

# *Sheetlines*

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**Number 133**

**August 2025**

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The Society once again exhibited in July at the annual meeting of the London Topographical Society. Always in an architecturally-significant building, this year's AGM was held in the so-called New St Pancras church, in the Euston Road, dating from 1828.

We gained a number of new members as a result – those LTS members who joined up receiving a free map as a perk. Maps from the Past Number Seven (the secret military General Strike map) raised a lot of interest, and sales were worthwhile. Richard Oliver's third edition of Concise Guide to OS also sold out of supplies.



We were greatly honoured by a visit from the LTS's new Patron, HRH the Duke of Gloucester, who proved to be most interested in maps. Our chairman Gerry Zierler presented the Duke with a copy of the secret General Strike map, after he had expressed great interest in its unique symbology, shown on the Society's latest flag banner.

Manning the stand with chairman Gerry Zierler were John King and John Davies, to whom many thanks for hard work on a hot day. Thanks too to a number of our London members, also in LTS, who came by to say hallo.

*Left: The Duke of Gloucester and Gerry Zierler examine the CCS Map from the Past (John King)*

## ***Crispin Jewitt (1949-2025)***

Crispin, author of *Maps for Empire*, the second edition of which the Society was proud to publish last year, passed away on 1 June after a short illness.

Born Anselm Crispin Jewitt on 30 July 1949, Crispin was one of five siblings and attended Skinners' School, Tunbridge Wells and later the School of Librarianship at North London Polytechnic. In 1969 he joined the British



National Bibliography, and here began a lifelong career of distinction in archiving and curatorship. In 1973 he made his first foray into the world of maps with a placement in the British Museum Map Room. He continued at the BM as a Legal Deposit cataloguer but by 1980, and clearly pining for the maps, returned as a curator to what was now the British Library Map Library. It was while here that he joined the Charles Close Society.

In 1988 Crispin's career changed direction, when he joined the National Sound Archive, now also part of the BL. In 1992 he was appointed as its Director, a post in which he remained for fifteen years. During this time, he oversaw the transfer of the Archive to its present site at St Pancras. From 1999-2002 he was also President of the International Association of Sound and Audiovisual Archives.

Crispin was passionate about his work and the collections he managed. Fascinated by bookbinding, he completed an evening course and continued it as a hobby. In retirement he returned to the BL as a volunteer, and from 2011 to 2025 held the position of Specialist Advisor on British Military Cartography. Here he curated the War Office Archive, a collection of mostly unique, unpublished manuscript maps produced in support of British overseas operations in the late nineteenth and early twentieth centuries. It was in this capacity that I first met him in 2017. He was wonderful to work with: kind, understanding, wise, and with a formidable knowledge that he was always willing to share.



Crispin was also a skilled and meticulous researcher, as evidenced by his two books. *Maps for Empire* (BL, 1992; 2nd Edn CCS, 2024) is a narrative history and detailed cartobibliography of the first two thousand sequentially numbered maps issued by the Intelligence Division, WO (and its successors). Some of these maps were fiendishly elusive, and it was always a pleasure to pass on to him undiscovered 'strays' (his word, not mine!) that I occasionally chanced upon in the less frequented corners of the BL. *Intelligence Revealed* (BL, 2011) is a companion volume covering the maps, plans and views published in

the eighty years prior to the numerical sequence of *Maps for Empire*.

Crispin married Mary Lee Lai-ling in 1970, and from here blossomed a deep interest in Hong Kong, Macau and China. This included travel and the building of a personal collection of maps and histories. Mary Lee also taught Crispin Chinese, a skill he later applied to curating the WO Archive maps from that region.

Mary Lee pre-deceased Crispin by six years. They lived in Edenbridge, Kent, and had a daughter and two sons – Alexandra, Michael and Henry – and it is to them and the rest of the family that the Society passes on our sincerest condolences.

**Nick Krebs**

### ***Another Redbourn show-and-tell***

In the beginning was ... the CCS Hertfordshire Regional Meeting. And from that, in 2018, sprang the Redbourn show-and-tell get-togethers, organised by Dave and Caroline Watt, the latest of which took place on 8 March. Eleven Society members gathered to tell of their “Favourite (and least favourite) Maps”.

Dave opened the proceedings with the Swiss 1:25,000 composite, Zermatt and Gornergrat, a map as art. Less arty was OS’s hill-shaded Landranger, sheet 124, Dolgellau, 1995. Using two light sources together was reckoned a technical marvel: Dave begged to differ, *Sheetlines* 44 pp52-56 explains more.

Caroline followed with a beautiful Barts Half-Inch of the Cairngorms east of Pitlochry where she catered for a family over many summers. The map brought out the stunning relief magnificently.

Next, Bernard Anderson began with his One-inch Seventh Series, Sheet 143 (Gloucester and Malvern) of 1953, a model of clarity. It was also where he was brought up. He pointed out the railway between Malvern and Upton-on-Severn, long closed, shown as open. The error was perpetuated on the edition corrected to 1956, when the line had been lifted. He highlighted too the detailed depiction of Pershore Airfield, then an active RAF station, later a standby V-Bomber base. His least favourite was the May 2023 Tube map ...a map needing a magnifying glass in good light to read it, not good.

As an aside, and relating to ongoing research on Gerry Zierler’s London AD map, the One-inch Seventh Series, Sheet 161 (London NE) was offered showing the rough location of the WWI Royal Flying Corps Hainault Farm Airfield, and details of the Airbase on almost the same site used in WWII. Hainault appears as another possible London Airport on Patrick Abercrombie’s Master Plan.

Julian Williams’ examples reflected his extended experiences in south-east Asia. As nearly all his map collection is still in storage he was restricted to just the two percent to which he had access. His favourite was a very rare two inches to one mile town plan of Kuala Lumpur, produced under the direction of the first Surveyor General of the Federation of Malay States – Colonel HM Jackson - in 1911. The specification included a great variety of land uses including tapioca, sugar-cane, rubber, and coconut plantations. Five hundred copies were printed. The only other example he has found of this state is at



the Bodleian: it seems even Malaysia and Singapore do not have copies. Early copies of Kuala Lumpur maps are generally very rare.

At the other end of the spectrum was an Indian Map Service town plan of Chandigarh, NW India. This unique city was planned and built just after WWII to provide the states of Punjab and Haryana with a combined capital, so is totally different from India's older, chaotic, larger cities. He kept it because this 2014 edition is the latest detailed map of the city, so very useful during his three months there in 2019. The Survey of India equivalent, though attractive and with a clear specification, is hard to find and usually twenty to thirty years old. So, though this commercial specification is unclear and poorly coloured - which is certainly a 'no-no' for a town plan - beggars can't be choosers.

Brian Garvan then showed a rarity in this digital era, a map drawn by his own fair hand, the 1:100,000 scale, Series K668, sheet NE-39-163, ed 3-GSGS of part of what is now Yemen. He explained and showed examples of the whole process from hand drawn compilation using air photography to colour printed sheet. His highlight was the Venice example of the panorama maps by *Terra Nostra* based in Warsaw. However, the maps are actually drawn by the Armenian cartographer, Ruben Atayan, and Brian provided a picture of him sitting in Venice sketching the buildings from life.

Next, and a highlight, was Gerry Zierler's favourite, a beautiful copy of the 1797 edition of Faden's map of Norfolk, dissected on linen in a leather slipcase in the form of a quarto book with gilt title. The title began as, *A Topographical Map of the County of Norfolk Surveyed in the Years 1790, 91, 92, 93 and 94 By Thos Donald, Thos Milne and Assistants...* It opened to about 6ft x 4ft and showed the names of the subscribers, gentry who got a discount on the three guineas price, like Thomas William Coke, Esq, later first Earl of Leicester at Holkham Hall. He promoted the map when Faden applied to the Royal Society of Arts for an award, unsuccessfully it turned out as he'd taken too long! Land is differentiated between Woods, Fen & March Lands, and Commons and Heaths. Great Roads, then Cross Roads, and Wind, Water and Drain Mills are amongst the wealth of other detail. Town plans of Great Yarmouth, and the Towns of Lynn and Swaffham appeared, but why not Norwich, the county town? Perhaps there were other town plans already available, so Faden had wisely concentrated on the highly accurate one-inch mile map instead. Perhaps even the Board of Ordnance might have contributed, as they had done elsewhere in East Anglia. Perhaps this really is an early prototype to the OS one inch?

Gerry's disappointing map was (horror!) an OS map. Not a well-known title this, but 'Regency Lawn: How to find the Zierlers' was an OS Select Explorer 1:25,000 map of central and north London on very heavy paper, specially produced in the early days of (nowadays) 'Custom Made' mapping. Why was this personalised very special OS map so disappointing? When the nicely plastic-packaged personal map was opened, Gerry's 1970-built house and its neighbours were nowhere to be seen! It was apparent that the 2004 map had used 1960s data. After some teasing of

customer-facing folk in Southampton, a few OS posters were however offered *gratis*!

Michiel Rademakers, travelling especially from the Netherlands, then explained his 1970s 'pocket' transport atlas of Tokyo, the detail and clarity being astonishing tributes to the cartographer's and printer's skills but designed for a pretty big pocket. Despite his excellent explanation of the workings of the bus stop network I was wondered how your average commuter got around!

Chris Dean transported us back nearly two hundred years to the canal and early railway eras. His Bradshaw's Railways of Great Britain, dated 14 January 1839 at one inch to ten miles, dissected and measuring approximately 162 x 100cm, showed the extant railways and their gradient profiles. More gradient detail was in the tables of the attached 27-page booklet. He then offered two examples from his set of 1833 Bradshaw Canal Maps, covering the Midland Counties and the North of England (primarily Merseyside and Manchester) at one inch to two miles. All were in excellent condition and hand coloured.

Next up, John Davies presented a pair of maps which were Alpha and Omega; street plans of local towns, mostly in Essex, published by Focus Maps. 'Alpha', as they earned him a slot on a Radio 4 humorous investigation into cartographic copyright traps, broadcast in 2010 and available on BBC Sounds. 'Omega', because they included dozens of non-existent roads, labelled with fictitious names derived from the phonetic alphabet. They were easy to spot, not least as they were carefully listed in the index: Bravo Ridge, Charlie Hill, Delta Court, Echo Croft, Foxtrot Place and so on to Tango Terrace and Whisky Hill.

Chris Higley then offered three examples of German mapping from World War II. His first began as a 1:50,000 German enlargement of OS One-inch Popular Edition of Scotland sheet 48, Loch Ericht and Loch Laggan. This copy had been liberated in a German map depot as the Allies advanced through Belgium, then the reverse side used by 3 Field Survey Company, Royal Canadian Engineers for a December 1944 printing of 1:25,000 AMS M831 (GSGS 4427) sheet 6NW EAST, Arnhem East. This was Chris's favourite, partly for personal reasons - a relative had been parachuted into Arnhem (and survived) a few months before the 1:25,000 sheet was printed. He also found it fascinating as the embodiment of the concept of a World War in a single small sheet of paper: a British map of Scotland, enlarged by Germans, captured in Belgium, used by Canadians to print an American map of part of Holland, with a French grid! To demonstrate that the Germans could produce some very good maps too, Chris showed a German c.1939 enlargement to 1:100,000 of OS Half-Inch, Large Sheet Series, sheet 32, Bristol. He observed that the clarity of the mapping showed an opportunity missed for an OS 1:100,000 series.



His least favourite was also German, a 1:50,000 enlargement of a Spanish 1:100,000 sheet covering Sóller in Mallorca. The larger scale added nothing in terms of clarity and with roads, contours, watercourses and the single railway line all shown by thick black lines, the sheet was very hard to read. However, this copy must have also been 'liberated', for want of anything better, someone had thought it worth Stanford's dissecting and mounting it on cloth.

Lastly, Ian Byrne's favourites included a variety of maps of Grenoble, an example being a clear and concise cycle map, a road map of Scandinavia which had so many town plans on the reverse you could barely count them and a road map of Tierra del Fuego with Antarctica on the reverse. His least favourite, was a triumph ... an immediately 'dated' 1967 psychedelic design, an Egon Ronay map of eateries around the UK.

***Dave & Caroline Watt***



*Discussing Ian's Egon Ronay map (Julian Williams)*



*Left : Gerry Zierler's Norfolk map; Right : Christopher Dean's Bradshaw Canal Map (Caroline Watt)*

## ***Bartholomew's maps for the War Office***

### ***Roger Hellyer***

#### ***1. Maps of foreign countries***

Between 1900 and 1903 John Bartholomew & Co. were contracted by the War Office to provide maps for three different functions.<sup>1</sup> Two were foreign jobs: one was to print the first four sheets to be published in IDWO 1539, a 1:1,000,000 map of Africa. These were sheets 68, 69, 80 and 81 entitled *North-West, North-East, South-West and South-East Somaliland*. The map was laid out on graticule sheet lines, each sheet measuring four degrees of latitude by six degrees of longitude. The mapping was compiled in the Intelligence Division, War Office in 1901; this was sent to Bartholomew's to prepare the stones from which were printed 510 copies of each sheet between 11 June and 16 July 1902.<sup>2</sup> Some thirty letters relevant to this map are in the Bartholomew Business Record, dating from 16 May 1901 to 7 July 1902. The further sheets in IDWO (later TSGS, then GSGS) 1539 were printed by W. & A.K. Johnston and the Ordnance Survey.

The other foreign job undertaken by Bartholomew's was IDWO 1643 *Map of the northern portion of South America prepared to illustrate the case presented on the part of His Britannic Majesty's Government in the matter of the boundary between British Guiana and the Republic of Brazil*, a 1:10,000,000 map drawn and printed for the Intelligence Division, War Office. Bartholomew's recorded the printing date as 8 January 1903.<sup>3</sup>

#### ***2. English maps***

As is well known, the Ordnance Survey only began to publish a half-inch map of any part of the United Kingdom in 1903, so the War Office's need for mapping at that scale before that date could best be met by using Bartholomew's maps. According to a letter to the War Office dated 1 August 1901, the Edinburgh firm had already completed a national half-inch map of Scotland which was in 29 sheets, and were in the process of producing one of England and Wales (in 37 sheets) which they expected to have complete in 1902. The War Office were purchasing copies of maps in both series, but they also had another, more specific, requirement in special maps of three areas which were not conveniently covered by the sheet lines of those series. The first, initially referred to as '½ in. England 4 sheets' was by 1 June 1900 more accurately described as '½ in. Map of London

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1 All the references to the maps, letters and other Bartholomew source materials mentioned in this paper are in the Printing Record or the Business Record in the Bartholomew Archive held in the National Library of Scotland, as listed below.

2 Bartholomew Printing Record, NLS Acc. 10222/PR/33b folios 137a, 165, 166, 167.

3 Bartholomew Printing Record, NLS Acc. 10222/PR/34a folio 56b.

District. Limits 5m. W. of Portsmouth & 5m. W. of Harwich. In 4 sheets. Usual Contour Colouring.' The others were of their military training areas, Salisbury Plain and Aldershot. These were all purely topographical maps, with no added security detail. The War Office allocated the IDWO number 1511 to *Salisbury Plain District*, and IDWO 1587 to *Aldershot District*. The London map was the first map to be printed – and, at that time, without an IDWO number.

#### *London District*

Unfortunately the incoming correspondence received by Bartholomew's has not survived, merely copies of the letters they sent, held in the Letter Books in their Business Record. From them we learn that the War Office first approached Bartholomew's about the London map on 8 March 1900 with an order for 1,000 copies of each sheet. Bartholomew's reply the next day underlined the phrase that to print so small a number would be a 'somewhat expensive matter' given the preparation of the stones and cost of printing. On 1 June the War Office was quoted that for a printing of 5,000 copies 'the price per sheet mounted on Jaconette & cased in usual style would be 11d each or 3/8d for the 4 sheets. For Copies on paper only in sheet form the price would be 4½d each or 1/6d for the 4 sheets.' The eventual order, confirmed 12 July, was for 7,800 copies of two sheets (probably the western sections) and 11,000 of the other two.<sup>4</sup> Bartholomew's suggested the southern quarters should be a little larger than the northern, 'because dividing them equally would have made a very awkward division as regards London & the north Kent coast.' On 5 September Bartholomew's sent another patched up proof, showing how 'we can, without breaking the outside border, show the whole south bank of the Thames between Gravesend & Grain' and went on to suggest 'should you prefer it, we can, by printing right up to the edge of the paper, show the opposite bank also.'

