south-central India had been superseded. By 1924, the *Atlas* sheets were almost all replaced; by 1931 the *Atlas* was no longer being published.¹³⁴

Yet the *Atlas* was still of immense importance, even after 1931: just as some quarter-sheets were created from older, full-sized sheets, so now the Survey of India began to splice together segments stripped from the old *Atlas* sheets to create 'new' topographic maps at four miles to the inch, shaped into regular 'degree squares.' For example, the 'new' map covering the Mount Everest region (sheet 72I) was extracted from *Atlas* sheet 111, and bears the date of 1857 with the added statement: "Reprinted in 1923 with corrections from extra-departmental information" (i.e., some surveys of the area from 1918 and 1921).¹³⁵ The progress of the new surveys was so slow that by the Second World War, the British still lacked new data for Assam; but as it lay within the Theater of War, they needed maps of the area and so created 'new' degree sheets from *Atlas* sheets. Thus sheets 78G and 78H were derived from *Atlas* sheets 118, 119, and 120 in three stages: a "provisional issue" in 1914, reprinted in 1942 "with minor corrections," and a "first edition" in 1944. Sheet 78H bears the annotation "Corrected from extra-departmental information, the accuracy of which is not guaranteed." Both sheets further warn: "The large rivers in this sheet have considerably shifted their courses since its compilation."¹³⁶ There is no indication that such severe cartographic short-cuts ended with the war.

After an active life lasting eight decades and a death-watch lasting another four, the *Atlas of India* had thus come full circle. It was born out of a desire to replace the confused and anarchic conditions of map making in British India, to

take fresh surveys based upon mathematical triangulation, and to present the results in a scientific and accurate manner. It certainly seemed that the *Atlas* would meet those goals, had it not been for the slowness of both the surveys and the production of the actual maps. Ultimately through insufficient resources, the Survey of India began to compromise the *Atlas*, using old data to create seemingly new sheets. With other large-scale map series being published, quality control for the *Atlas* was no longer essential. It lost its freshness. Image became everything. In creating a new quarter-inch topographic series after 1905, a series which was supposed to be as fresh and as accurate as the *Atlas* had been in 1823, the Survey of India focused upon the image of the map and let its integrity lapse. The surveying and mapping of India was once again confused (but not anarchic), and this time the *Atlas* was again right at the center of things.

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I would like to thank Tony Campbell and Karen Cook in the Map Room of the British Library and Andrew Cook at the India Office Library and Records for very kindly allowing me special access to their collections. I am indebted to Mr. Cook for his comments and for pointing out the examples cited from the *Map of India and Adjacent Countries*. The remainder of this material is based upon work supported by the National Science Foundation under Grant No. SES 88-01781; the United States Government has certain rights in this material.

NOTES

Abbreviations used in the notes:

- BL : British Library, Great Russell St., London WC1
- NMG : Bengal Military Consultations
- BoMG : Bombay Military Consultations
- BPC : Bengal Public Consultations
- IOR : India Office Records, 197 Blackfriars Road, London SE1 (after 1996, all IOR call marks will more properly be BL IOR ...)
- MMG : Madras Military Consultations
- MPC : Madras Public Consultations
- UN : University of Nottingham Archives

¹ A complete cartobibliography of the *Atlas of India* has been deposited with the Map Rooms of both the India Office Library and Records and of the British Library; for a copy, send a 3.5" diskette (DOS format) to the author. The cartobibliography and all comments in this paper about individual sheets of the *Atlas of India* are based upon an examination of 1,562 sheets in the following collections: BL Maps *52410 (86), a substantial collection of mixed provenance which contains examples of almost all the sheets published; IOR X/237, the "India Office Main Set," which was apparently kept up to date with each new issue of a sheet, previous issues being discarded, and which therefore constitutes a good guide to the final publication dates of each sheet; IOR X/11000 series - Indian Atlas-"Walker Album," an album of then-current *Atlas* sheets presented to the cartographer John Walker upon his retirement in 1872; IOR X/11000 series-Indian Atlas-"Box Set," a set of *Atlas* sheets in print between ca. 1865 and ca. 1875; IOR X/14000 series-Indian Atlas-"Plus Newydd Set," a contemporary collection of the earliest sheets from the estate of the Marquis of Anglesey; IOR X/14000 series-Indian Atlas-"CMS Set," collected by the Church Missionary Society; IOR X/9000, an early set of sheets purchased as historical items in 1929; IOR

x/9003, being nine volumes of sheets bound by province, dating largely from the 1880s and early 1890s; and a bound collection of the very earliest sheets (published before 1850) held by the American Geographical Society Collection, University of Wisconsin-Milwaukee. The New York Public Library also has a fairly substantial collection of sheets from the later nineteenth century. Further information about the printing sequence of these sheets was taken from the following Survey of India publications: *List of Sheets of the Atlas of India and of General, District, and Divisional Maps of India, Burma, and Other Parts of Asia* (London: Eyre & Spottiswoode, 1892); *Catalogue of Maps Published by the Survey of India, Corrected up to 1st February 1910* (Calcutta, 1910); *Catalogue of Maps Published by the Survey of India, Corrected up to 1st January 1915* (Calcutta, 1915); *Catalogue of Maps Published by the Survey of India, Corrected up to 1st October 1917* (Calcutta, 1918); *Catalogue of Maps Published by the Survey of India, Corrected up to 1st January 1921* (Calcutta, 1921); *Catalogue of Maps Published by the Survey of India, Corrected up to 1st January 1923* (Calcutta, 1923); *Catalogue of Maps Published by the Survey of India, Corrected up to 1st July 1924* (Calcutta, 1924); *Survey of India Map Catalogue* (Calcutta, 1931).

² The phrase is, of course, from Barbara Barz Petchenik, "The Natural History of the Atlas: Evolution and Extinction," *Cartographica* 22.3 (1985): 49-59.

³ Matthew H. Edney, "Mapping and Empire: British Trigonometrical Surveys in India and the European Concept of Systematic Survey, 1789-1843" (Ph.D. diss., University of Wisconsin Madison, 1990); a microfilm of this has been taken by the India Office Library and Records. For the early British mapping of India in general, see Reginald H. Phillimore's monumental *Historical Records of the Survey of India* (Delhra Dun: Survey of India, 1915-58, 5 vols), esp. 3:282-86 for the Atlas.