On 18 October Bartholomew's wrote to the War Office about the design of the cover:

'We are now well advanced with the printing of the above Map & in a position to make a start with the mounting of the sheets. Before proceeding we should like if the form of cover to be used could be settled so that we may be able to complete the order. For field use we

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<sup>4</sup> The number of copies required as recorded in Bartholomew's jobs register on 30 July 1900 is slightly different: '1008 (the job number) | War Office | ½" England 4 sheets : 7,800, 11,000 | 8,400, 11,600 copies. | See order.' This seems to confirm that the shorter print runs were for the western sheets. Later entries in the jobs register record a reprint order between 3 and 9 June 1901, from H.M.S.O., of 7,000 copies; another between 5 and 25 November records an order from the War Office for 7,700 sheets, marked 'delayed'. This total was supported by a letter sent on 15 November 1901 placing a curiously precise order for a further '3526 Copies N.E. Sheet & 4174 Copies of S.E. Sheet ½" England', which indeed totals 7,700 sheets.



think there is little doubt that these Maps would be better & more easily manipulated without a cover but simply with a cloth paste down on front & back as we have done on copies of two of the sections enclosed. On the copy in brown skiver we have sketched on the design & lettering etc we should suggest for back & front & we should be glad if you would submit this for approval. If brown is decided on as the colour to be used we should give cloth of that shade similar in quality to the red cloth on other section map enclosed, unless the brown skiver should be preferred. We are sorry we have no sample we can enclose.

'We shall be glad to have sample Map returned with any suggestions as to design etc, & also the decision come to as regards the form of cover. At same time we should be glad to learn the ?number of? (damaged) the Maps will be required, so that we may arrange as to the mounting. We should also like to have the formal official order.

We remain | Yours faithfully | John Bartholomew & Co.'

It is interesting that 'for field use' Bartholomew's were recommending against the use of their usual bookfold covers, but even so the War Office seem not to have been entirely satisfied with what was suggested, and wrote on the 20th asking for changes. On 3 November Bartholomew's sent an altered specimen cover, and, once that was approved, undertook to send ten complete sets of the maps as requested by the War Office. They enquired as to the delivery of the entire consignment, now that the mounting of the maps on cloth was in progress, whether in one or part deliveries 'We are going on with the mounting now & will make a part delivery in a few days if wished.' The printing of the components of the four maps was completed by 28 November 1900. Bartholomew's also responded to another matter raised by the War Office, who had made the suggestion that Bartholomew's could also put the map on sale themselves. They replied 'we cannot very well do this ourselves without leading to confusion with our ordinary series which is advertised & known to the bookselling trade' and suggested that any surplus stock be offered to 'leading volunteer officers in London District intimating that they may get copies of these sheets at ?certain (damaged) prices in certain quantities. We cannot think of any other outlet for these.' To judge by the number of extant copies of the London maps many found their way into the public domain even though never placed on sale.

On 26 December Bartholomew's wrote again to the War Office, sending a set of the maps mounted in another cover variant:

'Herewith we have pleasure in sending with our Comp[limen]ts a set of ½" London Dist. Maps mounted ?& disse?cted (damaged paper) in a special way that has been suggested to us as most useful for Field etc use, which we think may interest you. You will notice that when

going from one Section to Another, all that is required is to fold it over. We trust You may find them useful.'

There is no evidence that the War Office took up this offer, which must have involved some form of long (Michelin) fold: the extant copies of the London maps seen all have short form 'War Office Series' covers, which takes the form of cards pasted to the front and back of the map when folded in four sections north to south and nine west to east.

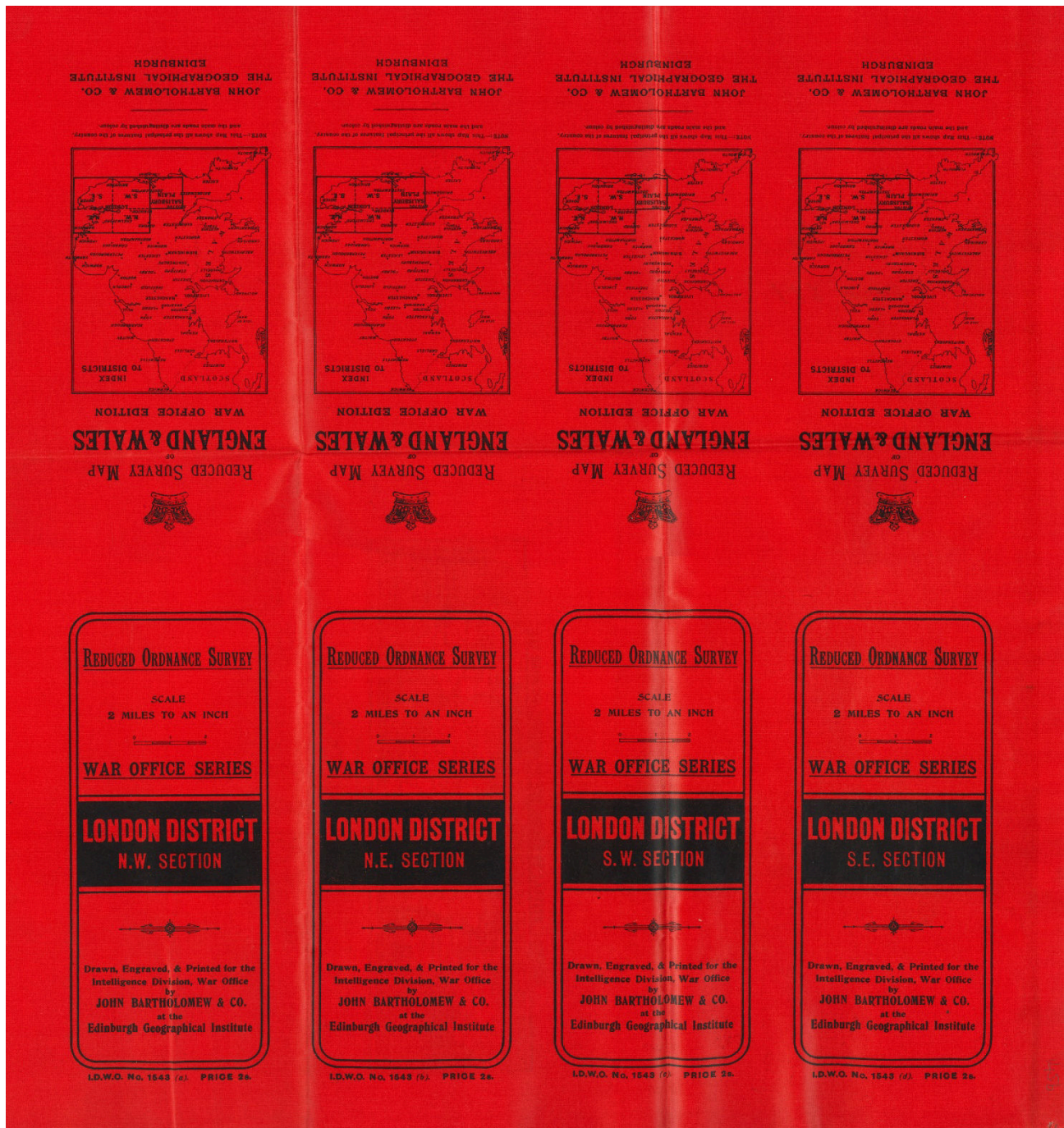


Figure 1. The covers for IDWO 1543 (a, b, c, d) as printed, prior to separation

But still the War Office had not taken possession of the map stock. When they did is unclear: on 28 February 1901 they requested that Bartholomew's hold the stock for a few more weeks. Bartholomew's wrote

again on 1 May enquiring as to when they could send the maps. But evidently they had gone by 17 July: from a letter sent that day to Alexander Knox, Map Curator at the War Office:

‘With reference to the London District Maps, now delivered, kindly say if we are to receive an official order from H.M.S.O. & send in our a/c in usual way to them. The Maps were delivered to The Director of Military Intelligence, and we sent a/c to him as in the case of “Salisbury Plain” Map, which was paid direct by War Office.’

The later correspondence does not reveal how this matter was resolved.

It was on 14 May 1901 that a short printing of another 100 copies of each of the London sheets was ordered. These were to have an IDWO number added: 1543(a-d). Without the incoming correspondence we have no clue why the War Office requested an IDWO number to be added to so small a number of copies – or for that matter why the original printing was unnumbered. This is Bartholomew’s reply on 17th May, sent to Captain E.H. Hills, Intelligence Division, War Office, S.W.

‘Dear Sir | “½" London District Maps”

We are favoured with Yours of 14th, and note You wish an additional 100 Copies of Each of 4 Sections. As requested we shall imprint the Note on these, and as we have no Extra Covers we shall require to specially print them. We Enclose a set with numbers marked on, and shall be glad to know if these are Correct before printing off the 100 Copies of Covers etc. Yours faithfully | John Bartholomew & Co. | G.S.R[obinson]

| P.S. Please return Encl<sup>d</sup>. Copies.’

Bartholomew’s wrote twice sending proofs, first ‘specially drawn in by hand’, then printed, asking for them to be returned to them ‘passed for press’. The specimen in the Printing Record of the four covers with the IDWO numbers added (see *figure 1*, previous page) is hand-dated on the reverse ‘112 Sheets 10/6/01’. The only information we have about the delivery of the map to the War Office comes from this sentence at the end of their letter about the Salisbury Plain map (q.v.) dated 6 September 1901 ‘We shall also be obliged by your returning the box as soon as possible, as we will shortly be sending off the London Dist. maps’, though it is also possible that this referred to the reprint order of 7,000 sheets of the unnumbered map.

One copy only of this numbered map is known to exist: IDWO 1543(c) *London District : South-West Section* is in the Bartholomew Printing Record at Acc. 10222/PR/32b folio 178b, dated 14 August 1901 (see *figure 2*), with its cover at Acc. 10222/PR/32b folio 187b, dated 30 August 1901. Many more copies of the map without the IDWO number survive: for instance the two eastern sections are in the NLS Map Library, and copies of all four are in the Charles Close Society Archives at CCSA.RRO\_636\_7.



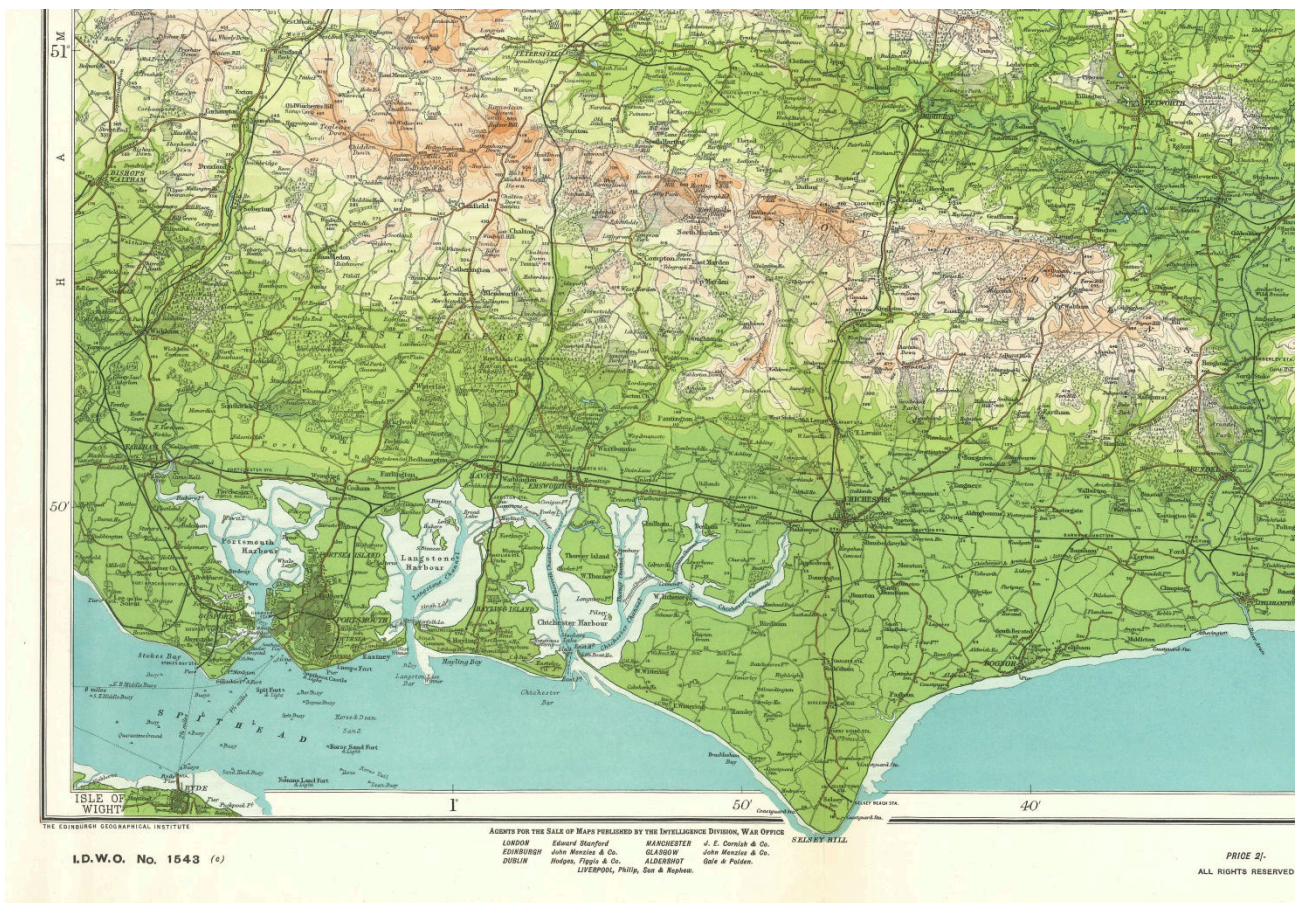


Figure 2. The SW corner of IDWO 1543 (c) London : South-West Section

### Salisbury Plain District

The War Office wrote to Bartholomew's about supplying 'a special edition of ½ in. Map of Salisbury Plain for military purposes' on the first day of 1901. They seem to have made the same proposal to Bartholomew's as they had with the London map: that the Edinburgh firm should print enough copies for them to put the map on sale themselves. Again Bartholomew refused on the grounds that it would cause confusion with the sale of their regular series. They told the War Office that for a map covering about 55 by 40 miles they could print 1,000 copies at 1/2d per copy or 2,000 at 1/- per copy. And on the 10th 'We are adding the additional names on the Map as requested.' By 12 January it had been decided, by adding patches to the original, to produce a map 'the same size as the S.W. Section of the London District Map.' This reached the south coast, where 'We purpose breaking the border so as to include "Bournemouth". The price for Map this size would be 1/3½d per Copy.' 1,000 copies were ordered, according to the jobs register, on 10 January; these were printed by 30 April and sent off on 10 May 1901. Almost immediately, Bartholomew's received an order for 2,000 more copies, which caused something of a problem because, as Bartholomew's told their client on 1 June, the map 'has been effaced from

the stone, but we are getting it put down again.’<sup>5</sup> This they must have done very speedily. They were ready to go ahead by 12 June, but were again awaiting the return of proofs ‘passed for press’. The job was completed on 29 July 1901, but they felt compelled to write again on 6 September, concerned that:

‘On 24th ult. we dispatched, in one Box, per Steamer Paid, 2,000 copies map of Salisbury Plain Dist., and shall be glad to hear that you have received them safely (as we have had no acknowledgement.) We shall also be obliged by your returning the box as soon as possible, as we will shortly be sending off the London Dist. maps.’

Copies of the *Salisbury Plain District* map are in the Bartholomew Printing Record at Acc. 10222/PR/32b folio 171b and the NLS Map Library.

#### *Aldershot District*

The first approach about the Aldershot map seems to have been made on 9 July 1901: Bartholomew’s reply on 1 August to a letter written the day before includes an apology that the earlier one had been mislaid. Bartholomew’s text does not mention Aldershot by name, but the War Office seem to have enquired about the cost of another special half-inch sheet, and by suggesting that they could judge the cost for themselves against that of the London and Salisbury Plain maps, the inference is clear. Once work started, the progress of the Aldershot map seems to have been straightforward throughout. An order for 10,000 copies was placed on 2 January 1902, and by the 6th Bartholomew’s sent a patched up proof of the area for the War Office to consider. By the 25th the map’s dimensions had been agreed. Bartholomew’s sent a monochrome proof copy of the new map and the ‘back & front’ (cover cards) on 17 March which they asked to be returned ‘passed for press’. On 22 April the order for 10,000 contour coloured copies was confirmed, and by 30 June the first 2,000 were mounted and ready for delivery. There is a finished copy, complete with cover cards and mounted on cloth, in the Bartholomew Printing Record at Acc. 10222/PR/33c folio 196, dated 4 July 1902, and another in the NLS Map Library.

So ended the War Office’s connection with Bartholomew’s. Richard Oliver gives a detailed account of their transition to the use of the Ordnance Survey’s half-inch mapping in 1903.<sup>6</sup> The first special maps at this scale produced by the Ordnance Survey for the War Office were published in August 1903, and in addition to the series mapping in different formats of all three countries, a constant stream of half-inch special area and

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<sup>5</sup> The entries numbered 1289 and 1290 in the jobs register during the week beginning 3 June 1901 record that the orders for this and the London District map came, not from the War Office, but H.M. Stationery Office.

<sup>6</sup> Roger Hellyer and Richard Oliver: *Ordnance Survey small scale maps*, London: Charles Close Society, 2023, pp 39-41.

manoeuvre maps followed, including replacement maps of the Aldershot and Salisbury Plain areas.<sup>7</sup> Universal coverage by the Ordnance Survey of the United Kingdom was not achieved until October 1919, when at last they had the printing capacity available to complete the publication of the map of Ireland.

***Table of printings of the special area maps prepared by Bartholomew's for the War Office***

| <i>Map Title</i>  | <i>No. of Sheets</i> | <i>Job No.</i> | <i>Date</i>   | <i>IDWO</i> | <i>No. of Copies</i> | <i>Cost</i>   |
|-------------------|----------------------|----------------|---------------|-------------|----------------------|---------------|
| London NW         | 1 of 4               | 1008           | 30.08.1900    | none        | 7,800                | £1,833 6s 8d  |
| London NE         | 1 of 4               | 1008           | 30.08.1900    | none        | 11,000               | part of above |
| London SW         | 1 of 4               | 1008           | 30.08.1900    | none        | 8,400                | part of above |
| London SE         | 1 of 4               | 1008           | 30.08.1900    | none        | 11,600               | part of above |
| London            | 4                    | 1290           | 03-09.06.1901 | none        | 7,000                | £335 8s 4d    |
| London            | 4                    | ?              | 14.08.1901    | 1543(a-d)   | 100 x 4              | ?             |
| London NE         | 1 of 2               | 1421           | 15-24.11.1901 | none        | 3,526                | ?             |
| London SE         | 1 of 2               | 1421           | 15-24.11.1901 | none        | 4,174                | ?             |
| Salisbury Plain 1 | 1                    | 1110           | 10.01.1901    | 1511        | 1,000                | £65 2s 0d     |
| Salisbury Plain 1 | 1                    | 1289           | 03-09.06.1901 | 1511        | 2,000                | £110 13s 4d   |
| Aldershot         | 1                    | 1454           | 03.01.1902    | 1587        | 10,000               | £479 3s 6d    |

***Acknowledgements***

I am very grateful to Chris Fleet, of the National Library of Scotland, who ensured that all the relevant documents from the Bartholomew Archive were available to me, with the permission of HarperCollins Publishers.

***Bartholomew Archive papers, held by the National Library of Scotland***

Bartholomew Business Record

Acc.10222/BR/282: Jobs register, January 1900 to December 1925

Acc.10222/BR/316: Order and cost book, November 1897 to March 1903

Correspondence files – copies of letters sent, not received

Acc.10222/BR/764: Letter book 12, March 1899 to March 1900

Acc.10222/BR/765: Letter book 13, March 1900 to May 1901

Acc.10222/BR/766: Letter book 14, May 1901 to April 1902

Acc.10222/BR/767: Letter book 15, April 1902 to March 1903

Bartholomew Printing Record

Acc. 10222/PR/32a folio 31b: London SE and SW covers, index - 28.11.00

Acc. 10222/PR/32a folio 32a: London NE and NW covers, index - 28.11.00

Acc. 10222/PR/32a folio 72a: London NE and NW covers, index - 18.2.01

Acc. 10222/PR/32a folio 72b: London SE and SW covers, index - 18.2.01

Acc. 10222/PR/32a folio 110: Salisbury Plain map - 30.4.01

Acc. 10222/PR/32a folio 110b: Salisbury Plain covers, index - 30.4.01

Acc. 10222/PR/32b folio 145b: London, 4 sections, covers, index (IDWO 1543) - 10.6.01

Acc. 10222/PR/32b folio 171b: Salisbury Plain map - 29.7.01

Acc. 10222/PR/32b folio 178b: London SW map (IDWO 1543(c)) - 14.8.01

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<sup>7</sup> *Op. cit.* pp 178-179, 201-202, 213, 225.



Acc. 10222/PR/32b folio 184a: Salisbury Plain covers, index - 21.8.01  
 Acc. 10222/PR/32b folio 187b: London SW (IDWO 1543(c)) covers, index - 30.8.01  
 Acc. 10222/PR/33b folio 137a: NW Somaliland - sheet 68 - 11.6.02  
 Acc. 10222/PR/33b folio 165: NE Somaliland - sheet 69 - 16.7.02  
 Acc. 10222/PR/33b folio 166: SW Somaliland - sheet 80 - 16.7.02  
 Acc. 10222/PR/33b folio 167: SE Somaliland - sheet 81 - 16.7.02  
 Acc. 10222/PR/33c folio 196: Aldershot map on cloth in covers - 4.7.02  
 Acc. 10222/PR/34a folio 56b: British Guiana-Brazil boundary - 8.1.03

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### ***A Poet Laureate writes ...***



As far as the Ordnance Survey is concerned the landscape between here [Woolacombe] and Braunton is mostly yellow. Or something between vanilla and magnolia. And the map lied, because within those large blocks of standard OS shading the eye eventually discerns an unlimited spectrum of colour within the sand: cream, corn, gold, mustard, salmon, straw, umber, amber, peach, pearl, brass, skin, bronze, bisque, buff, tan. And discerns striations of tone and texture lying at intervals from the shoreline, like tree rings, with some strips of sand already dried by the wind and the morning sun and others still damp and heavy from last night's tide. And discerns gradations of sand, from fine powder to coarse scratchy granules. And relief patterns in the surface caused by draining water or eddying breezes, domes and depressions, furrows and bevels, ribs and ripples, levelled plains that could have been finished with a plasterer's trowel followed by a few hundred yards of chaotic ground that looks like the aftermath of a stampede.

*Simon Armitage : Walking Away – Further Travels with a Troubadour*

## ***The Mid-Victorian ‘County Series’ production process (an update)***

***Fraser Donachie***

In my previous article on this subject<sup>1</sup> I presented a ‘swim lane’ diagram summarising the Ordnance Survey production process used for the ‘County Series’ large-scale maps and plans c.1870. The diagram was based on the descriptions found within the following references:

1. Lt. General Sir Henry James & Col. Duncan A Johnston. *Account of the Methods and Processes Adopted for the Production of the Maps of the Ordnance Survey of the United Kingdom; drawn up by officers of Royal Engineers, &c.* H.M. Stationary Office. First edition 1875. Second edition 1902.
2. Mumford, Ian. *The Maps of the Ordnance Survey: a mid-Victorian View*. London, The Charles Close Society: 1995. This reproduces a series of articles describing production methods and processes written by Captain H. Riall Sankey R.E. for the *Engineering* journal published in 1888. Whilst later than c.1870, the detailed descriptions complement the ‘official’ treatise above.<sup>2</sup>
3. Index sheets printed to track the progress of surveying, etc, of counties or groups of counties, including e.g. South Eastern Counties (*Sheetlines* 29), Argyllshire and Bute-shire, Shetland and Orkney Islands (*Sheetlines* 31) and Essex.<sup>1</sup>

This article introduces an updated ‘swim lane’ diagram that adds the one-inch map production process, as half-promised in the initial article. The revised diagram can be found across two pages at the conclusion of this paper.<sup>3</sup> Despite its complexity, I hope that the revised version continues to provide a useful *aide-memoire*.

The products of the one-inch workflow c.1870 consisted of three variants of the basic map; i) an outline edition that included contours, ii) a relief edition with hachures (but no contours) and iii) a hand-coloured geological map. The electrotyping process was crucial to these one-inch production activities, allowing the ‘outline’ content to be re-used across variants and avoiding the need to entirely re-engrave plates.<sup>4</sup>

Electrotyping had been adopted by the OS at Phoenix Park, Dublin, in 1840, just one year after its discovery. The process was perfected at Dublin

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<sup>1</sup> *Sheetlines* 132. ‘The Mid-Victorian ‘County Series’ production process’.

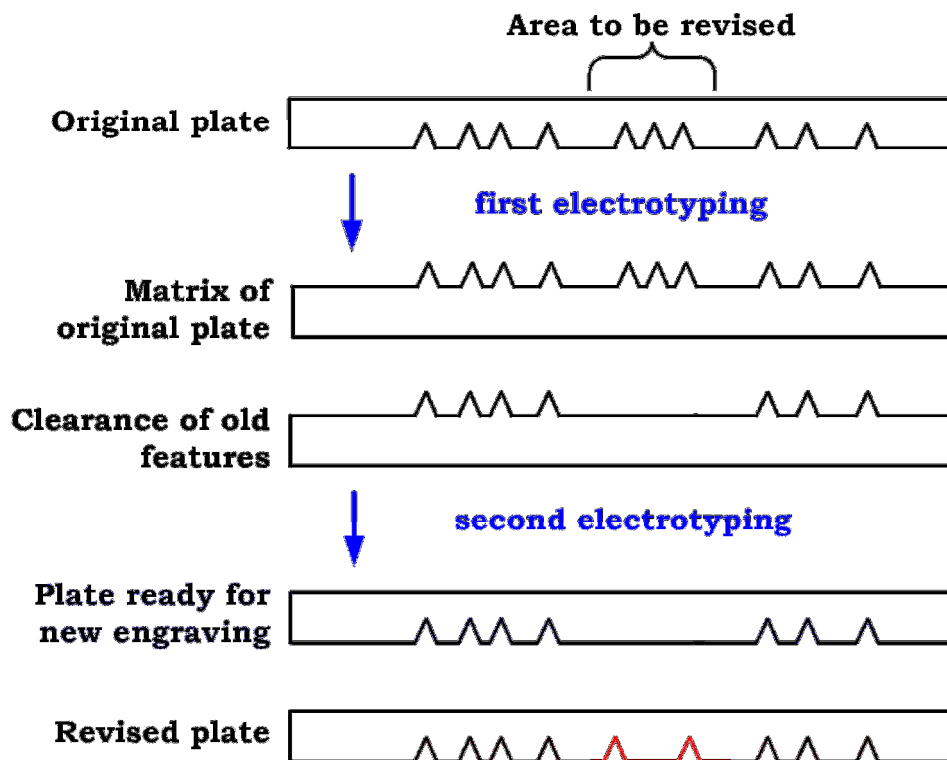
<sup>2</sup> See also C Higley, *Old Series to Explorer, A Field Guide to the Ordnance Map*, 2011.

<sup>3</sup> See also <https://ccs-web.s3.eu-west-2.amazonaws.com/county-series-production-process.pdf>

<sup>4</sup> Electrotyping was also used between c.1849 and 1866 to produce the *Index to the Tithe Survey* variant of the one-inch ‘Old Series’ maps. See R Hellyer & R Oliver, *The First Ordnance Survey Map*, 2015.

by Mr William Dalgleish and used to make revisions of their six-inch maps. Electrotyping was introduced at OS Office, Southampton, in 1847 (an inexplicably long time after Dublin, given the benefits on offer) and rapidly became indispensable due to the high quality of the results and the variety of uses to which it could be put.

*Figure 1* illustrates how an engraved copper plate could be revised, for example to show a new railway, using electrotyping. The original plate included engraved lines that hold the ink during intaglio printing. An electrotype would be made of the original plate, forming a copper ‘matrix’. The engraved lines would now appear as raised lines on the ‘matrix’, enabling them to be easily removed using a scraping tool and clearing areas that needed to be re-engraved (as specified on an ‘erasure sheet’). The cleared ‘matrix’ would then be electrotyped to form a new copper printing plate that could receive new engraving to depict the required revisions, whilst retaining the original areas not subject to revision.



*Figure 1. Copper Plate Revision Using Electrotyping*

As well as revision, electrotyping was also exploited to create the three variants of the basic one-inch map mentioned above. The first Progress Report of the Ordnance Survey for the years 1855/56 (published 30 June 1857) was reviewed in the Proceedings of the Royal Geographical Society of London,<sup>5</sup> Vol. 2, No. 4. The reviewer states “When the [one-inch] plates have been engraved it is found expedient never to use them for printing, but to keep them as permanent references, and to prepare any required

<sup>5</sup> [www.jstor.org/stable/1798952](http://www.jstor.org/stable/1798952)



number of electrotypes duplicates from them. This art of electrotyping is here carried on, as Colonel James considers it, to perfection. There is no loss of sharpness in the duplicates, additions and alterations can be made without tampering with the original plate, and there is no fear of a gradual deterioration in future impression". The quality of the electrotyping process was so high that it could be used to create duplicates of the 'hills' plates that featured extremely fine detail.

As a further source of information about the production process, *Figure 2* shows the layout of the OS Office, London Road, Southampton, on the 1:500 town plan Hampshire LXV.7.21 surveyed 1868, engraved 1869 and published 30 September 1870.



*Figure 2 – OS Office, Southampton c.1868*

The buildings were clearly thought to be sufficiently important to warrant the depiction of their internal layouts. The plan illustrates how the various functions were assigned to the physical accommodation, at least at ground level. The following areas are identified:

- Electrotyping rooms and offices
- Copperplate printing room
- Drawing and printing offices

- Engraving rooms<sup>6</sup> (x 2)
- Manuscript store
- Map store
- Copperplate store
- Lithographic tracing room

The last four of these were located in the ‘new’ fire-proof building of c.1858. Just to the north, and not depicted on this plan, were the meteorological observatory, the astronomical observatory and the photographic office. The 1871 census shows that the London Road site included accommodation as well as offices and workspaces. Twenty children, under the age of twelve, are listed. It seems likely that these were the children of employees (rather than child labour).

Hand colouring of 1:500 and 1:2500 plans was undertaken at Southampton.<sup>7</sup> The Progress Report for the years 1855/56 states “All large maps are greatly improved by colours, to clearly distinguish the houses from the courts or gardens attached to them, and for clearly defining the extent of water, and the direction of the roads. I have therefore had a number of boys, from 13 to 14 years of age, taught to colour these large maps; they are paid from 6d. to 1s. a day, and we find that the average cost of colouring a sheet is 1¼d. We charge 6d. extra to the public for the coloured impressions”.

Examining coloured plans reveals that the work was performed to a very high standard, albeit that errors were sometimes made.<sup>8</sup> It seems likely that a single sheet would be coloured by an experienced colourist, probably with access to the Fair Drawing, creating an *exemplar* or *model* that could then be studied by the junior colourists whenever needed. It also seems probable that the lads who survived this Dickensian monotony would have been offered employment in other functions, the job effectively being an apprenticeship that could also be used to sort the diligent from the lax.

A typical print run for a 1:2500 sheet would be 30 off, sent to the stores in their un-coloured state. These could all be coloured in one batch, ready for distribution to external map agents. However, if the print run was longer, say 50 off, then only a subset would be coloured to meet the immediate sales demand. The remainder could languish in storage for a considerable time before being coloured. Rob Wheeler and I discovered a 1:2500 sheet (Westmorland XXI.2) that has an Embossed Printing Date

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<sup>6</sup> These were termed *pavilions*, so presumably had very large windows. The implication is that the hapless engravers would suffer extreme heat in the summer and extreme cold in the winter.

<sup>7</sup> Richard Oliver advises that hand colouring of the 1-inch geological sheets was outsourced to an HMSO contractor.

<sup>8</sup> See Rob Wheeler, ‘The first edition of the 1:2500 in Glamorganishire and Monmouthshire’ in *Sheetlines* 132 where Rob estimates an error rate of only 1 or 2 percent.

(EPD) of 1859 as well as an HM Office of Works ink stamp showing a colouring date of '1B' (January 1884); a difference of 25 years!

When writing the initial article I was unaware of a description of the production methods and processes published seventeen years before reference 1. It appears as *Appendix No. 9* to the Report of the Commission into the Ordnance Survey<sup>9</sup> published 20 May 1858. The full title of the Appendix is '*SKETCH of the Mode of making the National Survey, and of the different Processes adopted at the Ordnance Survey Office, Southampton, for the Publication of the Maps and Plans*'. Colonel Henry James, the then superintendent, would undoubtedly have supervised its compilation. Much of the material formed the basis for reference 1 of 1875, that updated and fleshed-out the 'Sketch' into a detailed description.

Using character recognition software I was able to capture the text of *Appendix No. 9* from a copy of the Commission's Report. The description is far more compact than those offered in either reference 1 or 2, and therefore it better lends itself to being reproduced within *Sheetlines*. Accordingly, it is reproduced below in its entirety. Note that it did not include any figures or diagrams.