⁴ For theoretical discussions of this question of cartographic power and secrecy, see the work of J.B. Harley, most notably "Cartography, Ethics and Social Theory," *Cartographica* 27.2 (1990): 1-23; "Maps, Knowledge and Power," *The Iconography of Landscape*, ed. Derek Cosgrove and Steven J. Daniels (Cambridge: Cambridge University Press, 1988), 277-312; "Silences and Secrecy: The Hidden Agenda of Cartography in Early Modern Europe," *Imago Mundi* 40 (1988): 57-76.

⁵ IOR E/2/31, 403-4: Board of Control to Court of Directors, 10 Jul 1811.

⁶ IOR L/MIL/17/2/440: *Code of the Bengal Military Regulations ... [to] 1st September 1817* (Calcutta, 1817), chap. 65, ¶6-7. The original order was dated 5 Aug 1779.

⁷ IOR E/4/903: Court to Madras, military, 9 Aug 1809, ¶140.

⁸ See odd notes in IOR L/AG/24/18 (unpaginated).

⁹ Rennell's published maps of the Ganges and Brahmaputra rivers were at the larger scale of five miles to an inch. Phillimore, *Historical Records*, 1:250; Andrew S. Cook, "Major James Rennell and 'A Bengal Atlas' (1780 and 1781)," in *India Office Library and Records Report for 1976* (London: British Library, 1978), 5-42.

¹⁰ IOR E/1/263: Misc. Corres. §1401: Court to Messrs. J. & A. Walker, 19 Jun 1827.

¹¹ IOR D/8, 777-78: Corres. Cttee. Minutes 16 Oct 1822; IOR E/4/679: Court to Bengal, separate military, 29 Oct 1823, ¶27-32.

¹² IOR E/4/721: Court to Bengal, military, 16 Jan 1828, ¶12-13; repeated in IOR E/4/1049: Court to Bombay, military, 6 Feb 1828, ¶4-5; IOR E/4/721: Court to Bengal, military, 30 Apr 1828, ¶26-28. The order was published verbatim in the *Bombay Gazette*, as reported in the *Asiatic Journal* 27 (1829): 100. BL Maps 52450 (23): *Map of Central India, including Malwa and the Adjoining Provinces, Constructed by order of Major Genl. Sir J. Malcolm, GCB, from the Routes of his Division and the Surveys of Officers under his Command* (London: Aaron Arrowsmith, 5 Apr 1823).

¹³ IOR E/4/679: Court to Bengal, separate military, 9 Jun 1814, quote from ¶19; Edney, "Mapping and Empire."

¹⁴ IOR Eur F/151/57: Mackenzie to Sir Thomas Munro, 24 Dec 1817; IOR Eur F/151/99: Mackenzie to Munro, 1 Jan 1819.

¹⁵ IOR X/2108/1-6 is Mackenzie's atlas of Mysore; IOR X/2108/7: Mackenzie, "Index to a series of maps constructed from the results of the survey of Mysore and Canara, designed as the foundation of an atlas of the province dependent upon the Presidency of Fort St. George," 17 Oct 1808. IOR X/2914: "Atlas of the Provinces Ceded by the Nizam in 1800 to the Honorable East India Company ...," 1 Jan 1820.

¹⁶ IOR E/4/904: Court to Madras, public, 9 Feb 1810, ¶4.

¹⁷ IOR F/4/730 20519, 3-12: Hodgson to Govt., 26 Dec 1822. The Madras surveys (nos. 29-40 in Hodgson's list) are listed in *A Catalogue of Manuscript and Printed Reports, Field Books, Memoirs, Maps ... of the Indian Surveys deposited in the Map Room of the India Office* (London: W.H. Allen, 1878), 85, but are now lost.

¹⁸ IOR F/4/832 22115, 11-17: BMC 7 Nov 1823 §112-13; IOR E/4/112: Bengal to Court, separate military, 27 Nov 1823. The map of Southern India is IOR X/342: Mounford, "Map of the Peninsula ...," 1823, 1:1,013,76a. Hodgson's atlas is IOR X/345: "Atlas of the North-West of India, containing maps of the countries between the latitudes of 28°50' and 32° North, and longitudes of 75°50' and 81°30' East," 1823,

1:253,440, in 15 sheets.

¹⁹ IOR F/4/682 18864, 273-322: NPC: 28 Sep 1821 §1: Hodgson to Govt., 18 Sep 1821, ¶5.

²⁰ IOR E/4/112: Bengal to Court, separate military, 27 Nov 1823.

²¹ Aaron Arrowsmith, *Atlas of South India in Eighteen Sheets from Cape Comorin to the River Kistnah: Delivered on a scale of four English Miles to One Inch, principally from Original Surveys communicated by the Honorable Court of Directors of the East India Company; to whom this Atlas is with permission respectfully dedicated by their obedient humble servant, A. Arrowsmith, Hydrographer to His Majesty* (London, 1822). Copies are in: Maps 146.e.6; IOR X/344/1 & 2 (duplicates); Cambridge University Library, Atlas 1.82.1; and Library of Congress, G2880.A76 1822 G&M.

²² Arrowsmith published memoirs describing in detail the sources and the method of compilation for both his 1794 map of the world - *A Companion to a Map of the World* (London: G. Bigg, 1794) - and his 1807 map of Scotland (based primarily on William Roy's surveys after 1745): *Memoir Relative to the Construction of the Map of Scotland published by Aaron Arrowsmith in the Year 1807* (London, 1809). Arrowsmith was not above criticism, however; a short exchange in *Asiatic Journal* 21 (1826): 65, 717-19, highlighted the problems with his four-sheet map of Asia, e.g., that his ignorance of Russian led Arrowsmith to mistake caravansaries for towns and villages when copying from Russian maps. Despite Arrowsmith's importance, there has as yet been no full study of his work, simply because of the lack of supporting documentary evidence. All too brief (and untrustworthy) biographies are Charles Henry Coote, "Aaron Arrowsmith," *Dictionary of National Biography* 1: 289, 296; and Leslie Verner, "The Arrowsmith Firm and the Cartography of Canada," *The Canadian Cartographer* 8, 1 (1971): 1-7, which was largely repeated in idem, "Maps by John Arrowsmith in the Publications of the Royal Geographical Society," *Map Collectors' Circle* 76 (1971), and in Alexander McGeachan and Coolie Verner, "Maps in the Parliamentary Papers by the Arrowsmiths: A Finding List," *Map Collectors' Circle* nos. 88 & 89 (1973), 1. Verner, "The Arrowsmith Firm," 5, lamented the lack of even a catalogue of all Aaron Arrowsmith's maps, let alone of his heirs'; Verner planned such a study, but did not complete it before his death.

²³ Thomas Jefferson to Alexander von Humboldt, 6 Dec 1813: *The Writings of Thomas Jefferson ...*, ed. Andrew A. Lipscomb (Washington, DC: The Thomas Jefferson Memorial Association, 1903, 21 vols.), 14:24, commiserated with von Humboldt that Arrowsmith had "stolen" Humboldt's map of Mexico. 'Stolen,' of course, might have meant anything from the blatant breach of copyright to the physical stealing of the map.

²⁴ For a rewarding discussion of the context of patronage in English society, see J. M. Bourne, *Patronage and Society in Nineteenth-Century England* (London: Edward Arnold, 1986).

²⁵ Letter by 'B,' *Asiatic Journal* 21 (1826): 717.

²⁶ IOR E/4/681 18863, 43-48: NPC: 1 Oct 1819 §21: Mackenzie to Govt., 29 Dec 1818. The map in question was probably the 1818 edition of the *Improved Map of India*, discussed below.

²⁷ BL Maps 52415 (18): *To Mark Wood, Esq., MP, Colonel of the Army in India, late Chief Engineer and Surveyor General, Bengal, this Map of India, compiled from various Interesting and Valuable Materials is inscribed in grateful testimony of his liberal communications by his obedient and most humble servant, A. Arrowsmith* (London, 2 Jan 1804), six sheets. The map had several annotations which cited the *Asiatic Researches*.

²⁸ BL Maps 56310 (1): *Map of the Province of Malabar, drawn from various surveys by A. Arrowsmith* (London, 12 Aug 1809).

²⁹ BL Maps K.115.17.2.2: TAB.END: *To the Honble. the Court of Directors of the East India Company this Improved map of India compiled from all the latest & most Authentic materials is respectfully dedicated by their most Obedient & most humble servant, A. Arrowsmith* (London: 2 Jan 1816). This copy has been mounted as one large map (the small index map being separate): 2.425m x 2.52m. Arrowsmith's great map ran to four later issues, each featuring the addition of new information, in 1820, 1821, and 1822. BL Maps 12.c.20 is the 1820 issue, BL Maps 52415(22) that of 1822; no copy has been seen of the 1821 issue. BL Maps 26.a.4 is an 1826 reprint by Arrowsmith's heirs without any additions. Arrowsmith also made a reduced map in 1818 to serve as an index to the *Improved Map of India*, BL Maps 52415 (20): *To the Right Honorable John Sullivan, MP, one of His Majesty's Commissioners for the Affairs of India ... this Map of India is inscribed by his sincere and affectionate friend, A. Allan* (London: A. Arrowsmith, Apr 1818).

³⁰ Phillimore, *Historical Records*, 3:287.

³¹ Respectively, IOR F/4/681 18863, 121-25: NPC 7 Jan 1820 §61: Mackenzie to Govt., 29 Dec 1819, §3; IOR F/4/735 19845, 36-52: NPC: 3 Jul 1821 §17: Mackenzie to Govt., 11 Jul 1817, ¶5; IOR F/4/681 18863, 203-48: NPC 10 Mar 1820 §26: Mackenzie to Govt. 7 Mar 1820, §26; idem, 27-43: NPC: 1 Oct 1819 §20: Mackenzie to Govt., 1 Aug 1819, §3, enclosing idem, 43-48: NPC: 1 Oct 1819 §20: Mackenzie to Bengal Civil Auditor, 29 Dec 1818, ¶5.

³² IOR F/4/679 18861, 675-79: NPC 4 Dec 1818 §2: Minute by Lord Hastings, 4 Dec 1818.

³³ IOR F/4/682 18864, 500-25: NPC: 7 Dec 1821 §62: Hodgson, "Remarks on the surveys of India ...," 21 Nov 1821, ¶2. For the comparison of maps, see idem, 273-302: NPC 28 Sep 1821 §3-4. Hodgson cited

Reynolds' map as being about seven miles to an inch, while Arrowsmith's was 16 miles to an inch; there is no statement of scale on the *Improved Map of India*, but measuring the scale bar implies a scale of about 14 miles to an inch.

³⁴ IOR F/30/30; BMC 7 Nov 1823 §112; Hodgson to Govt., 22 Oct 1823.

³⁵ IOR F/4/681 18263, 43-48; BPC 1 Oct 1819 §20; Mackenzie to Bengal Civil Auditor, 29 Dec 1818, 16; *idem*, 121-25; BPC 7 Jan 1820 §61; Mackenzie to Govt., 2 Dec 1820, 13.

³⁶ IOR B/175, 127-33; Court Minutes 24 May 1822; IOR F/1/258; Misc. Corres. §1063; Court to Arrowsmith, 27 May 1822.

³⁷ Anon. Arrowsmith, *Sketch of the Outline and Principal Rivers of India by A. Arrowsmith, Hydrographer to His Majesty* (London, 1822). Copies are bound in with the BL and IOR copies of the *Atlas of South India*; Cambridge University Library Maps 360.82.1 is a separate copy.

³⁸ IOR B/175, 442; Court Minutes 4 Sep 1822.

³⁹ Clements R. Markham, *A Memoir on the Indian Surveys* (London: Allen & Co., 1878, 2nd ed.), 405. While his history was unsubstantiated, Markham probably based it on departmental tradition which he would have acquired in his long tenure as the India Office's Geographer and from his certain acquaintance with John Walker. His version is also supported by statements in two well-informed (but anonymous) articles: 'J' [for James Salmond or John Walker?], letter, *Asiatic Journal* 27 (Jan 1829): 56; 'The Atlas of India Published by the East India Company,' *Asiatic Journal* 27 (Jun 1829): 723-24.

⁴⁰ See Eilney, "Mapping and Empire," *passim*, for other indications of Salmond's importance for the systematic mapping of India.

⁴¹ See 'TIM', letter, *Asiatic Journal* 26 (1828): 430.

⁴² 'J', letter, *Asiatic Journal* 27 (1829): 56.

⁴³ IOR X/9599; Colin Mackenzie, "A General Map of Mysore comprehending the Territories ceded to the Rajah of Mysore, [and] the Provinces ceded to the Honorable East India Company ...," Madras, 27 Feb 1808; IOR X/2312; Colin Mackenzie, "Geographical and Statistical map of the North-East Part of the Mysore Dominion or the Ceded Districts ...," Madras, 1 Nov 1815.