It turns out that *Appendix No. 9* had an even earlier precursor. The David Rumsey Map Collection (DRMC) includes a bound copy of the first progress report published 30 June 1857. Unlike standard copies, this one includes an additional fourteen page *Notice*, on light blue paper-stock, bound into the same volume and presumably contemporaneous with the report itself.<sup>10</sup> The title is '*Notice of the different processes adopted at the Ordnance Map Office Southampton in the Publication of the Maps and Plans*'. The *Notice* and *Appendix No. 9* share the same wording, however the *Notice* omits the first four sub-sections of *Appendix No. 9*.

Whilst *Appendix No. 9* was compiled twelve years prior to my chosen 'datum' of c.1870, it forms a useful cross-check and supplements references 1, 2 and 3.

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<sup>9</sup> The Commission's Report was primarily concerned with the question of the scales to be adopted on OS maps and plans, in an attempt to resolve the protracted debates and arguments known as the 'Battle of the Scales'. The Report was published in the wake of a vote in the Houses of Parliament on 18 June 1857 that stopped the drawing of 1:2500 scale plans, enormously frustrating Henry James and his staff. A Treasury Minute of 11 September 1858 formally enabled the production of 1:2500 plans to resume.

<sup>10</sup> Although the DRMC website asserts that the *Notice* is in manuscript, this seems doubtful. Whilst it is rendered using neat handwriting, it seems likely that it was printed. It would be extremely unusual for Henry James to bypass an opportunity to promote the printing technology available at Southampton.



## APPENDIX No. 9

SKETCH of the Mode of making the National Survey, and of the different Processes adopted at the Ordnance Survey Office, Southampton, for the Publication of the Maps and Plans.

### CONTENTS.

1. TRIANGULATION.
2. LEVELS.
3. SCALES FOR THE PLANS AND MAPS.
4. LITHOGRAPHY.
5. ZINCOGRAPHY.
6. ANASTATIC PROCESS.
7. REDUCTION OF PLANS BY PHOTOGRAPHY.
8. CONSTRUCTION OF THE MAPS ON COPPER AND TRACING FOR ENGRAVING
9. ENGRAVING
10. COPPLERPLATE PRINTING
11. ELECTROTYPE COPIES OF THE PLATES.

#### 1. TRIANGULATION.

The survey of the United Kingdom is based upon and connected with a triangulation which extends over the whole country.

The distances between the trigonometrical stations are derived from the measured base lines on Salisbury Plain and on the shore of Lough Foyle in the north of Ireland. This most important branch of the work has been executed with the greatest possible degree of accuracy, the difference between the measured lengths of the bases of verification and their computed lengths not exceeding  $2\frac{1}{2}$  inches in about seven miles.

The average length of the sides of the triangles in the principal triangulation is about 60 miles, but many of the sides exceed 100 miles in length. A full account of all the observations and calculations connected with this branch of the work has just been published, and I beg to lay a copy of the work before the Commission.

The primary triangulation is next broken up into smaller triangles, the sides of which are from five to ten miles long, and this secondary triangulation is again broken up into triangles, the sides of which are about one mile long, to form the tertiary or minor triangulation.

The men employed to make the detailed survey then actually measure the length of each side of the minor triangles on the ground, noting in their "Field-books" every fence, stream, or other object they may cross.

They then measure cross lines from one side of the triangle to the other, and by taking offsets from the measured lines to every object on the face of the country, they obtain in their field-books the data for plotting accurate plans of the country upon any scale which may be required.

The length of every measured side of a triangle is therefore checked by the computed trigonometrical distance, and the accuracy of the lines within each triangle is checked by the plotting, and thus no errors which may be made by the surveyor can escape detection.

By this method not only is perfect accuracy obtained in every part of the detail of the survey, but every object is in its exactly correct relative position to every other object however distant; thus, for example, any house on a plan of part of the centre of the kingdom is not only in its correct position in relation to any other house in its neighbourhood, but it is in its exact relative position to any and every house from Caithness to Cornwall.

#### 2. LEVELS.

The levels which are engraved on the plans are all given in relation to one datum level, that for Great Britain being the level of mean tide at Liverpool; and in relation to this datum, principal lines

of levels have been carried all over the kingdom from Cape Wrath to the Land's End; and thus again the levels which are published on the plans are strictly correct in relation to each other, however widely separated the places may be.

### 3. SCALES FOR THE PLANS AND MAPS.

The scales which were adopted for the Ordnance survey of Great Britain are, for-

*Towns*, 1/500 of the actual linear measure ;

*Parishes*, 1/2500, or 25.344 inches to a mile in the cultivated districts ;

*Counties*, 6 inches to a mile;

*The Kingdom*, 1 inch to a mile.

The parish plans on the 25 inch scale, or the scale of one inch to one acre, are traced, and 30 copies taken by zincography.<sup>11</sup> Tables containing the area of each separate enclosure are published with these plans.

Each sheet is sold separately; they are one and a half miles long and one mile wide, and therefore contain 960 acres.

The plans of the towns, counties and the present map of the kingdom are engraved on copper.

### LITHOGRAPHY, ZINCOGRAPHY, AND ANASTATIC PROCESS.

The plans of parishes on the 1/2500 scale have been published either by lithography, zincography, or by the anastatic process.

Zincography is now generally adopted on account of the facility of handling thin zinc plates rather than lithographic stones, which are necessarily very heavy, and are constantly liable to be broken.

The anastatic process will probably be valuable hereafter, as by its means as

many copies of a zincograph as we please can be obtained from a single copy, and the stock of impressions of the plans can therefore be replenished *ad libitum*.

The copies of the plans produced by the three processes are scarcely distinguishable.

### 4. - LITHOGRAPHY.

The plan is first traced with lithographic ink on tracing paper, which is thinly coated with starch or paste, and for the sake of cheapness the outline is traced by boys, the woods and figures are stamped, and only the writing and a few details requiring some taste in drawing are traced by draftsmen; the drawing should not be too fine, and the lines should be firmly traced.

When completed, the tracing is laid between sheets of damp paper, and is afterwards ready to be transferred to stone or zinc.

The stone must be previously polished with pumice-stone, any former drawing having been first removed from its surface by rubbing it face to face with another lithographic stone, using silver sand and water between; a final polish is given to the stone by rubbing with a piece of "water of Ayr stone," or steatite.

The stone being prepared, the tracing is laid upon it, and is passed through the lithographic printing press about a dozen times, care being taken to damp it once or twice during the process, after which it is peeled off, and it will then be found that the ink from the tracing has adhered to the stone, to which, therefore, the drawing has been transferred.

As the stone has an affinity for grease of every kind, it is necessary to be careful to keep the tracing perfectly clean, and not to touch it with hot hands, &c., otherwise spots of grease will be transferred to the stone, and cause the prints from it to be dirty. These spots can, however, be removed with dilute nitric acid, or rubbed off with the water of Ayr stone.

<sup>11</sup> Orders to discontinue making these plans have been given in consequence of the decision of the House of Commons on the 18th June 1857.

The next process is to etch the stone with dilute nitric acid and afterwards to pour on it a solution of gum arabic; the acid effects a chemical change on the surface of the stone, diminishing its attraction for grease, it also removes any small particles of grease which may have adhered to the stone, and by opening its pores enables it better to imbibe wet, while the gum water fills up the pores, and prevents the blank parts of the stone from taking up the ink in printing.

The stone is now washed over with turpentine to remove all but the fatty portion of the transfer ink, after which the drawing is inked in by passing the printing roller over it, or which is probably better, by rubbing it over with a piece of flannel charged with printing ink.

When the lines have been thus sufficiently charged with ink, the printing may be commenced - the paper on which the impressions are taken being damped for some time before it is used, and after each impression the printing roller is passed over the stone, which is constantly kept damp by sponging.

#### 5. - ZINCOGRAPHY.

The zinc plates are prepared by first rubbing off with "water of Ayr stone" any previous drawings which may be upon them, and afterwards graining them with fine sand and water, using for the purpose a zinc muller or rubber.

The drawing is made and transferred as in lithography; but, instead of using nitric acid, the zinc plate is etched with a solution of nutgalls.

If any alteration has to be made in the drawing, after scraping off the old work with "water of Ayr stone," the part scraped must be grained anew with fine sand before any new drawing is made upon it, or the first lines may be obliterated with a solution of fused potash, which forms at the same time a finely grained surface suitable to receive additions.

#### 6. - ANASTATIC PROCESS.

This is a patent process, by means of which any drawing or print, however old, which has been made with a greasy ink, may be transferred to a zinc plate, and copies of it obtained by printing from the zinc.

It is first ascertained, by rubbing a piece of thin paper over some part of the drawing, whether the ink is so fixed that no trace of it will come off by pressure, if this is the case the drawing is immersed for a few minutes in a hot solution of strontia (1 oz. of strontia to a quart of water), which has the effect of loosening the ink; it is then partially dried, and afterwards is immersed in a solution of nitric acid (one to six of water). If the print be comparatively new, the strontia bath is not required, and it is only necessary to immerse it in the nitric acid. The drawing is then ready to be transferred to a zinc plate previously polished as finely as possible with powdered emery, and etched by placing a sheet of paper over it damped with nitric acid and passing it through the press. The transfer is effected by passing the plate through a copperplate printing press, after which the drawing is removed and the plate wiped over with gum water. It is then charged with printing ink, and subsequently etched with phosphoric acid, a few drops of which are mixed with gum water, after which it is ready to be printed in the usual manner.

#### 7. - REDUCTION OF PLANS BY PHOTOGRAPHY.

The plans of towns on the 1/500 scale, and those of the cultivated districts on the 1/2500 scale, are reduced to the scale of 6 inches to a mile for engraving by photography.

The collodion process is employed for the purpose of taking the negative copy. The lens of the camera is a single achromatic meniscus, 3½ inches in diameter, with a principal focal length of 24 inches.



The plan to be reduced is attached to a board, which can be adjusted by a screw to any height above the ground which may be required, and turns upon a central pivot.

The camera is placed opposite to it on a table which runs upon wheels on a small tramway laid down on the floor of the photographic room.

The required scale of the reduction is obtained by tracing on the ground glass of the camera a rectangle corresponding on the reduced scale to the rectangle of the plan to be reduced. The curvature of the image and indistinctness of outline from spherical aberration, are both remedied by reducing the diaphragm in front of the lens to a small aperture.

The negative having been obtained upon glass is placed in the printing frame in contact with sensitive paper, and in this manner as many positive prints as may be required are taken in succession.

In reducing plans it has been found convenient to colour the houses yellow, by which means they print sharp and black on the paper, the yellow ray, as is well known, having no effect upon the sensitive coating of the glass plate on which the negatives are taken.

The introduction of this process has very much reduced the cost of reducing plans, and saves an immense quantity of time and labour.

#### 8.—CONSTRUCTION OF THE MAPS ON COPPER AND TRACING FOR ENGRAVING.

*Six-inch Map.* - The six-inch map is engraved in sheets, 3 feet by 2 feet, the sheets of each county being made to fit together by the marginal lines so as to form, if required, a single plan.

For this purpose the co-ordinates of all the trigonometrical points, and of the corners of the sheets of the map, are computed with reference to the meridian of a central trigonometrical point in each county. The sheet lines are then drawn and the trigonometrical points laid down on the copperplates by their co-

ordinates, which is done with a machine, the principal parts of which are two scales at right angles to each other, and a tracing point which traverses in directions parallel to the scales.

The photographed plans being traced on tracing paper with lamp black, the tracings are fitted down by the trigonometrical points and sheet lines to the copperplates, which are previously covered with a thin coating of wax; they are then rubbed with a burnisher, by which means the lamp-black is transferred to the wax, and when the tracing is peeled off; there remains on the wax an outline drawing sufficient for the guidance of the engraver, who cuts the work into the copper through the wax ground.

Each six-inch engraving contains 24 square miles; and embraces the same district of country which is contained in 16 plans on the 1/2500 scale, the marginal lines of which are equivalent to 1½ miles and one mile respectively.

The latitudes and longitudes have been of late engraved on the marginal lines of the six-inch map.

The meridional point in each county being always a point in the grand triangulation of the kingdom, its latitude and longitude are known with the greatest accuracy, and from these are easily computed the latitudes and longitudes of the sheet corners of the map.

*One-inch Map.* - The one-inch maps of Scotland and Ireland are being laid down on Flamsteed's projection modified, and the sheets of each kingdom will therefore join together to form one map; this is not the case with the one-inch map of England, which has not been laid down on any projection, but by the method of parallels and perpendiculars to different meridional lines in different parts.

The plans are reduced for the engraver by the pentagraph or by photography from the engraved impressions of the six-inch map, and are then traced, and

the tracings fitted down to the copperplates by means of points previously scored on the copper in the same manner as the tracings of the six-inch map, the distortion caused by the projection being quite insensible in a small area. The hill features are first sketched on six-inch engravings, and are subsequently drawn on the reduced scale by a skilful draftsman for the engravers to copy.<sup>12</sup>

The contours on the six-inch map are of great assistance to the hill draftsman in regulating his scale of shades and fixing the proper relative importance of the different features, as well as for giving the exact form of the map of the hill.

*Plans of Towns.* - These are engraved on copper, and the scale on which they are engraved being five times that of the plans on the 1/2500 scale, it is arranged that 25 sheets shall be included in one 1/500 sheet.

#### 9. ENGRAVING.

The engraving consists of two processes, viz., direct cutting with the "graver" or "the dry point," and of etching.

The instruments called gravers are of various shapes and sizes, according to the kind of lines required to be produced. Square gravers are used to cut broad lines, and lozenge-shaped gravers for the finer ones; they are pushed forward in the direction required to form the lines.

The "dry points" and etching points resemble large sewing needles fixed in handles about five or six inches long. The graver cuts the copper out, forming a clean line; the "dry point" used for the more delicate lines raises a "burr," which has to be removed by an instrument called a "scraper," otherwise the work would print very thick and unequal.

Etching consists in covering the surface of the copper plate with a substance called "etching ground," composed of

asphaltum, Burgundy pitch, and virgin wax. The subject is traced on the ground, and with the "etching point" marked through to remove the ground wherever it passes, and expose the surface of the copper to the action of aquafortis, technically called "biting-in." This process is continued until the fainter tints are sufficiently deep, the acid is then poured off, the plate washed with pure water and dried.

The parts that are bitten-in enough are now painted over with "stopping-out" varnish, when dry the acid is again poured on the plate and process of "stopping-out" and biting-in must be repeated in this way until the darkest tints are sufficiently corroded.

The work has to be completed with the "dry point," to give the more delicate tints and finish. The hills on the one-inch map of England are thus etched, and afterwards completed with the dry point.

A considerable saving in the cost of engraving the Ordnance maps is effected by using steel punches to cut the woods, figures, rocks, &c. on the copperplates.

The work is thus done much more quickly than by hand, and boys are employed at it in the place of skilled engravers.

A portion of the writing also on the copperplates is engraved by machine (Becker's patent), and the parks and sands are ruled by machine with a steel dotting wheel, the pressure of the wheel and the interval between the lines of dots being regulated according to the tint required to be produced.

#### 10. COPPERPLATE PRINTING.

The ink is dabbed on the copperplate with a dabber made of old blanket, and is first wiped off with a cloth dipped in an alkali solution, and then finally cleaned off with a cloth wetted with water only.

In such large surfaces as those of the copperplates of the six-inch map this method is much easier to the printer

<sup>12</sup> It is contemplated to reduce the hill sketches for the engraver by photography.

than the usual mode of wiping with the hand.

The paper for printing is wetted and brushed over to make its surface smooth for the better reception of the ink, and being laid on the copperplate is passed through the press, the upper roller of which is wrapped round with three turns of blanket and one turn of a cloth called "fronting," which is placed next to the paper. After printing the impressions are first dried between mill-boards and are then placed between glazed-boards and pressed in an hydraulic press, after which they are ready for issue.

The ink used in copperplate printing consists of Frankfort black with a mixture of Prussian blue; it is ground with burnt oil in a small mill constructed at the Ordnance Map Office for the purpose.

#### 11. ELECTROTYPE.

The process of electrotype is applied at the Ordnance Survey Office to the purpose of obtaining duplicates of the copperplates of the Ordnance maps, and has been found to be eminently useful, not only as a means of always preserving unworn copies of the plates, but also as enabling copies of them to be taken in their different stages of progress, so that different classes of information can be engraved upon a map the same in all other respects; as, for instance, we may have one copy of a map with contours, boundaries, &c., another with the hill features engraved, a third with geological lines, &c.