⁴⁴ Arrowsmith, *Map of Scotland* (London, 1809), 31.

⁴⁵ IOR E/4/709; Court to Bengal, Military, 29 Oct 1823, 148-49.

⁴⁶ Phillimore, *Historical Records*, 3:283.

⁴⁷ Phillimore, *Historical Records*, 3:510-11 and *Dictionary of National Biography* give biographical details. John Walker's maps were almost all engraved or lithographed by 'J. & C. Walker'; one exception is sheet 65 of the *Atlas of India* (cf. Appendix) which identifies only "John Walker" as the engraver. Charles Walker is invisible to historians: perhaps he died young and John kept both initials to prevent any confusion with the unrelated, contemporary cartographic firm of J. & A. Walker.

⁴⁸ Bl. Maps 52415 (21): *A New Improved Map of India, compiled from the Latest Documents, is respectfully inscribed to Major James Rennell, FRS, &c &c &c, by his most obedient servants, Black, Kingsbury, Parbury and Allen*, drawn and engraved by John Walker (London, 25 Mar 1820). Its relation to Arrowsmith's *Improved Map of India* of 1816 is born out by similarities in their content: e.g., both have a big gap in coverage in eastern Bihar. Walker's map is also very highly detailed, suggesting it is a reduction from a larger map. A later state, with "additions to 1822," is Bl. Maps 52415 (23).

⁴⁹ IOR E/1/151, 182; Misc. Corres.: Horsburgh to East India Company Chairmen, 11 Jun 1823.

⁵⁰ IOR B/19, 191; Corres. Ctee. Minutes 16 Jul 1823. On Wilkins, cf. Andrew S. Cook, "Maps from a Survey Archive: The India Office Collection," *The Map Collector* 28 (1984): 27-32, sp. 29-30.

⁵¹ Probably IOR X/347: *This Newly Constructed and Extended Map of India from the Latest Surveys of the Best Authorities, published principally for the use of the officers of the Army in India, is respectfully inscribed to Major-General Sir John Malcolm ...*, drawn and engraved by John Walker (London Parbury, Allen, & Co., 1825). It is also likely to have been the "new map of Hindoostan &c which has been engraved under our direction": IOR E/4/1047; Court to Bombay, military, 17 Jan 1827, 16.

⁵² *Index containing the Names and Geographical Positions of all Places in the Maps of India, designed to facilitate the use of those Maps and especially that of the Newly Constructed and Extended Map of India, lately published by Kingsbury, Parbury, and Allen, Booksellers to the Hon. East India Company* (London: Kingsbury, Parbury, and Allen, 1826). The only copy found is Bl. 791.C.14.

⁵³ IOR B/10; Corres. Ctee. Minutes 16 Mar 1825; the bill was for compiling, engraving, printing, coloring the map, plus the cost of the paper.

⁵⁴ IOR D/11, 735; Corres. Ctee. Minutes 22 Nov 1826: £55 5s 6d paid to Walker for "lithographing maps and plans of places in the Burman Empire"; *idem*, 808; Corres. Ctee. Minutes 29 Dec 1826: £15 16s 6d for Walker "drawing on stone, printing and coloring plans of communications between Rangoon and Bassan and of Amherst Town."

⁵⁵ IOR D/10, 633-34; Corres. Ctee. Minutes 2 Jun 1825; IOR D/72 §185 is the identical report.

⁵⁶ IOR B/178, 133; Court Minutes, 8 Jun 1825.

⁵⁷ IOR D/10, 674; Corres. Ctee. Minutes 22 Jun 1825.

⁵⁸ Cook, "Maps from a Survey Archive," 30, states that Horsburgh undertook the compilation of the *Atlas* sheets which were then engraved by Walker. However, the delay in production after Arrowsmith's death (which should have then occurred if Horsburgh was to be the compiler), the manner of Walker's hiring as Arrowsmith's replacement in the enterprise, and the lack of mention of Horsburgh's name in the records indicate that he oversaw the process, but was not involved in its details.

⁵⁹ Markham, *Memoir*, 406.

⁶⁰ IOR L/AC/24/18, unpaginated volume, including an extract from Court Minutes 5 Jan 1838, and an unaltered note, signed '[John] Walker'.

⁶¹ These bills are found in the unpaginated volume, IOR L/AC/24/18. See also, Alexander Gerard, *Account of Koonawur, in the Himalayas*, ed. George Lloyd (London: James Madden & Co., 1841), which contained *A Map of Koonawur by Capt. A. Gerard, Surveyor* (n.d.), "J. & C. Walker sculpt"; Bl. Maps 51800 (5), *Map of Afghanistan and the Adjacent Countries, published by Authority of the Honble. Court of Directors of the East India Company* (London: Wm. H. Allen & Co., 23 May 1842), "drawn and engraved by J. & C. Walker."

⁶² See the list of maps advertised at the rear of Henry Virtue Stephen, *Handbook to the Maps of India* (London: W.H. Allen, 1857), most of which were by Walker.

⁶³ For example, *The Atlas of India; revised by J. Walker, Esq., Geographer to the Honourable East India Company ...* (London, Society for the Diffusion of Useful Knowledge, not dated), 12 sheets plus index. Bl. Maps 25.d.15 bears a marginal date (sheet 2) of 1853; I have a copy dated 1832.

⁶⁴ Aaron Arrowsmith, *Companion to a Map of the World; idem, Geometrical Projection of Maps* (London, 1825); M.A.P. D'Arveze de Castera-Macaya, *Camp d'oeil historique sur la projection des cartes de géographie* (Paris: E. Martinet, 1863), 100-3 [repr. *Acta Cartographica* 25 (1977): 21-173]; John P. Snyder and Philip M. Voxlan, *An Album of Map Projections*, US Geological Survey Professional Paper 1453 (Washington, DC: Government Printing Office, 1989), 176 and 234; and James A. Steers, *An Introduction to the Study of Map Projections* (London: University of London Press, 1966), 150-60. It was also favorably discussed in two pamphlets on projections and mapping by a contemporary, Captain William Müller of the Royal German Engineers: Cambridge University Library, Royal Greenwich Observatory Archives, 4/111/1 and 4/111/2 (both undated but pre-1811).

⁶⁵ J.T. Walker, "Memorandum on the State of the Arrangements for the Publication of the Sheet[s] of the Indian Atlas in England," in Markham, *Memoir*, 431-39; it was written in 1872, a year before John Walker's death.

⁶⁶ IOR V/26/420/2, *Report of the Indian Survey Committee, 1904-1905* (Simla, 1905), 75.

⁶⁷ IOR E/4/1047; Court to Bombay, military, 28 Feb 1827, 12-3; IOR E/4/718; Court to Bengal, military, 28 Feb 1827, 12-3; IOR F/4/1264 50866(2), 1-3; Bengal to Court, military, 14 Aug 1830, 166-68; and the criticism levelled at atlas sheets compiled in Bombay (note 96).

⁶⁸ IOR E/4/717; Court to Bengal, military, 24 May 1826, 176 (1100); repeated in IOR E/4/728; Court to Bengal, military, 26 May 1830, 14. IOR F/4/1314 52443, 89-99; BMC 25 Nov 1831 §145; Everest to Govt., 10 Nov 1831, 110; IOR F/4/1318 53055, 91-92; BMC 12 Mar 1832 §196; Everest to Govt., 16 Mar 1832; IOR F/34/32; BMC 30 May 1833 §2; Govt. to Everest, 30 May 1833; IOR E/4/144; Bengal to Court, military, 30 Sep 1833, 111-12; Everest objected on the grounds that Rennell's maps were insufficiently detailed. The Court overrode his objections: IOR E/4/736; Court to Bengal, military, 16 Jan 1833, 18. Ultimately, the *Atlas* sheets covering Bengal were based largely on revenue surveys begun after 1847.

⁶⁹ [Section of the Great Meridional Arc from Baler to Takkhakaral] (London: Horsburgh, 1 Mar 1827); *Sketch of the Principal Triangles extending over that Part of the Nizam's Dominions lying to the eastward of Nirmal & Kurnool by Lieut. Col. W. Lambton and Capt. George Everest* (London: Horsburgh, 1 Mar 1827); *Plan of the Trigonometrical Operations in the Nizam's Dominions, Extending from Kurnool to the Godavery by Lieut. Col. Wm. Lambton* (London: Horsburgh, 1 Mar 1827); *Plan of the Trigonometrical Operations on the Peninsula of India from the Year 1802 to 1814 inclusive under the Superintendance of Lieut. Col. W. Lambton* (London: Horsburgh, 20 Jun 1827), in eight sheets. All are in IOR X/14000 series—Indian Atlas—"Plan Newydd Set"; other copies (except of the first listed map) are Bl. Maps 52450 (25) and (26), and 52415 (25), respectively. IOR E/4/719; Court to Bengal, military, 11 Jul 1827, 153 and IOR E/4/1048; Court to Bombay, military, 18 Jul 1827, 111, covered their transmission to India.

⁷⁰ George Everest, *An Account of the Measurement of an Arc of the Meridian between the Parallels of 18°3' and 24°7'*, being a Continuation of the Great Meridional Arc of India as detailed by the Late Lieut-Col. Lambton in the Volumes of the Asiatic Society of Calcutta (London: East India Company, 1830).

⁷¹ IOR E/4/729; Court to Bengal, military, 25 Aug 1830, 12, and IOR E/1/266 §1244; Misc. Corres.: Court to Everest, 27 May 1830, respectively. The institutions were the Royal Society, Royal Astronomical Society, Royal Asiatic Society, Geological Society (of London), and the British Museum.

⁷² The first publication batches of the *Atlas of India*, 1827-44, were:

Sent to India	Sheets	Publication dates
2 May 1827:	47, 48, 65, 66, 69, 70	Feb 1827
16 Jan 1828:	42, 43, 58	Aug 1827
28 Jan 1829:	50, 60, 77, 80, 81, 95	May-Nov 1828
2 Mar 1831:	49, 75, 63, 76, 124, 125, 129, 130, 131, 138	May 1829 - Oct 1830
ca. 1834-35:	44, 61	Sep-Nov 1833
29 Mar 1837:	72, 103	Sep 1836
16 Mar 1841:	94, 62, 108	Aug-Nov 1840
27 Mar 1842:	77, 75, 94 (re-issues)	Jul 1842
3 Jul 1844:	76, 80 (re-issues)	undated

The precise publication dates on each are clarified by several documents. British Parliamentary Papers 1851 (219) 41, 44-45; John Walker, "Return of the Number and what Sheets of the Grand Atlas have been Completed and Engraved, and the Cost thereof to the Government, and the Selling Price per Sheet to the Public, and what Progress the remaining Portions of the Atlas are in," 2 Apr 1851, listed the 41 sheets (including 5 revisions) of the *Atlas* published to that time. There are also the letters from the Court, forwarding the sheets to India: IOR E/4/719: Court to Bengal, military, 2 May 1827; IOR E/4/721: Court to Bengal, military, 16 Jan 1828 and 30 Apr 1828 (listing sheets sent to date); IOR E/4/724: Court to Bengal, military, 28 Jan 1829; IOR E/4/731: Court to Bengal, military, 2 Mar 1831; IOR E/4/749: Court to Bengal, military, 29 Mar 1837; IOR E/4/765: Court to Bengal, military, 16 Mar 1841; IOR E/4/771: Court to Bengal, separate military, 27 Jul 1842; and IOR E/4/779: Court to Bengal, military, 3 Jul 1844. Letters of the same dates went to Madras and Bombay. IOR F/4/1290 51643; BMC 27 Apr 1830 85: "Memorandum shewing the Sheets of the New Indian Atlas which have been received at this Presidency up to the Present Date and the Manner in which they have been Distributed," not dated, and UN PW Jf 2744/5: Salmon, "Memorandum," Aug 1827, both list sheets produced to those dates.

⁷³ The ten sheets were: all land, 56, 59, 75; almost all land, 79; half-sea, 42, 80; almost all sea, 44, 81, 95, 109.

⁷⁴ IOR D/11, 1027: Corres. Citee. Minutes 27 Mar 1827 (£876 8s for six sheets); IOR D/12, 367: Corres. Citee. Minutes 8 Aug 1827 (£402 8s 4d for 150 copies of three sheets); IOR D/12, 689: Corres. Citee. Minutes 2 Jan 1828 (£431/4/10 for the same three sheets, but also included coloring).

⁷⁵ British Parliamentary Papers 1851 (219) 41, 44-45. The range stems from considering whether the five revisions should be taken as being equivalent to a whole or half-sheet.

⁷⁶ IOR L/MIL/5/413 306, ff. 107v: Walker to Court, 15 Aug 1838.