It has also been usefully employed in joining two or more engraved plates together so as to form a single copperplate for printing from. In order to do this, electrotype matrices of the plates are first taken, and having been cut to the edges to be joined, are fitted together as closely as possible, after which a thin piece of metal is laid along the line of junction at the back of the plates, and is rivetted and soldered to each of them, the ends of the rivets

being cut off flush with the upper surface, which is scraped and burnished to an even plane along the junction. The joined matrices are then placed in the decomposing trough and a copper duplicate is obtained, on which the portion of the engraving which has been destroyed in scraping the edges (to the extent of about one quarter of an inch along the line of union) is made good by the engraver.

In this way county maps of several counties in Scotland have been formed (to serve as indexes to the six-inch maps of those counties) out of the copperplates of the one-inch map, in one instance no less than seven plates have thus been joined together.

Another great advantage is the facility which the process affords for altering engravings, it being much easier to scrape off obsolete details, &c., from the electrotype cast or "matrix" of an engraved plate in which they are in relief, than to cut them out from the original copperplate, this application has been especially valuable in the insertion of the railways on the one-inch map of England, which could hardly have been effected by the ordinary mode without destroying the plates.

The galvanic battery employed is that invented by Mr. Smee, in which the metals are zinc amalgamated with mercury and copper silvered and platinized, the exciting liquid being dilute sulphuric acid.

The zinc plate, 2 feet by 2 feet 4 inches, and weighing 85 Lbs., is suspended between two platinized silvered plates of the same size as itself in a bath of dilute sulphuric acid (about twenty gallons of water to one gallon of acid), to each of the silvered plates is attached a bundle of six copper wires (16 inch in diameter), which are united together by means of a screw-plate, from which there proceeds a bundle of twelve copper wires, the extrémities of which are soldered to a sheet of crude copper of the same dimensions as the plate to be copied.

From the zinc plate also proceeds a bundle of twelve copper wires which are attached to the engraved plate, which has been previously washed over with cyanide of silver, and then with a solution of iodine, which is afterwards evaporated in the sun, by which means all chance of adhesion of the new to the old copper is obviated.

A composition of wax and tallow is also laid round the edges of the plate to prevent the deposit of electrotype copper around them.

The engraved and the plain copper sheets are then laid horizontally one above the other, with a space of about an inch between them, in a wooden trough lined with lead or gutta percha, and containing a saturated solution of sulphate of copper and sulphuric acid. As soon as this is done the galvanic action begins, copper is deposited on the engraved copper-plate, and the zinc plate in the battery tank commences to be dissolved, the sheet of crude copper in the trough also dissolving and supplying the waste in the sulphate solution caused by the deposit of copper on the engraved plate; during the process a rocking motion is given to the troughs by means of a simple machinery of which the motive power is a descending weight, which is wound up about every seven hours, the total descent being forty feet.

As soon as a sufficient time has elapsed the plate is taken out of the trough, and the sheet of copper which has been deposited is removed from the engraved plate, of which it will be found to be an exact cast, the sunk lines on the engraving being represented by lines in relief on the electrotype "matrix."

The same process being repeated with the substitution of the newly made "matrix" for the engraved plate, an electrotype "duplicate," an exact facsimile of the original engraving in every respect, is obtained.

The platinized plates are dipped every day in to a solution of perchloride of iron

to remove impurities, and the zinc plates are scrubbed at the same time.

When the battery is in good working order, and the engraved plate is laid under the sheet of rough copper, about 1Lb. of copper to the square foot is deposited *per diem*. With the engraved plate upper-most, only half that quantity is deposited, but the copper is of better quality and more free from impurities.

Experiments have been tried to ascertain the increase of the amount of deposit to be obtained by heating the metallic solution; this was found to be very considerable, about 1 lb. of copper per square foot having been obtained in the twenty-four hours ; the process, however, is a more expensive one, and the fumes arising from the troughs most pernicious, so that it is not desirable to use hot solutions, except in an emergency when a plate is required to be copied in the least possible time.







## ***Satnav? Forget it ... test-driving 1960s Road Maps***

### ***Gilbert McCaul***

During my schooldays in the 1960s, my father was a subscriber to *Which?* magazine. In amongst the more routine articles on the best buys for toasters and washing machines etc, I vaguely remembered one on the small scale UK motoring maps available at the time. When, many years later, I thought that it might be of interest to CCS members, finding the article proved a challenge. My father's copy had long since been disposed of and, on making enquiries with *Which?* I discovered that they did not maintain an archive that far back. I therefore tried Cambridge University Library. After a little searching there I finally discovered the article in the July 1963 edition, which is reproduced here.

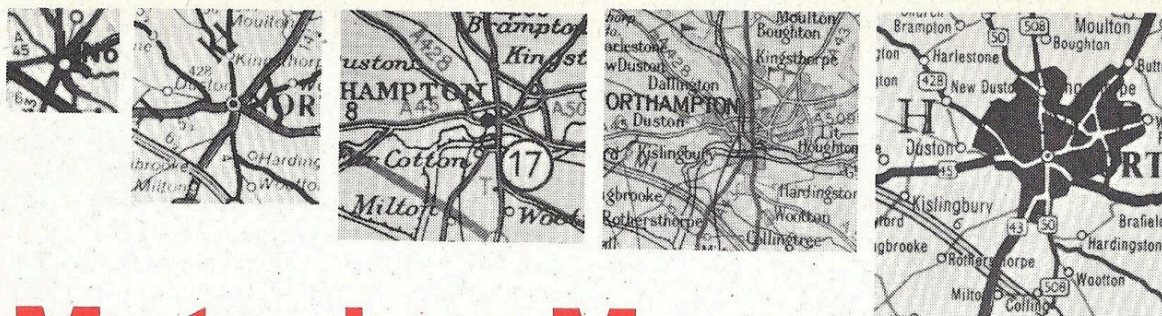
As is stated in the article, the normal *Which?* methods of laboratory testing could not be used here. A panel approach was therefore utilised instead. Whilst this makes the conclusions more subjective, they are, nevertheless, most interesting.

The maps are split into two categories: those between 8 and 16 miles to the inch (described as for long journeys) and those between 3 and 8 miles to the inch (described as touring maps). There are the usual complaints that, on some maps, recent developments are not recorded and on others, that future changes are shown as complete. The tables are compiled on a very practical basis as to what would be useful for the average user. I certainly have not seen before an analysis of different maps on the clarity of lettering and suitability of colour combinations for day and night viewing. It is altogether a fascinating survey of what was available at the time.

I should like to express my thanks to *Which?* magazine for kindly allowing *Sheetlines* to reproduce the article, and to Ian Byrne for the page scans.







# Motoring Maps

As our roads become more and more congested, so a good motoring map becomes more and more necessary to help plan a quicker route along less crowded roads. And, from time to time, new roads are built.

Which maps are good for planning a long journey between towns? Which for touring around or finding the most pleasant routes?

For planning a long journey, a single map with a small scale—say, 8 or more miles to the inch—is often used. For touring an area you may need several maps with larger scales—fewer miles to the inch—that give you more information about the countryside. We have included in this report maps with scales from 16 to 3 miles to the inch.

Some maps have different scales for different areas—Northern Ireland or Scotland, for example—and we give these in the Tables. We did not include maps with scales of 1 or 2 miles to the inch, as these are mainly used for very intensive touring of a small selected area.

When maps are bound together in book form, they are called road atlases, and we have included these in this report. Some maps and atlases also contain town plans or show approaches to towns.

## PUBLISHERS

The many motoring maps you see are all based on Government Ordnance Survey maps.

Publishers of motoring maps are not confined to map-makers like BARTHOLOMEW or JOHNSTON: one of the earliest maps was published in

1907 by a magazine, to warn motorists of police traps. Now oil companies (BP, ESSO, MOBIL, NATIONAL BENZOLE, REGENT, SHELL), national newspapers (DAILY MAIL, DAILY MIRROR, DAILY TELEGRAPH), car manufacturers (BMC, FORD), tyre manufacturers (DUNLOP, MICHELIN), motoring organisations (AA, RAC), all publish maps under their own names, and often subsidise them. There are also foreign publishers who produce maps of this country (HALLWAG, KUMMERLY & FREY).

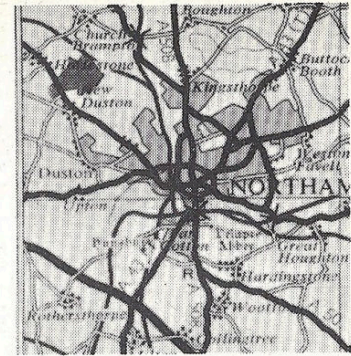
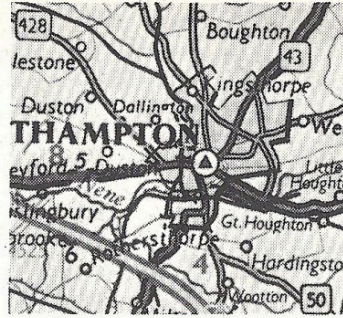
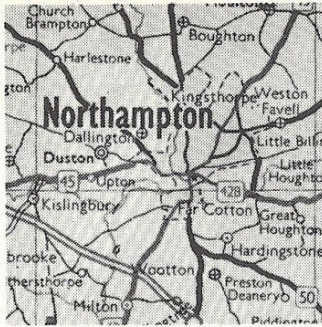
We have included 28 maps and 23 atlases, all from well-known publishers. Our shoppers were instructed to ask for the latest editions, and bought the paper versions (see Tables for maps available in cloth versions). Several maps were almost identical (for example, the JOHNSTON and the THOMAS road atlases) but we deal with each under its own name.

We found two unusual 'atlases', consisting of a whole series of maps built into a hard plastic case through which they could be seen (see photograph). To bring a particular map into view, you moved a pointer along the side. They cost more than usual: £2 19s. 6d. for the AUTO-MAPIC, and £3 15s. for the ROLL-O-MAPIC. There was also a series of maps on stiff cards—STANFORD's Motocards.

## THE INVESTIGATION

We could not put the maps through a series of laboratory tests as we can many things, so we asked a panel of six people—three experienced motorists, two geographers and a typographer—





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to answer a detailed questionnaire on the maps and atlases.

The questions were designed to discover how **informative**—how much information, how up-to-date—the maps were, how **clear** to read (lettering and colours), whether they were easy to **fold** in a car.

So that their assessments were not just theoretical, the geographers and two of the motorists drove a total of 1,500 miles, through towns and countryside, using each map in turn.

Our ratings for the maps (see Tables) are based on the panel's judgments. Up-to-dateness and accuracy cannot be included in the ratings (our panel would have had to check every inch of the country), but we discuss them below.

No map or atlas was perfect, and we can give below only a few examples of some faults—or advantages—our panel found.

### FOR LONG JOURNEYS

Under this heading we include all the maps with 8 or more miles to the inch. All but two of the maps were on single sheets.

#### How informative?

For long journeys maps should show all motorways, by-passes, 'A' and 'B' roads with Ministry of Transport numbers, and as many good minor roads as possible. The mileage is indicated by the scale, but it is also helpful to have mileage markers between towns and/or junctions, or a mileage chart. It is also useful to have such things shown as built-up areas, air-

ports and railways, toll bridges, AA and RAC telephone boxes, topographical relief, rivers, ferries, camping sites and, in remote areas, inns and garages.

Taking these and many other points—e.g. town plans—into consideration, we give in Table I general ratings for the informativeness of each map or atlas, and of any town plans.

Only the MICHELIN map, the AA MEMBERS HANDBOOK and RAC GUIDE & HANDBOOK were rated 'very good'. The JOHNSTON'S REVERSIBLE ROAD MAP and JOHNSTON ROAD AND MOTORWAY ATLAS, neither of which showed many 'B' roads, were 'poor'.

The MICHELIN map was unique in showing the width of roads, and with the AA HANDBOOK and BARTHOLOMEW'S TOURING MAP, indicated those stretches of narrow roads in the Scottish Highlands with limited passing places.

The DAILY TELEGRAPH map had inset maps showing areas of rainfall and sunshine, among other things, but did not show all 'A' roads in the Peak District.

The ORDNANCE SURVEY TEN-MILE maps had no road numbers (we have been told that the next edition, now in preparation, will) and were not thought to show 'sufficient difference between "B" roads and other minor roads'.

The DUNLOP atlas put Ministry of Transport numbers only on 'A' roads. And Gower Street and Gray's Inn Road, for example, were not shown at all on the London town plan.

The geographers thought the DAILY MIRROR POCKET ROAD MAP was 'clearly a smugglers'



TABLE I Long distance

| PUBLISHER and Title                                           | Price<br><br>£ s. d.  | Scales<br>(miles/<br>inch) | Date on<br>map<br>tested | Inform-<br>ativeness | Town plans |                      | Legend<br>and<br>symbols | Clarity of<br>lettering |         | Suitability<br>of colour<br>combinations |       |
|---------------------------------------------------------------|-----------------------|----------------------------|--------------------------|----------------------|------------|----------------------|--------------------------|-------------------------|---------|------------------------------------------|-------|
|                                                               |                       |                            |                          |                      | Number     | Inform-<br>ativeness |                          | day                     | night   | day                                      | night |
|                                                               |                       |                            |                          |                      |            |                      |                          |                         |         |                                          |       |
| MAPS                                                          |                       |                            |                          |                      |            |                      |                          |                         |         |                                          |       |
| BARTHOLOMEW'S British Isles Motoring Map C                    | 5 0 16                | 1962                       | fair                     | —                    | —          | fair                 | fair                     | poor                    | fair    | fair                                     |       |
| BARTHOLOMEW'S Touring Map of England and Wales C              | 5 0 12                | —††                        | fair                     | —                    | —          | good                 | good                     | poor                    | fair    | poor                                     |       |
| BARTHOLOMEW'S Touring Map of Scotland C                       | 4 0 12                | 1960††                     | fair                     | —                    | —          | good                 | fair                     | poor                    | good    | fair                                     |       |
| DAILY TELEGRAPH Tourists' Map of Great Britain                | 3 6 12½, 23           | 1962††                     | good                     | —                    | —          | fair                 | good                     | poor                    | fair    | poor                                     |       |
| FOLDEX Road and Touring Map of Great Britain                  | 9 6† 9, 10½           | —††                        | good                     | 3                    | poor       | fair                 | fair                     | fair                    | fair    | fair                                     |       |
| GEOGRAPHIA The Motorways Map of Great Britain                 | 5 0 15                | —                          | fair                     | —                    | —          | poor                 | good                     | good                    | fair    | poor                                     |       |
| HALLWAG Great Britain, Ireland and Eire                       | 8 0 16                | 1962††                     | fair                     | —                    | —          | good                 | v. good                  | good                    | v. good | good                                     |       |
| JOHNSTON'S Reversible Road Map of Great Britain               | 5 0 12                | —                          | poor                     | 7                    | poor       | poor                 | good                     | fair                    | fair    | poor                                     |       |
| JOHNSTON'S Road Map of England and Wales                      | 4 0 10                | 1962                       | fair                     | 8                    | poor       | poor                 | poor                     | poor                    | fair    | fair                                     |       |
| JOHNSTON'S Road Map of Scotland                               | 3 6 8                 | 1961                       | fair                     | 2                    | poor       | poor                 | poor                     | poor                    | fair    | fair                                     |       |
| KUMMERLY & FREY No. 61, Great Britain and Ireland             | 9 0 16                | —                          | good                     | 1                    | poor       | good                 | good                     | good                    | good    | good                                     |       |
| MICHELIN Motoring Map: England, Wales, Scotland, N. Ireland   | 5 0 14                | 1962††                     | v. good                  | —                    | —          | v. good              | v. good                  | good                    | v. good | good                                     |       |
| ORDNANCE SURVEY Ten-Mile Map of Great Britain (2 sheets)      | 15 0 10               | 1958<br>1962               | fair                     | —                    | —          | v. good              | v. good                  | good                    | v. good | good                                     |       |
| PHILIPS' Main Road Map of Great Britain                       | 2 6 16                | 1960                       | fair                     | —                    | —          | poor                 | fair                     | fair                    | fair    | fair                                     |       |
| STANFORD'S Motocard Road Maps (13 cards)                      | 8 6† 8                | 1962                       | fair                     | 1                    | poor       | fair                 | fair                     | poor                    | fair    | poor                                     |       |
| ATLASES                                                       |                       |                            |                          |                      |            |                      |                          |                         |         |                                          |       |
| AA Members Handbook 1963                                      | free to AA<br>members | 5, 10                      | 1963                     | v. good              | —          | —                    | good                     | fair                    | poor    | good                                     | fair  |
| AUTO-MAPIC Road Map of Great Britain                          | 2 19 6                | 12                         | —                        | good                 | 1          | fair                 | fair                     | fair                    | poor    | poor                                     | fair  |
| DAILY MIRROR Pocket Road Map of the British Isles*            | 2 6 16                | —                          | —                        | good                 | —          | —                    | good                     | good                    | fair    | good                                     | fair  |
| DUNLOP Touring Atlas of the British Isles                     | 7 6 12                | —                          | —                        | fair                 | 1          | poor                 | poor                     | good                    | fair    | fair                                     | poor  |
| FORD Around Britain with Ford                                 | 8 6 8                 | —                          | —                        | good                 | 1          | poor                 | good                     | good                    | fair    | v. good                                  | fair  |
| JOHNSTON'S County Motoring Atlas of Great Britain and Ireland | 7 6 8, 10             | 1961                       | fair                     | 33                   | fair       | fair                 | good                     | poor                    | poor    | poor                                     |       |
| JOHNSTON'S Handy Road Atlas of Great Britain and N. Ireland   | 5 0 10, 15            | 1962                       | fair                     | 27                   | poor       | poor                 | fair                     | fair                    | fair    | poor                                     |       |
| JOHNSTON'S Pocket Road Atlas of Great Britain and Ireland     | 2 6 16                | —                          | —                        | fair                 | 1          | poor                 | poor                     | fair                    | fair    | poor                                     |       |
| JOHNSTON Road and Motorway Atlas of Great Britain             | 2 6 8, 14             | —                          | —                        | poor                 | —          | —                    | fair                     | good                    | fair    | fair                                     |       |
| RAC Guide and Handbook 1963                                   | 12 6** 10             | 1963                       | v. good                  | 105                  | v. good    | fair                 | fair                     | fair                    | good    | fair                                     |       |

C: Cloth version also available at higher price.