⁷⁷ IOR D/12, 367: Corres. Citee. Minutes 8 Aug 1827.

⁷⁸ IOR F/4/1290 51643; BMC 27 Apr 1830 85: "Memorandum shewing the Sheets of the New Indian Atlas ...," not dated.

⁷⁹ IOR E/4/719: Court to Bengal, military, 2 May 1827, 13.

⁸⁰ IOR E/4/764: Court to Bengal (North West Provinces), political, 1 Jan 1841, 169.

⁸¹ IOR E/4/712: Court to Bengal, military, 13 Oct 1824, 112.

⁸² IOR F/30/32: BMC 11 Dec 1823 8274: Govt. to Blacker, 11 Dec 1823. See also IOR E/4/113: Bengal to Court, military, 20 Mar 1824, 8203.

⁸³ IOR F/4/1890 23143, 47-48; BMC 5 Feb 1824 8137: Blacker to Govt., 28 Dec 1823, 116.

⁸⁴ Phillimore, *Historical Records*, 3:293-95. IOR E/4/1054 29031, 9-37; BMC 25 Jan 1828 8196: Hodgson to Govt., 5 Nov 1827, 14. Blacker's intended sheet size was 1056.6 to Arrowsmith's 1071.9 and Walker's 927.2 square inches.

⁸⁵ IOR F/4/836 22401, 240-43; BMC 29 Jul 1825 8158: Blacker to Govt., 12 Jul 1825, 15-6. IOR E/1/158, 168: Misc. Corres., 30 Aug 1825, forwarded the tables and map to London. IOR D/11: Correspondence, Committee Minutes 4 Apr 1826: sent them to the Astronomer Royal for comment.

⁸⁶ IOR F/30/60: BMC 23 Sep 1824 8126: Blacker to Govt., 11 Aug 1824, 123.

⁸⁷ IOR F/4/1050 29031, 9-37; BMC 25 Jan 1828 8196: Hodgson to Govt., 5 Nov 1827, 15.

⁸⁸ IOR F/4/976 27498, 16-34; BMC 12 Jan 1827 8236: Hodgson to Madras Assistant Surveyor General, 31 Nov 1826, 14.

⁸⁹ IOR X/258a: "Bombay Presidency, Degree Sheets," dated 1827-33. Most are in duplicate; one set of sheets are signed by James Jopp, Bombay Assistant Surveyor General, and are likely to be originals; the other set were signed by A.S. Waugh (as Surveyor General) and are therefore copies dating from after 1843. Marginal annotations indicate that at least 60 sheets were planned in this series, of which 23 are

present in the set (32 maps in all). Cf. IOR E/4/528: Bombay to Court, military, 23 Sep 1833 and 16 Dec 1833; IOR F/360/12: BMC 11 Sep 1833 84447; IOR F/360/14: BMC 14 Nov 1833 85391.

⁹⁰ IOR X/329: "Drawings for the Indian Atlas," 1828-30, at four miles to an inch; 16 maps in all, constituting 14 actual sheets.

⁹¹ IOR E/4/732: Court to Bengal, military, 20 Jul 1831, 19-14; IOR E/4/1053: Court to Bombay, military, 22 Apr 1831, 18; IOR E/4/1054: Court to Bombay, military, 8 Feb 1832, 117, rejected Bombay sheets as having positions "too vague and unsatisfactory" which were not based upon triangulation; IOR E/4/1058: Court to Bombay, military, 15 Oct 1834, 12-9; IOR E/4/10548: Court to Bombay, military, 17 Dec 1834, 123; IOR E/4/749: Court to Bengal, military 22 Mar 1837, 112-15.

⁹² Hodgson to Madras Assistant Surveyor General, 8 Feb 1827, cited by Phillimore, *Historical Records*, 3: 284.

⁹³ IOR E/4/1050 29031, 9-37; BMC 25 Jan 1828 8196: Hodgson to Govt., 5 Nov 1827, 15, 9.

⁹⁴ Phillimore, *Historical Records*, 3:276; Andrew S. Cook, "The Beginning of Lithographic Map Printing in Calcutta," in *India: A Pageant of Prints*, eds. Pauline Rohatgi and Pheroza Godrej (Bombay: Marg Publications, 1989), 125-34.

⁹⁵ IOR F/4/1050 29031, 9-37; BMC 25 Jan 1828 8196: Hodgson to Govt., 5 Nov 1827, 19.

⁹⁶ IOR E/4/1050 29031, 38-39; BMC 25 Jan 1828 8197: Govt. to Hodgson, 25 Jan 1828.

⁹⁷ IOR E/4/121: Bengal to Court, military, 24 May 1827, 1129-30.

⁹⁸ IOR E/4/723: Court to Bengal, military, 29 Oct 1828, 1139-42; IOR E/4/726: Court to Bengal, military, 9 Sep 1829.

⁹⁹ UN PW Jf 2861/6: James D. Herbert, "On the Construction of the Atlas of India," note dated but annotated "rec'd 27 April '29," 11. See also UN PW Jf 2767/8: Herbert, Memorandum, 21 Apr 1829, and associated materials (1/5-7). IOR F/4/1250 50394*, 3-8: Bengal Military Consultations 29 Jan 1830 8151: Herbert to Govt., 29 Jan 1830, argued that Atlas compilation would be better and easier in Calcutta than in London.

¹⁰⁰ E.g., IOR F/34/45: BMC 8 Aug 1833 88: Memorandum by Montgomerie, 11 Jul 1833, on the preparation of an atlas for the Madras Board of Revenue.

¹⁰¹ Cited in Thomas Best Jervis, *Address Delivered at the Geographical Section of the British Association Descriptive of the State, Progress and Prospects of the Various Surveys and other Scientific Enquiries instituted by the ... East India Company throughout Asia* (Torquay, private publication, 1838), 34.

¹⁰² Two examples made for the Indian market are: Bodleian Maps (E) D10 (228), G. Herklotz, a map of India in Persian, printed at the Asiatic Lithographic Press, Calcutta, 1826; BL Maps 52415(28), J.B. Tassin, *Anglo-Persian Map of India* (Calcutta: Oriental Lithographic press, 1837).

¹⁰³ IOR F/4/976 27498, 16-34; BMC 12 Jan 1827 8236: Hodgson to Madras Assistant Surveyor General, 31 Nov 1826, 16.