\* The publisher says now out of print; may still be available.

† 19s. 6d. in leathercloth cover, £1 5s. in leather cover.

‡ 19s. in plastic case, £2 17s. 6d. in leather case.

\*\* 8s. 6d. to RAC members.

†† Later version now available. Also, the publishers of JOHNSTON'S REVERSIBLE map, JOHNSTON'S COUNTY and POCKET atlases, and the ORDNANCE SURVEY map, have told us that 1963 editions are in preparation.

TABLE II Touring

| PUBLISHER and Title                                                     | Price<br>per map<br>£ s. d. | Scales<br>(miles/<br>inch) | Date on<br>map<br>tested | Inform-<br>ativeness | Town plans |                      | Legend<br>and<br>symbols | Clarity of<br>lettering |         | Suitability<br>of colour<br>combinations |         | London<br>to<br>Edin-<br>burgh | Dover<br>to<br>Ply-<br>mouth |
|-------------------------------------------------------------------------|-----------------------------|----------------------------|--------------------------|----------------------|------------|----------------------|--------------------------|-------------------------|---------|------------------------------------------|---------|--------------------------------|------------------------------|
|                                                                         |                             |                            |                          |                      | Number     | Inform-<br>ativeness |                          | day                     | night   | day                                      | night   |                                |                              |
|                                                                         |                             |                            |                          |                      |            |                      |                          |                         |         |                                          |         |                                |                              |
| MAPS (with number of sheets in each series)                             |                             |                            |                          |                      |            |                      |                          |                         |         |                                          |         |                                |                              |
| BARTHOLOMEW's Sixth-inch Motoring Maps of Great Britain (8)             | 3 0 6                       |                            | 1960-2††                 | good                 | —          | —                    | good                     | good                    | good    | fair                                     | fair    | 4                              | 2                            |
| BP Road Maps (6)                                                        | 1 0 5                       |                            | 1961-2††                 | good                 | 1          | v. good              | good                     | v. good                 | good    | good                                     | fair    | 3                              | 2                            |
| DAILY MAIL Motor Road Maps (6)                                          | 5 0*                        | 4, 6                       | —                        | good                 | —          | —                    | fair                     | good                    | fair    | v. good                                  | v. good | 4                              | 2                            |
| DUNLOP Width of Road Maps (6)                                           | 5 0                         | 5, 6                       | —                        | good                 | 83         | poor                 | v. good                  | good                    | good    | good                                     | fair    | 3                              | 2                            |
| ESSO Road Maps (8)                                                      | 6                           | 4, 5, 6, 8                 | 1960-2††                 | v. good              | 1          | v. good              | good                     | v. good                 | good    | v. good                                  | v. good | 4                              | 2                            |
| FOLDEX Maps of Great Britain (12)                                       | 5 0*                        | 4                          | —††                      | v. good              | —          | —                    | fair                     | good                    | fair    | good                                     | fair    | 6                              | 3                            |
| GEOGRAPHERS' Road Maps of Great Britain (8) C                           | 4 6                         | 4                          | —††                      | fair                 | —          | —                    | good                     | good                    | v. good | fair                                     | fair    | 4                              | 2                            |
| MOBIL Road Maps (5)                                                     | 1 0                         | 5, 10                      | 1960-2††                 | v. good              | 38         | fair                 | v. good                  | good                    | fair    | fair                                     | poor    | 3                              | 2                            |
| NATIONAL BENZOLE Road Maps (6)                                          | 1 0                         | 5                          | 1959                     | good                 | 1          | v. good              | good                     | v. good                 | good    | good                                     | good    | 3                              | 2                            |
| NUFFIELD (or AUSTIN) Numbered Road Touring Maps of Great Britain (6) C  | 5 0                         | 5                          | —††                      | good                 | —          | —                    | fair                     | fair                    | fair    | good                                     | fair    | 3                              | 2                            |
| ORDNANCE SURVEY Quarter-inch Maps of Great Britain, Fifth Series (17) C | 5 6                         | 4                          | 1960-3                   | v. good              | —          | —                    | v. good                  | v. good                 | good    | v. good                                  | good    | 5                              | 3                            |
| REGENT British Isles Section Road Maps (5)                              | 1 0†                        | 5, 6                       | —                        | v. good              | —          | —                    | good                     | good                    | good    | good                                     | fair    | 3                              | 1                            |
| SHELL Touring Maps (6)                                                  | 1 0                         | 5                          | 1961-2††                 | good                 | 1          | v. good              | good                     | v. good                 | good    | good                                     | fair    | 3                              | 2                            |
| ATLASES                                                                 |                             |                            |                          |                      |            |                      |                          |                         |         |                                          |         |                                |                              |
| AA Road Book of England and Wales*                                      | 1 5 0*                      | 5                          | 1962                     | v. good              | 224        | good                 | v. good                  | good                    | fair    | good                                     | fair    | 8††                            | 4                            |
| AA Road Book of Scotland*                                               | 12 6*                       | 5                          | 1961                     | v. good              | 72         | good                 | v. good                  | good                    | fair    | good                                     | fair    | 1††                            | —                            |
| BARTHOLOMEW's Roadmaster Motoring Atlas of Great Britain                | 7 6                         | 6                          | 1960                     | v. good              | —          | —                    | good                     | v. good                 | good    | fair                                     | poor    | 6                              | 4                            |
| BARTHOLOMEW's Road Atlas of Great Britain                               | 15 0                        | 5                          | 1963                     | v. good              | 6          | poor                 | good                     | good                    | fair    | v. good                                  | fair    | 8                              | 4                            |
| BP Road Atlas of Great Britain                                          | 12 6                        | 5                          | —                        | good                 | —          | —                    | good                     | v. good                 | good    | good                                     | fair    | 7                              | 5                            |
| GEOGRAPHERS' Road Atlas of Great Britain and Northern Ireland           | 17 6                        | 4                          | —††                      | good                 | 35         | poor                 | good                     | good                    | v. good | fair                                     | fair    | 10                             | 5                            |
| JOHNSTON's 'A' & 'B' Roads Motoring Atlas of Great Britain              | 8 6                         | 6                          | —††                      | fair                 | 42         | poor                 | fair                     | good                    | good    | good                                     | poor    | 6                              | 3                            |
| JOHNSTON Road Atlas of Great Britain                                    | 1 1 0                       | 3                          | 1962                     | good                 | 25         | poor                 | fair                     | fair                    | poor    | fair                                     | poor    | 19                             | 10                           |
| NEWNES' Motorists' Touring Maps and Gazetteer of Great Britain          | 1 5 0                       | 4, 16                      | 1962                     | v. good              | 4          | poor                 | fair                     | good                    | fair    | fair                                     | fair    | 9                              | 7                            |
| PHILIPS' GB Road Atlas of Great Britain                                 | 7 6**                       | 6                          | —††                      | fair                 | —          | —                    | fair                     | good                    | fair    | fair                                     | poor    | 7                              | 4                            |
| ROLL-O-MAPIC                                                            | 3 15 0                      | 6½                         | —                        | good                 | 11         | poor                 | poor                     | fair                    | fair    | poor                                     | poor    | 6                              | 8                            |
| SHELL Touring Road Atlas of Great Britain                               | 12 6                        | 5                          | —                        | good                 | —          | —                    | good                     | v. good                 | good    | good                                     | fair    | 7                              | 5                            |
| THOMAS National Road Atlas of Great Britain†                            | 1 6                         | 6 3                        | —                        | good                 | 25         | poor                 | fair                     | fair                    | poor    | fair                                     | poor    | 19                             | 10                           |

C: Cloth version also available at higher price.

\* DAILY MAIL London and S.E. England Sheet 6s. 6d. FOLDEX series, £3 19s. 6d. in a special folde r. AA ROAD BOOKS (Members only) available with illustrations at higher price.

†† Later version of series, or of single sheets, now available. Also, the publisher of JOHNSTON ROAD ATLAS (and THOMAS) has told us that a 1963 edition is in preparation.

\*\* Later version costs 8s. 6d.

† Free by post from Regent Touring Service.

‡ Mail order only.

‡‡ To The Border.



edition' because it showed Customs stations in Northern Ireland—as did some others.

The KUMMERLY & FREY map gave distances in kilometres, with miles as well for some longer stretches; heights were in metres.

### Legend

The symbols used on a map should be descriptive, and clear to read. All of them should be explained clearly in the legend (or key). Most legends were fairly comprehensive, but not all were easy to read in daylight and at night. Our ratings in the Table take all these factors into account.

Among the atlases, only four—AUTO-MAPIC, DAILY MIRROR, FORD and JOHNSTON'S POCKET ROAD ATLAS—did not have a legend printed on each page.

### How up-to-date?

Several things go to make up the accuracy of a motoring map, up-to-dateness probably being the most important. (We give in Table I the date, if marked, of the maps we tested—not all have the year of revision on the map.)

The panel found many of the maps lacking. For example—JOHNSTON'S REVERSIBLE ROAD MAP omitted the Biggleswade, Grantham and Slough by-passes. It made up for this by showing a non-existent motorway joining the M1 south of Hemel Hempstead (Herts). This was also shown in JOHNSTON'S POCKET ATLAS and ROAD AND MOTORWAY ATLAS.

JOHNSTON'S ROAD MAP OF ENGLAND AND WALES and all the JOHNSTON atlases except the COUNTY MOTORING ATLAS, showed a continuation of the Maidstone (Kent) by-pass as being open to traffic, but construction has not yet started.

The AUTO-MAPIC went one better—it showed proposed motorways even when the precise routes have not yet been fixed.

The KUMMERLY & FREY map omitted the Biggleswade and Grantham by-passes. The 1962 HALLWAG map omitted most motorways (and a lot of 'B' roads).

### How clear?

The panel used the maps both in daylight and at night (by the interior light of their cars) and judged how clear the lettering was and whether the colours—for relief, rivers, roads, etc.—were suitable. Only three were judged to have 'very good' lettering, even by day—the HALLWAG, MICHELIN and ORDNANCE SURVEY maps—and the same three, with the FORD atlas, were judged to have the best colouring.

The JOHNSTON ROAD MAPS—of ENGLAND AND WALES, and of SCOTLAND—both had 'poor' lettering even by day. The former, for example, used the same size lettering for Liverpool and Maidstone.

The AUTO-MAPIC had unusual—and confusing—colouring for roads. Some 'A' roads were shown red, some green. The result was that, depending upon the colouring of the background through which the roads passed, green roads appeared most prominent and important in East Anglia, while in Cornwall, red roads showed up more than green.

Colour blind people who have difficulty in distinguishing between red and green (about 6 per cent of the male population do) could have trouble with five of the maps—the two BARTHOLOMEW TOURING MAPS, FOLDEX and JOHNSTON'S ROAD MAPS OF SCOTLAND and of ENGLAND AND WALES.

### Folding

None of the maps was judged particularly difficult to fold in a medium sized car. The FOLDEX and ORDNANCE SURVEY were easiest. The MICHELIN map was on thinner paper than the others and had to be handled with care.

### FOR TOURING

#### How informative?

A good touring map—with fewer than 8 miles to the inch—should give you extra detailed information like picturesque routes, viewpoints, National Parks, National Trust properties, bathing beaches, interesting buildings, woods, altitudes—the list is a long one.

Our general rating for informativeness is given in Table II on page 199. Almost all the





The ROLL-O-MAPIC 'atlas'

maps were judged 'good' or 'very good'.

FOLDEX had almost too much information for motoring—for example, old earthworks, old wells, and inland waterways with a certain headroom and draught. But it was left to three oil company maps—BP, NATIONAL BENZOLE and SHELL—to show the Clubs in Pall Mall—'dashed useful'.

Some maps showed picturesque routes, some viewpoints. Only two showed both—FOLDEX and MOBIL.

The BARTHOLOMEW maps and the PHILIPS' atlas were not always accurate in the mileages they marked.

The DUNLOP maps showed the width of roads; the AA ROAD BOOK OF SCOTLAND, BARTHOLOMEW's ROAD ATLAS and ESSO showed the narrow stretches of road in the Scottish Highlands.

Some of the panel felt that the DAILY MAIL map's practice of showing side roads where they join main roads and then letting them fade out was 'irritating'.

All showed built-up areas except the GEOGRAPHERS' ROAD MAPS and ATLAS and the JOHNSTON'S 'A' AND 'B' ROADS MOTORING ATLAS.

## Legend

All had adequate legends—none was rated less than 'fair' (see Table II). But the DAILY MAIL map had its legend printed over the pale blue sea so that the colours in the legend—especially the green for 'Woods'—appeared to be different from those on the map.

The JOHNSTON ROAD ATLAS, and NEWNES' and THOMAS atlases had the legend printed on each page. The ROLL-O-MAPIC had its legend permanently showing at one end, and the AA ROAD BOOKS showed special symbols on some pages.

## How up-to-date?

Again, as with the long distance maps, several were not very up-to-date.

The DUNLOP maps were very up-to-date, showing more proposed roads than did any other touring map.

On page 9 of BARTHOLOMEW's ROADMASTER MOTORING ATLAS, the Stevenage by-pass was omitted,\* but it *was* shown on page 8.

Recent by-passes and motorways—M5 and M6—were shown on some FOLDEX sheets and not on others. Some of those that were shown were drawn in by hand in ink. London's North Circular road was not shown as such. And among other inaccuracies, a non-existent railway line ran north from Enfield (Middlesex).

The London plan in the JOHNSTON atlases and in the THOMAS NATIONAL ROAD ATLAS was 'almost unbelievable'. It lacked Charing Cross Road, Trafalgar Square, the Embankment, Whitehall, and Westminster Bridge, for instance.

## How clear?

Two series of maps had 'very good' lettering and colour combinations in daylight—ESSO and ORDNANCE SURVEY. At night, the JOHNSTON ROAD ATLAS OF GREAT BRITAIN and the THOMAS NATIONAL ROAD ATLAS were 'poor' for both. The ROLL-O-MAPIC had especially bad colours that did not 'stand out or apart from each other'.

\* The publisher has told us that the new edition in preparation will include this.



Red/green colour blind people might have difficulty with the ORDNANCE SURVEY QUARTER-INCH maps, and BP and SHELL maps and atlases.

### Folding

None was found particularly difficult to fold in a medium size car, although the Esso were on thinner paper than the others.

The ROLL-O-MAPIC's mechanism for bringing the different maps into view made a grating noise ('plays the sabre dance'), and the panel thought the process of finding different areas 'confusing and difficult'. The Bristol town plan was in the sea off Clacton, and Devon was on the section above Durham, for example.

### Coverage

To indicate how conveniently each series of touring maps covered Great Britain, we give in Table II the number of sheets of maps (or double page spreads) you would need for journeys from London to Edinburgh and Dover to Plymouth.

### CONCLUSIONS

The motorists thought that 'generally speaking, the motorist is well served by the variety of maps available' but our typographer felt that, geography apart, the maps were generally 'graphically amateur' and 'mostly low grade compared with many other types of graphic work'. The geographers went as far as saying that little improvement had been made to motoring maps since the Michelin Maps of the 1920's. None of the panel liked the gadget 'atlases'.