¹⁰⁴ Royal Geographical Society, Library file "Jervis": Thomas Best Jervis to John Washington, 27 Feb 1840.

¹⁰⁵ UN PW Jf 2836/4: Everest to Bentinck, 8 May 1834, transmitted one such diagram (UN PW Jf 2938). Cf. Cook, "Lithographic Map Printing."

¹⁰⁶ Royal Geographical Society, Library file "Jervis": H.T. Prinsep to T.B. Jervis, 25 Dec 1830.

¹⁰⁷ See Edney, "Mapping and Empire," for more details.

¹⁰⁸ IOR L/MIL/5/413 306, 106v: John Walker to Melville, 15 Aug 1838.

¹⁰⁹ IOR L/MIL/5/413 306, 106-11: John Walker to Melville, 15 Aug 1838.

¹¹⁰ IOR E/4/767: Court to Bengal, military 4 Aug 1841, 11-10.

¹¹¹ IOR F/4/1949 84753: Court to Bengal, marine, 16 Dec 1840, 11-7, quote from 15.

¹¹² IOR E/4/771: Court to Bengal, marine, 13 Jul 1842, 14.

¹¹³ See the surveys lithographed by the Allahabad Board of Revenue and received by the Court in 1843: IOR E/4/774: Court to Bengal, public, 3 May 1843, 12.

¹¹⁴ W.M. Coldstream, "Notes on Survey of India Maps and the modern Development of Indian Cartography," *Records of the Survey of India* 12 (1919), pl. XX.

¹¹⁵ E.g., Bodleian Maps (E) D10:20 (12): *Nuldroog Circar* at 1 inch to a mile, 4 sheets (London: J.& C. Walker, not dated). One example, however, bears an Indian imprint: Bodleian Maps (E) D10:24 (88), *Maiker Circar*, 1 inch to a mile, surveyed 1843-44 (Calcutta: Surveyor General's Office, 16 Jan 1845). It should be noted that most of the Hyderabad surveys were lithographed by Trelauney Saunders during the 1870s; the IOR map room still possesses the original survey materials, just waiting to be examined!

¹¹⁶ Royal Geographical Society, Correspondence file "Walker".

¹¹⁷ Coldstream, "Notes on Survey of India Maps," gives a good overview of the different maps of India published through the nineteenth and early twentieth centuries; the monograph is illustrated (in color when necessary) with forty details from original maps. See also, Andrew S. Cook, "Maps," *South Asian Bibliography: A Handbook and Guide*, ed. J. D. Pearson (Hassocks: Harvester press, 1979), 97-107; *idem*, "Maps from a Survey Archive"; B.C. Kunte, ed., *Catalogue of Maps in the Bombay Archives* (Bombay:

Maharashtra Department of Archives, 1979-, many vols.); National Archives of India, *Catalogue of the Historical maps of the Survey of India (1700-1900)* (New Delhi: National Archives of India, 1975).

¹¹⁸ IOR X/11000 series - Indian Atlas - Walker Album (cf. note 1) includes sheets from 1865 (no. 105SE), 1866 (nos. 5NE, 5SE, 6NE, 6SE, 8NE), 1867 (nos. 69NW, 70-NW), 1868 (27aSE, 44aSW, 45NW, 45SW, 69SW, 69NE, 70SW), and 1869 (91SE, 92NE).

¹¹⁹ Sheets 1SE, 8SE (later issue), 44aSE, 45NE, 45SE, 46 (later issue; a full-size sheet), 51NW, 63aNW, 63aSW, 64NW, 64SW, 70NW (later issue), 70SW (later issue), 71NW, 71SW, 90NW, 90NE, 91NE, 92SE, 105NW, 105SE, 126NW, 126NE, 126SE, 127NW, 127SW, 127NE, 127SE, 128NE.

¹²⁰ Finally, there were twelve quarter-size sheets, not in IOR X/11000 series - Indian Atlas - Walker Album but published under Walker's name with dates before his death: 1aSE, 1NE, 8SW, 8SE, 27aNE, 44aNW, 51NE, 69SE, 70SE, 71NE, 90SE, and 105NE.

¹²¹ IOR V/26/420/2, 74.

¹²² Coldstream, "Notes," 25.

¹²³ Bi. Maps *52410(86), index.

¹²⁴ Bi. Maps *52410(86), sheets 48NW (1897) and SW (1899), 40NW (1898).

¹²⁵ The confidential portion was evidently the western half of the sheet, which was blank on the first edition of 6SE.

¹²⁶ *Catalogue of Maps Published by the Survey of India, Corrected up to 1st February 1910* (Calcutta, 1910). The quarter-sheets stripped from full sheets are: (on stone) 28NW and NE (1904), 41SW (1905), 44NE (1903) and SE (1904), 49SW (1886), 59NE (1905), 72SW (1899), 76NW (1904), 79SE (1904), 114NE (1904); (electrotyped) 28SW and SE (1888-89). Sheet 59SE, an electrotype, might conceivably have been stripped from the full sheet in 1905.

¹²⁷ See James Burgess, "Mapping and Place-Names of India," *Scottish Geographical Magazine* 7 (1891): 357-69; James Sconce, "Progress of the Indian Surveys, 1875 to 1890," *Scottish Geographical Magazine* 8 (1892): 208-13. For the Committee and its significance, see Andrew S. Cook, "More by Accident than Design": The Development of Topographical Mapping in India in the Nineteenth Century, paper presented to the Eleventh International Conference on the History of Cartography, Ottawa, 1985.

¹²⁸ IOR V/26/420/2, 66.

¹²⁹ IOR V/26/420/2, 75.

¹³⁰ IOR V/26/420/2, 66-67, 74-77.

¹³¹ All-new sheets published in 1906: 60SW, 80SW, 106SW, and 107NW. New states of existing sheets in 1906: 43, 47SE (and another in 1908), 62, and 69.

¹³² Coldstream, "Notes," 2 and 25.

¹³³ IOR X/237/48NE. No other copy seen.

¹³⁴ Survey of India, *Catalogue of Maps ... 1917*; *idem*, *Catalogue of Maps ... 1924*; *idem*, *Map Catalogue 1931*.