The most obvious choice in buying a motoring map is between bound atlases and folding maps. In one respect, atlases are more convenient to use in a car than ordinary maps (provided they fit somewhere conveniently in the car) since there is no folding to be done and they are less likely to tear. But the panel thought that 'No atlas measured up to our ideal standard of ease of following a road from one page to the next. . . '—few were consistently generous in their overlap. And atlases can be costly if all you want is an up-to-date map of a particular area.

## VALUE FOR MONEY

### For long journeys

Even for long journeys the geographers 'saw no real advantage' in any of the maps with scales of eight or more miles to the inch over the 'more informative' touring maps. But they did agree with our motorists that the MICHELIN MOTORING MAP (5s.) was clearly best.

Next came three atlases: AROUND BRITAIN WITH FORD (8s. 6d.), the AA MEMBERS HANDBOOK (available only to members of the Automobile Association), and the RAC GUIDE AND HANDBOOK (8s. 6d. if you are a member of the Royal Automobile Club, 12s. 6d. if you are not).

Also reasonably good were: DAILY MIRROR POCKET ROAD MAP OF THE BRITISH ISLES which was cheap (2s. 6d.) and, within the limits of its small size, informative and clear; and the ORDNANCE SURVEY TEN-MILE MAP OF GREAT BRITAIN (two sheets for 15s.) which was very easy to read.

The AUTO-MAPIC at £2 19s. 6d. was the most expensive of the long distance maps. It had poor colours—'. . . too crude a map to be of much use'.

The JOHNSTON maps and atlases were cheap, but all were either uninformative, or inaccurate, or hard to read.

The remaining maps and atlases were useful, but none was outstanding for its price, and so we choose as

### Joint best buys

for long distance motoring

|                                                       |                        |
|-------------------------------------------------------|------------------------|
| ► MICHELIN MOTORING MAP                               | 5s. 0d.                |
| England, Wales,<br>Scotland, Northern<br>Ireland      |                        |
| ► AROUND BRITAIN<br>WITH FORD                         | 8s. 6d.                |
| ► RAC GUIDE AND<br>HANDBOOK 1963                      | 8s. 6d.<br>or 12s. 6d. |
| and the AA MEMBERS HANDBOOK 1963 (for AA<br>members). |                        |



## VALUE FOR MONEY

### For touring

The panel approved of most of the touring maps, but some were poorer value for money than others.

The ROLL-O-MAPIC was very expensive (£3 15s.), hard to read, and awkward to use. The FOLDEX maps were also expensive (£3— or £3 19s. 6d. in a special folder—for the set) and, although very informative, not entirely accurate.

Some others were not very informative for touring: the GEOGRAPHERS' ROAD MAPS (£1 16s. for the set, but only 15s. when bound together with 35 town plans as an atlas), JOHNSTON'S 'A' & 'B' ROADS MOTORING ATLAS (8s. 6d.) and PHILIPS' GB ROAD ATLAS (7s. 6d.). And two of the atlases were difficult to read, particularly at night: JOHNSTON ROAD ATLAS (£1 1s.) and THOMAS NATIONAL ROAD ATLAS (£1 6s. 6d., mail order only).

The remaining maps and atlases were better value for money. Among the cheapest of them were the oil company maps (up to 6s. for the series—though the series of BP and SHELL maps, when bound together as atlases, cost twice as much). They were easy to read, and informative in different ways—Esso maps showed even tiny villages and had comprehensive indexes to guide you to them, but showed no railway lines at all. BP, NATIONAL BENZOLE and SHELL sacrificed some villages but showed railway lines. MOBIL showed picturesque routes and viewpoints. REGENT showed many villages, some viewpoints and railways.

But most informative and clearest of all the maps was the ORDNANCE SURVEY QUARTER-INCH, FIFTH SERIES. Though not cheap (£4 13s. 6d. to cover the UK), a single sheet (5s. 6d.) is well worthwhile buying for the particular area you are interested in.

The two AA ROAD BOOKS (members only, £1 17s. 6d. for both) had clear and informative maps, and much other useful information besides—nearly 300 town plans, itinerary maps, touring guide and so on.

### How good compared with continental Michelin maps?

We asked our panel to make a general comparison of current British motoring maps with the continental Michelin touring maps which are such a pleasure to motor with abroad.

The panel thought the current French maps 'very good'—'lots of information, easy to read'. Except for the ORDNANCE SURVEY maps which were 'good' as motoring maps, British maps were rated from 'poor' to 'fairly good' in comparison.

An old MICHELIN MAP OF THE BRITISH ISLES, published in 1920 (then, M. Bibendum, the MICHELIN tyre man, smoked a cigar) with a scale of 3.15 miles to the inch, was not thought to be quite as good as the current continental MICHELINS. But 'in general, MICHELIN maps both new and old present far more information of value to motorists than do British maps—width and straightness of road, length, scenic value . . . in a clear and legible manner'.

A smaller, cheaper atlas, yet still very informative and clear, was the BARTHOLOMEW'S ROAD ATLAS (15s.)—its maps were basically the same as those in the AA ROAD BOOKS, though colours were different.

We choose as

### Joint best buys for touring

► ORDNANCE SURVEY QUARTER-INCH MAPS,  
FIFTH SERIES 5s. 6d.  
if you want the best each

► BARTHOLOMEW'S ROAD ATLAS 15s. 0d.  
if you want an atlas

► ESSO ROAD MAPS 6d.  
if you want to spend very little each

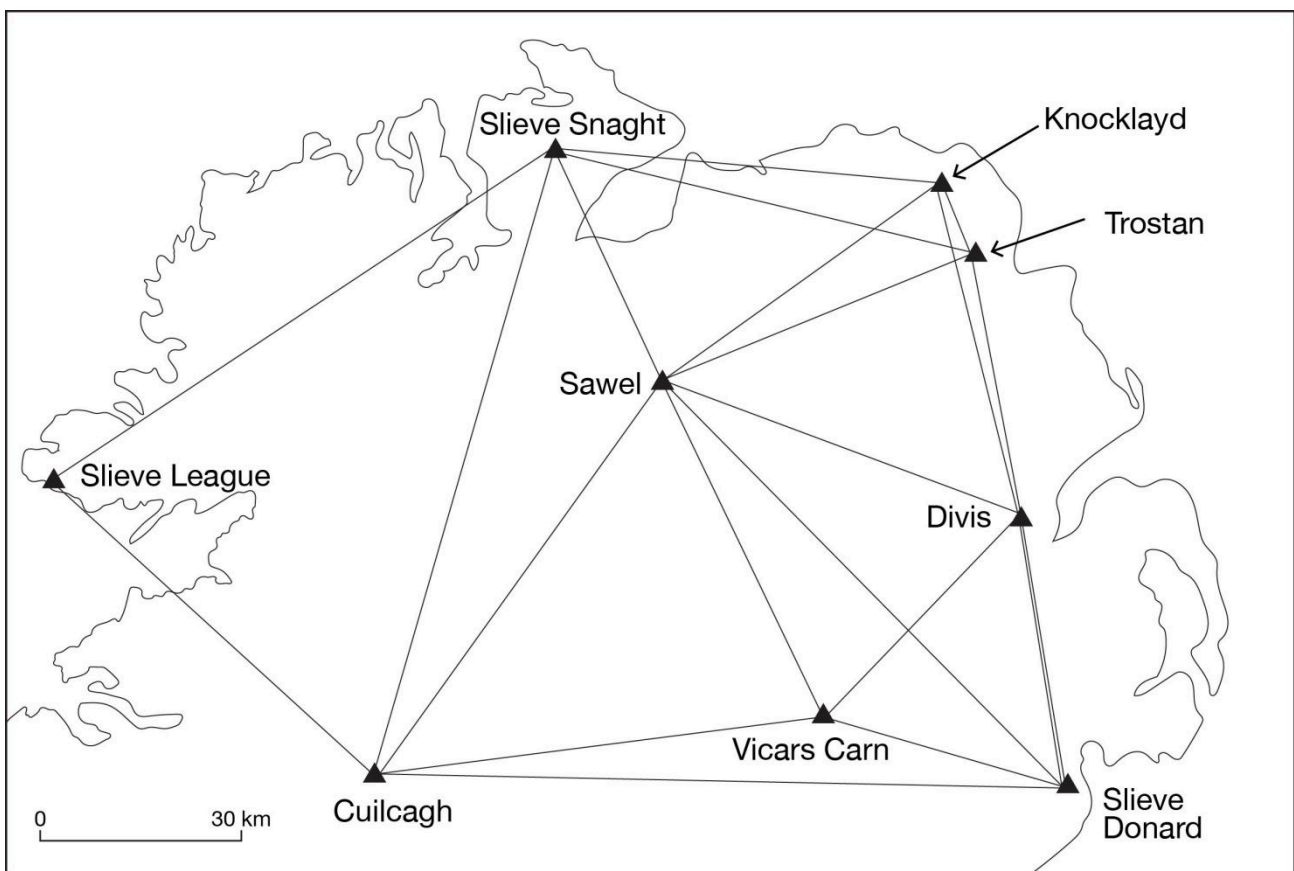
And the AA ROAD BOOKS £1 17s. 6d. if you are an AA member and want a lot of information.



## ***OS camps and cairns of 19th century northern Ireland: 3. Cuilcagh, Slieve League and Slieve Snaght***

***Peter Wilson and Frances Wilson***

The three summits considered in this final article of the current series are in the western part of the north of Ireland (*Figure 1*). Cuilcagh is on the border of Co. Fermanagh and Co. Cavan, whereas Slieve League and Slieve Snaght are at opposite ends of Co. Donegal, southwest and northeast respectively. Slieve Snaght and Cuilcagh rise to over 610m (2,000ft) in height, whereas Slieve League is slightly lower at 595m but is arguably one of the most dramatically situated summits in Ireland.



*Figure 1. Locations of summits in the north of Ireland used as survey stations for the Principal Triangulation 1824-32. Surveyed lines to stations in Scotland, the Isle of Man, northern England and the rest of Ireland are omitted for clarity.*

### ***Cuilcagh***

The summit of Cuilcagh (Grid ref. H 124 280, 666m OD, *Figure 1*) is at the southeastern end of a 4-km long northwest-southeast trending ridge with cliffed northern slopes overlooking vast tracts of bog. Another ridge trends south from the summit and has cliffed east-facing slopes. A pile (?cairn) and staff were set up on the mountain at Colby's request in 1825, but observations from the summit were not taken until the OS established its trigonometrical station at the highest point on 17 June 1828. The OS party remained on the mountain until 12 September and 29 stations were



observed therefrom with the 3-ft theodolite, including Keeper Hill in Co. Tipperary, c. 164 km (102 miles) to the south. The location of Cuilcagh enabled stations in 20 counties (Ireland has 32) to be observed (Clarke & James, 1858, p.14 and 100).<sup>1</sup>

Joseph Portlock was the Observer on Cuilcagh and in a letter dated 25 June he tells of how both he and a member of his team (Gunner Phibbs) were struck by lightning. Phibbs suffered more than Portlock and had to be sent down the mountain to recover (Close, 1969, p.130).<sup>2</sup> The trigonometrical station on Cuilcagh was sited “...on an ancient cairn (cairn)...” (Clarke & James, 1858, p.14),<sup>1</sup> but the Northern Ireland Sites and Monuments Record (NISMR)<sup>3</sup> do not specify to which cultural period it belongs. The twentieth-century concrete triangulation pillar with flush bracket OSNIBM 2076 was built on top of the cairn (*Figure 2*).



*Figure 2. The “ancient cairn” at the summit of Cuilcagh topped with the twentieth-century triangulation pillar.*

Portlock’s (1869, p.130)<sup>4</sup> words for the encampment on Cuilcagh were “...the marquee, and the tents, partly sheltered by hummocks of rock, and surrounded by stone walls, and the smoke-begrimed gipsy-like cook-house...”. Today, c. 150-160m southwest of the summit cairn there are two sub-circular stone structures. They consist of low walls of boulders standing to a maximum of c. 0.7m above the surrounding ground and with

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1 AR Clarke & H James, *Account of the observations and calculations of the Principal Triangulation; and of the figure, dimensions and mean specific gravity, of the Earth as derived therefrom*. Eyre & Spottiswoode, London, 1858.

2 C Close, *The early years of the Ordnance Survey*. David & Charles, Newton Abbot, 1969.

3 Northern Ireland Sites and Monuments Record, SMR number: FER-258-001.

4 JE Portlock, *Memoir of the life of Major-General Colby*. Seeley, Jackson & Halliday, London, 1869.

internal dimensions of c. 4x3m. The interior and the immediate exterior ground surfaces of the structures are devoid of boulders, suggesting that the walls were never much higher than they are at present, although some boulders have fallen and reduced wall height slightly (*Figure 3*). These structures are similar in style and size to those we reported on Slieve Donard in part two of this series, and some of those on Slieve League and Slieve Snaght (see below), and they probably functioned as protective surrounds for tents rather than being the remains of stone huts. However, the NISMR<sup>3</sup> report two circular stone structures with diameters of 6-7m c. 100m west of the cairn. Furthermore, it is said that they are “...probably the remains of round houses.” It is not made clear whether the summit cairn and round houses are considered as contemporaneous features. The 1:50,000 map (Discoverer Series sheet 26) indicates “*Hut Sites*” adjacent to the summit “*Cairn*”. We are not aware of any archaeological investigation of these structures and, given the details provided in the NISMR, cannot be entirely certain that they are the same as the ones we have recorded.



*Figure 3. One of the sub-circular stone structures on Cuilcagh, with summit cairn and triangulation pillar in the background.*

Although the two structures we have recorded lie on the windward slope of Cuilcagh, an OS camp on the lee side would have been highly unlikely given the steepness of slope. We therefore propose that the structures most likely represent the remains of Portlock’s camp, but his description indicates that it consisted of more than two tents. The other camp elements were likely to have been located nearby, but of these we found no trace. A further possibility that we cannot discount is that these structures are the same as those reported in the NISMR and that Portlock’s team utilised existing features that were already of some antiquity.



### ***Slieve League***

The OS station on Slieve League (Grid ref. G 544 784, 595m OD, *Figure 1*) was said to be “...on the wildest headland probably in Great Britain or Ireland.” (Clarke & James, 1858, p.35).<sup>1</sup> The southern aspect of the mountain is indeed impressive, falling extremely steeply to the Atlantic Ocean (*Figure 4*). The station was established on the westernmost and highest of the three summits and the 3-ft theodolite was said to have been positioned on “...a pile of stones 30 feet in diameter and 4 feet high, ...” (Clarke & James, 1858, p.35).<sup>1</sup> Once again, Portlock was in command and the party were in residence from 14 November 1827 until 5 January 1828, during which time they observed 10 stations. This lengthy stay at the summit included Christmas and New Year; favourable weather must have been in short supply given the relatively few observations recorded (Clarke & James, 1858, p.152).<sup>1</sup>



*Figure 4. The southern aspect of Slieve League from the Bunglass viewpoint. Arrow points to the summit where the OS established their station in 1827 and later placed a triangulation pillar.*

The pile of stones that supported the 3-ft theodolite is still evident, although now partly overgrown with vegetation. Its diameter is somewhat less than stated above; we measured it to be c. 5.5x4.5m – i.e. slightly less than 20ft across and sub-circular in outline. The flattened top of the pile is slightly depressed and today hosts the twentieth-century triangulation pillar (*Figure 5*). Unfortunately the pillar is badly damaged; it is now somewhat truncated and has lost substantial pieces of concrete from its



sides. This pillar differs from those in the UK in not having a flush bracket (Slieve League is in the Republic of Ireland, but see Slieve Snaght below).



*Figure 5. Slieve League summit with its slightly truncated triangulation pillar situated on the pile of stones that previously supported the 3-ft theodolite in the winter of 1827-28.*



*Figure 6. The northern-most of the semi-circular stone structures on Slieve League.*

Approximately 150m northeast of the summit and at a slightly lower elevation are two semi-circular structures comprising low stone walls less than 1m in height (*Figure 6*). These structures face one another, are c. 5m apart and have diameters of c. 5m. They resemble the stone structures on Cuilcagh, described above, and probably served the same purpose – as protective surrounds for large tents. Given their location and dimensions they are unlikely to be hill-walker related or of agricultural (sheep) significance, and they are not indicated as archaeological features on the 1:50,000 map. We therefore consider them to be the remnants of Portlock's camp.

### ***Slieve Snaght***

Of all the mountain summits in Ireland used for the Principal Triangulation, Slieve Snaght (Grid ref. C 424 390, 615m OD, *Figure 1*) on the Inishowen peninsula in north Donegal (Republic of Ireland) has the greatest concentration of OS encampment remains than any other. Six summit structures may be attributed to OS activity but because teams of OS personnel had two lengthy stays at the summit in the 1820s it is not known which structures relate to which team.

A long wooden pole was erected at the summit on 23 August 1825. This was intended to be a “conspicuous object” for the expected theodolite sightings by observers positioned on Divis, above Belfast, c. 108 km (67 miles) to the southeast. Unfortunately, unfavourable conditions prevailed for two months and prevented any observations being made. When Divis was clear, Slieve Snaght remained shrouded in cloud or obscured by haze.

Desperation to include Slieve Snaght in the triangulation measurements before winter set in led Colby to instruct Lieutenant Thomas Drummond to take a party of men to the mountain summit. Once there Drummond would attempt to make the connection with Divis by using apparatus that created extremely bright light that was visible over great distances. Drummond modified the heliostat and the limelight for use in surveying. The former instrument reflects the sun's rays via a mirror, and he altered this by making it smaller, more portable and considerably easier to operate. The limelight had been in use in the theatre for some years but once again Drummond improved on it and adapted it for use in the field; it became known as the ‘Drummond Light’.

Drummond and his team reached the summit of Slieve Snaght on 27 October. From letters he sent to Colby we learn that the initial camp consisted of a tent with a wall around it (Close, 1969, p.74).<sup>2</sup> The summit party endured horrendous weather and in another letter Drummond writes “...my tent is blown down and I now write from a kind of cave, formed on the lee side of the hill.” A further letter, this time to his mother and written on 11 November, tells us that following the storm “... we got two huts erected, one for the seven men who are with me, the other for me – a lonely and humble dwelling, it is true, and now that the snow has fallen, so completely covered up that it is not very easily distinguished; nevertheless



affording good shelter, warm and comfortable, and, at the present moment, with a good peat fire.”

From these letters it is a little confusing as to how many stone structures were built by Drummond's team. On aerial imagery five structures are clearly visible close to the circular wall that now surrounds the triangulation pillar. This wall (number 1 on *Figure 7*) was probably constructed by Drummond to protect the lamp tent positioned on the summit, but has undoubtedly been rebuilt several times since (see below). Of the other structures, 2-4 are the remains of rectangular huts with entrance ways, and two also have fireplaces (*Figures 8 and 9*). These three huts range from 2.9x2.5m to 4.4x3m internally with walls standing to a height of 2m in places. Structures 5 and 6 consist of sub-circular walls with internal dimensions of 6.1x4.6m and 7.5x4.4m respectively (*Figure 10*). Wall heights are up to 1.5m., but are generally less than 1m. The absence of boulders immediately outside of and inside these structures suggests to us that they functioned as the protective surrounds for large tents.



*Figure 7. Aerial image of Slieve Snaght summit with stone structures numbered 1-6.*  
© OSi Geohive mapviewer (<http://map.geohive.ie/mapviewer.html>).





*Figure 8. Structure 3 on Slieve Snaght with entrance way to right of person.*



*Figure 9. The fireplace in structure 4 on Slieve Snaght. The wall to the left is c. 2m high.*





*Figure 10. Structure 6 on Slieve Snaght – a sub-circular low wall that served as protection for a large tent.*

Drummond and his party departed Slieve Snaght on 12 November having received a letter a few days earlier from Lieutenant Murphy on Divis informing him that, “Your light has been most brilliant tonight for three hours and twenty minutes, as was your solar-reflection to-day.” Allowing for the time taken for letters to arrive on Slieve Snaght, this would mean that the lights were likely seen on either Sunday 6 or Monday 7 November. During that short window of time the Divis team recorded the bearing to Slieve Snaght 18 times. The maximum variation between these measurements was 6.85 seconds of a minute of a degree (Clarke & James, 1858, p.104)<sup>1</sup>.

The OS were back on Slieve Snaght from 29 September to 25 October 1827 in order to obtain bearings on other stations as part of the Principle Triangulation. Once again Portlock was the Observer and the 3-ft theodolite was used. Bearings were obtained on 16 other triangulation stations, including on Islay and Jura (Inner Hebrides) as well as three stations positioned along the Lough Foyle Base Line in Co. Londonderry, which was undergoing detailed measurement at that time.

A letter from Portlock, dated 4 October states: “The night is likely to be wild, but we are so secured by huge Stone Traverses that we have nothing to fear....”. (Close, 1969, p.130).<sup>2</sup> What Portlock meant by “Stone Traverses” is not entirely clear, but he may have been referring to the sub-circular walls (Structures 5 and 6) and therefore one question is: Were these



constructed by Portlock or did he re-use structures left by Drummond? Irrespective, we suggest that these adjacent structures housed large tents, one acting as a cook/mess tent and the other as accommodation for the men. Like Drummond before him, Portlock as officer in charge of the party, probably made use of one of the stone huts, and our guess would be Structure 4 with its large fireplace (*Figure 9*).

The circular wall at the summit of Slieve Snaght, mentioned previously in connection with Drummond's equipment, was likely dismantled and re-assembled to protect the tent housing the 3-ft theodolite used by Portlock. A more recent phase of the re-modelling of this wall was probably in connection with placement of the triangulation pillar in the twentieth century. This pillar has since lost its flush bracket, which we understand was OSNIBM 2078. The reason for the pillar having previously had a Great Britain / Northern Ireland-style flush bracket is because it was built by the GB OS in preparation for the retriangulation of Northern Ireland in the 1950s. This was with the agreement of the government of the Republic of Ireland, who used the pillar in the 1960s for their own retriangulation.

### ***Endpiece***

Once again, field examination of the summits dealt with above indicates that although stone structures exist there is still much we do not know about the camps and cairns that were established to facilitate the Principle Triangulation of Ireland. As with the summit structures considered in parts one and two of this series, time, climate and humans are having a deleterious impact on features that we believe should be given protected status and "maintained" because of the part they played in the mapping of the island of Ireland.

## ***An uneasy transformation: Ordnance Survey digitisation***

***Richard Oliver***

The Ordnance Survey paper map is largely a thing of the past, at any rate in terms of the number of ‘titles’. Some time in, I think, the late 1980s OS claimed to publish the largest number of ‘titles’ of any individual organisation, certainly in Britain, and possibly further afield. As there were something like over 230,000 of these ‘titles’ the claim was difficult to assail. Yet within a decade or so such a claim could no longer be made, at any rate in respect of paper maps, where the total is today about 620 to 630 or so.<sup>1</sup> And this drastic reduction was all of OS’s own doing.

The reason is not far to seek: digitisation. When this started, in the mid 1960s, it was seen very much as a means to more efficient map production; when completed, thirty years later, it was clear that the main benefit was for users to be able to interact with the mapping, and which was ‘seamless’ and not subject junctions between sheets. Digitisation offered the possibility of getting away from the need either to redraw mapping periodically, with the loss of accuracy inherent in any manual copying operation, and with the inherent inefficiency of replicating much work already done that was in itself satisfactory in order to incorporate patches of new work, or of photo-mechanical duplication, with gradual decline in visual quality, and the possibility of a loss of clarity. In the 1960s users wishing to add information to maps had to annotate them, and with the appearance of a new edition of the map, they were faced with the choice of either obtaining the new edition and having to repeat all the earlier annotation work, or else of continuing to annotate an out-of-date base. Digitisation offered the possibility of maintaining the annotations – for want of a better term – as a separate ‘layer’ that could be updated independently of the base mapping, which in turn could be updated and renewed independent of the annotations. Digitisation also offered the prospect of commercial map publishers producing mapping by adapting OS data, rather than by having to input afresh.

It all seems so simple that today one takes it for granted, yet this neat state of things took some time to develop, and the ultimate outcome seems to have been envisaged by few if any people when OS set out on the digitisation path in 1962-3. Here, it might be thought, is a suitable subject for a historian, yet histories of OS have paid comparatively little attention to it.

A recent book addresses some of this deficiency. Peter Wesley, who first joined the OS in the mid 1960s and retired from it in 1995, was commissioned by the then Director-General and Chief Executive, Professor David Rhind, to produce a history of the operation. This was completed in

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<sup>1</sup> Composed of 403 sheets at 1:25,000, 204 sheets at 1:50,000, 8 sheets at 1:250,000, 1 sheet at 1:550,000, and a handful of miscellaneous ‘non-core’ sheets.



1999 and has belatedly been published.<sup>2</sup> As Peter Staniczeko explains in a Prologue, the delay was entirely due to OS: what had evidently started with a view to publication was by 2001 found somewhat embarrassing on account of ‘the candid portrayal of the organisation’s struggles’, and so it progressed no further than the printing of a few copies. It probably remained quite unknown outside OS until the autumn of 2023. In 2021 Mr Wesley, concerned that his work might be lost, contacted OS with a view to publication being considered, ‘but it seemed that the organisation was still not ready to embrace this part of its past’. He then turned to Mr Staniczeko for assistance, and late in 2024 one of the unpublished copies was deposited in the Charles Close Society Archive in the Map Library at the University of Cambridge.<sup>3</sup> This seems to have marked a change of official heart, and in February 2025 *An uneasy transformation* was published – with OS’s consent, but not under its imprint. The text is the same as the unpublished version, but there are no illustrations: it is difficult to see why these should have been excluded, though the loss is not a significant one.

That said, *An uneasy transformation* has two substantial drawbacks. One is that the story ends with the completion of the digitisation operation, of the basic scale mapping variously at 1:1250, 1:2500 and 1:10,000, in 1995. Since then there have been substantial developments and refinements (not least in what appears at present to be the abortive exploration of deriving the 1:25,000 and smaller scales direct from the larger-scale data), of which any published record is scattered amongst specialist journal articles, yet which deserves a synoptic view. The second limitation, which I suspect may have played a part in OS’s reluctance to publish, is that the book, frankly, really needs a lot of editing and shortening. It is written often in over-formal, over-long ‘official’ style, which might do for internal communication, but is not the way to engage an outside readership. A sentence beginning ‘Up to this point in time’ seems distinctly inferior, on several grounds, to ‘Hitherto’. It is distinctly repetitive, with a great deal of recapitulation which is perhaps better suited to serialisation in a form where previous episodes cannot readily be referred back to, but which is at best unnecessary in a single-volume book. The text could probably be reduced to about two-thirds, or even less, of its length without sacrificing anything. I suspect that OS does not regard the necessary effort to put the manuscript into a publishable form to be justified by likely sales – themselves likely to be influenced by the lack of treatment of post-1990s developments – and in this respect they are probably correct. A third objection is that it is avowedly a ‘personal’

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<sup>2</sup> Peter Wesley, *An uneasy transformation: Delivering Ordnance Survey’s digital mapping of Great Britain 1962-95; a personal account* [no publisher], 2025. Available from Amazon, £13.99 (softcover): see <https://www.amazon.co.uk/UNEASY-TRANSFORMATION-Delivering-Ordnance-personal/dp/B0DXKQ5LX>.

<sup>3</sup> CCSA\_CCS\_629\_2.

account, and such things as tensions in the 1960s between military and civil staff on the OS need a more objective and understanding treatment than they receive here.

This is a pity, because there is an interesting story buried in these pages. Whilst the Director-General of the time, Major-General Henley Dowson, correctly foresaw in 1962 that production methods for paper mapping might well be improved by the adoption of automation, the hoped-for efficiencies were long in coming, and until they did come any digitisation efforts were bound to remain 'experimental'. It is symptomatic of this that a 'pilot project', begun in 1970, was still running at the end of the decade. Limited resources meant that only limited areas, often single isolated sheets, were input; there was also a limited 'customer base' that appreciated the likely uses of mapping in electronic form, and potential users could not always be matched with completed or in-progress inputting.

A hostile critic might suggest that the digitisation was actually spectacularly mistimed, as it began when the post-war remapping of Britain was approaching its half-way point in time, with much of the urban resurvey at 1:1250 complete, but with substantial areas still to be completed at 1:2500 and 1:10,000. Digital production might have reduced costs at the smaller scales, but in practice any demand was at the larger scales and, rather than it being a question of reducing overall remapping costs, it was a question of seeking to reduce the cost of digitising. Until the expense of the whole operation fell below that of manual cartography, computerised mapping could not move beyond its pilot stage, and in practice very few sheets of the remapping were produced from the start by digital means, and even then a certain amount of manual finishing was still necessary.<sup>4</sup> It was therefore necessary, effectively, to 'redraw' vast swathes of rural mapping which had undergone little if any change. Of some 240,000 'tiles' to be digitised, only about 10,000 had been digitised by early 1981, and a significant proportion of those would be found to need redoing; only about 100,000 had been input by January 1991, though there was then a spectacular increase, as work moved from 'heavy' sheets of built-up areas to very open rural sheets. Many of the principal customers for digital data were the utility groups, which wanted lists of 'assets' in advance of privatisation, and much of the inputting was undertaken by them, and also by numerous private contractors. In order that the data could be structured, it was necessary to devise 'feature codes', and earlier elaborate schemes were subsequently greatly rationalised.

*An uneasy transformation* is not that easy a read, but it will be a required one when a comprehensive account of OS map digitisation comes to be written. I hope that we shan't have to wait too long.

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<sup>4</sup> This is effectively demonstrated in the extract from the first published sheet, 1:2500 sheet SO 5052-5053, issued early in 1973: vegetation ornament and parcel acreages were supplied manually.



## ***Two notes***

### ***Michael Spencer***

#### ***Triplicate occurrences***

In Sheetlines 111, you were kind enough to print my solutions to Peter Haigh's puzzle, in which he asked us to find triplicate occurrences of the same seven-character grid reference, with H, N and S prefix. At the end of my solution, I wrote "I did wonder about playing this game in the opposite direction, starting in the Channel Islands and seeing how far north one could go, but even the National Library of Scotland gives up its calculations before they have gone that far south."

I have now been able to solve this aspect of the problem, and the answer is that it's not possible.

Members may be interested in a fascinating program on the Net ([www.nearby.org.uk/conversions.cgi](http://www.nearby.org.uk/conversions.cgi)) which provides conversions from practically any positional data you can think of to any other. In particular, it is very easy to go from geographical co-ordinates (WGS84, lat-and-long) to British National Grid (OSGB36). Open the program, click on entry forms, scroll down to Latitude/Longitude (yellow and purple form), and enter your data in place of what's already there.

I take my geographical co-ordinates from the Index to *The Times Atlas of the World*. These are given in degrees and decimals of a degree, so on the form you clear all the databoxes to "0" and then type in the degree values in the first box on each line. Don't forget that westerly longitudes are negative. I used the following values:

| Island   | Place      | Lat     | Long   |
|----------|------------|---------|--------|
| Alderney | Braye      | N 49.42 | W 2.12 |
| Guernsey | Les Hanois | N 49.27 | W 2.43 |
| Jersey   | St Aubin   | N 49.12 | W 2.10 |

Put these in, and press Go. It is fascinating to see ten-figure grid references come up in the major square "X", which has never crossed my path before! The calculated values (to six figures) are XD913466, XD688300 and XD927132 respectively. SD equivalents for these are fine, all near Blackburn in Lancashire; but ND equivalents are all in the outer reaches of the Moray Firth. HD equivalents are, of course, out of sight even from Muckle Flugga. No triplicates here, then. Sad.

### ***OK, so where is Rockall exactly?***

Landranger 18 has a nice little inset that shows Rockall (and its sidekick Hasselwood Rock) aligned in the geographical co-ordinates, from which you can measure that the actual position is 57°35'46"N, 13°41'21"W. This isn't very helpful to those of us who think in terms of the OSGB orthogonal graticule, otherwise known as the National Grid. It's not easy to convert this position mentally to "200 miles west of North Uist."

There are a number of co-ordinate conversion programs that will provide a National Grid reference output from a lat-and-long input, but if you load the above position into such a program you get that tooth-sucking noise that the garage does when you take the heap in for its MOT. "Not in the UK, mate."

So what we have to do is find a suitable map and draw the grid lines on it. If we can establish a single 100-km major square on the map, we can project its northerly and southerly boundaries into the ocean, and so draw a series of 100km squares where none have been drawn before. A suitable map is Admiralty Chart 4102, *Western Approaches to the British Isles*. This is on a scale of one to 3.5 million, so any drawing on it is going to be fairly approximate. Don't expect a ten-figure reference. Nevertheless, this is a map that everybody interested in the cartography of Britain should study with attention. It covers a huge area of totally foreign country in considerable detail. It's nice to see names from Tolkien applied to sea-bed features: Fangorn Bank, Rohan Seamount, Lorien Knoll, and so on.

It turns out that Rockall is at MB8800, and ain't that fun?



(Andy Strangeway / Rockall / CC BY-SA 2.0)



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