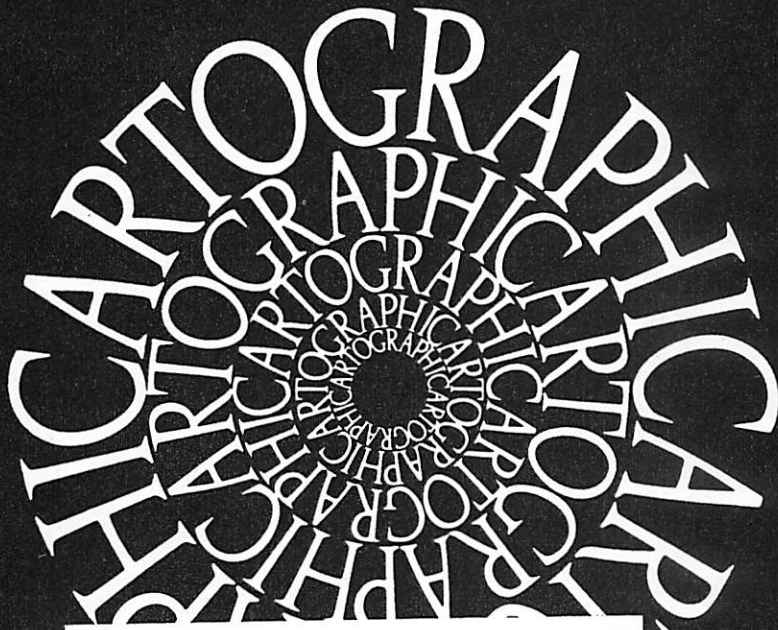
¹³⁵ IOR V/104/721 (1857/1923): *Map of India and Adjacent Countries*, 1:253,440, sheet 721, "Mount Everest."

¹³⁶ IOR V/104/78G (1944): *Map of India and Adjacent Countries*, 1:253,440, sheet 78G, "Rangpur (Assam, Bengal)"; IOR V/104/78H (1944): *idem*, sheet 78H, "Pabna (Assam, Bengal)."

RÉSUMÉ L'Atlas des Indes était la principale série de cartes topographiques des Indes britanniques. Gravées sur cuivre à l'échelle de quatre milles au pouce, on a produit de nouvelles feuilles pendant près de huit décennies, soit de 1827 à 1906. Cet article suit son histoire, en mettant l'emphase sur les premières décennies. Cette histoire commence avec le changement de politique de la Compagnie des Indes orientales, entre 1800 et 1823, visant à ne plus restreindre l'accès à l'information géographique, mais plutôt à la distribuer ouvertement. Elle continue avec une discussion des liens qui existaient entre des cartographes commerçants et ceux de la Compagnie, notamment entre Aaron Arrowsmith et John Walker. En ce sens plein de signification, on parle du conflit sur la responsabilité de compiler et de produire les cartes, conflit entre les cartographes commerçants de Londres et les géomètres des Indes. Finalement, à la suite du transfert en 1870 de la production aux Indes, cet article discute des compromis faits par les Levés des Indes alors que l'atlas entrait en compétition pour des ressources limitées avec d'autres séries de cartes topographiques lithographiées et à des échelles plus grandes ce, jusqu'à l'abandon officiel de l'atlas, en 1905. Toutefois, les planches de l'atlas ont continué à servir de base pour plusieurs nouvelles cartes jusqu'à la Seconde Guerre mondiale et la Guerre d'Indépendance, en 1947.

ZUSAMMENFASSUNG Der Atlas of India war die topographische Hauptkartenreihe Britisch Indiens. Die Kartenblätter wurden im Maßstab von 'Four Miles to the Inch' in Kupfer gestochen und fast acht Jahrzehnte lang, von 1827 bis 1906, hergestellt. Der vorliegende Aufsatz verfolgt seine Geschichte unter

Hervorhebung der frühen Jahrzehnte. Er beginnt mit einer Änderung in der Politik der East India Company zwischen 1800 und 1823, vom bisher beschränkten Zugang zu geographischen Informationen zu deren allgemeinen Vertrieb. Es folgt eine Erörterung der Verbindungen zwischen der East India Company und kartographischen Verlegern, vor allem Aaron Arrowsmith und John Walker. Von Bedeutung in diesen Beziehungen ist der Konflikt über die Verantwortung für Kartentwurf, Redaktion und Produktion zwischen den Kartographen in London und den Geometern in Indien. Zum Schluß bespricht der Aufsatz, nachdem die Atlasproduktion 1870 nach Indien verlegt war, die Kompromisse, zu der sich der Survey of India gezwungen sah; denn der Atlas konkurrierte mit anderen (lithographierten) topographischen Kartenserien in größeren Maßstäben um die begrenzten Finanz- und Produktionsmittel, ehe der Atlas 1905 offiziell eingestellt wurde. Dennoch bildeten die Atlasblätter die Basis für viele neuere Karten bis zum 2. Weltkrieg und bis zur Unabhängigkeit im Jahre 1947.



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Volume 28 / Number 4 / Winter 1991

CARTOGRAPHICA

D R F Taylor

A CONCEPTUAL BASIS FOR CARTOGRAPHY: NEW DIRECTIONS FOR THE INFORMATION ERA / 1

Patricia Mahoney, L W Carstensen and J B Campbell

EFFECTS OF TECHNOLOGICAL CHANGE ON RELIEF REPRESENTATION ON USGS TOPOGRAPHIC MAPS / 9

M Kate Beard

THEORY OF THE CARTOGRAPHIC LINE REVISITED: IMPLICATIONS FOR AUTOMATED GENERALIZATION / 32

Matthew H Edney

THE ATLAS OF INDIA 1823-1947: THE NATURAL HISTORY OF A TOPOGRAPHIC MAP SERIES / 59

John Brian Harley 1932-1991: A Tribute / 92

RECENT CARTOGRAPHIC LITERATURE / 94

Edited by Barbara J Gutsell

REVIEWS: BOOKS AND ATLASES / 99

How to Lie with Maps / 99

A Country so Interesting: The Hudson's Bay Company and Two Centuries of Mapping, 1670-1870 / 101

Mapping Upper Canada 1780-1867: An Annotated Bibliography of Manuscript and Printed Maps / 105

Map Projections: Theory and Applications / 106

Geographic Information Systems: The Microcomputer and Modern Cartography / 109

An Introduction to Urban Geographic Information Systems / 110

Mapping Texas and the Gulf Coast: The Contributions of Saint-Denis, Olivan and Le Maire / 112

Atlas of United States Environmental Issues / 114

The Atlas of Arkansas / 115

Student's World Atlas / 118

Atlas Thématique du Canada et du Monde / 120

Atlas du Monde 1665 / 122

Picture Atlas of the World / 123

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