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This month sees the release of the Society’s latest publication *The Ordnance Survey in the nineteenth century: maps, money and the growth of government* by Richard Oliver. You can read Richard’s account of the origins and purpose of the book on page 2 of this issue of *Sheetlines*. The book will be available at a ‘special offer’ reduced price at the Society’s AGM. See enclosed flier for full details.

The AGM on Saturday 17 May provides an excellent opportunity not only to socialise with other members and browse the traditional map market, but also a rare chance to visit the dramatic new home of Ordnance Survey, Explorer House, Southampton. Full details are on the second of the enclosed fliers.

An exciting series of visits is being compiled for the coming months to a variety of venues including British Geological Survey at Keyworth, Bodleian Library storage facility at Swindon and Ordnance Survey of Northern Ireland in Belfast. As dates have not been confirmed at time of *Sheetlines* closing for press, members are advised to check the visits page of the Society website at [www.CharlesCloseSociety.org/Forthcoming](http://www.CharlesCloseSociety.org/Forthcoming) or register their interest with Bernard Anderson (contact details opposite). Dates will also be announced on the Yahoo discussion group [https://uk.groups.yahoo.com/neo/groups/ordnancemaps/info](https://uk.groups.yahoo.com/neo/groups/ordnancemaps/info) and at the Society AGM.

The provisional cartobibliography of the one-inch Old Series map of England and Wales has been available on our website1 for more than eighteen months now. It was posted inviting anyone owning Old Series maps to check their copies against the details to be found there, and to inform us of any additional states or of detail requiring confirmation or correction. It is very disappointing therefore that so far only five members have got in touch offering assistance. There must be dozens of members who have Old Series maps in their collections, and any one of those maps may add to what we already know. So, even if you only hold a single copy, please check it against the website list, and let us know if it provides us with new information? The forthcoming book is to be published by your society, and by so doing you can assist in enhancing its accuracy and thus its value to students of the map of the future. The list will remain on the website no later than October this year. If you can offer any information, please contact the editors.

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The Ordnance Survey’s earlier years: a new history

Richard Oliver

The Ordnance Survey in the nineteenth century: maps, money and the growth of government is a book that I wanted to write, from back in my teens, yet hadn’t particularly expected to, at any rate until comparatively recently and in the form that it has taken.¹ When making my slow acquaintance with pre-1920 Ordnance Survey mapping I was particularly fascinated by the six-inch mapping of Yorkshire and the one-inch mapping derived from it, of the 1840s and 1850s: there seemed a certain mystery to be penetrated. I unravelled some of it in an unpremeditated way, when an undistinguished school career was offset by a better-than-expected degree in history, and the chance to combine an interest in the nineteenth century with an interest in maps. The result was a doctoral thesis on the Ordnance Survey in the middle third of the nineteenth century, which was completed in 1985, but persistently failed to be turned into a book.² Most doctoral theses don’t make it as books, but they usually generate several articles. Mine contributed something to the last three volumes of the Harry Margary one-inch Old Series venture, but there is a lot in those volumes that isn’t in my thesis, and vice-versa.³

What I intended to do with my thesis was to publish it largely as it stood, but with an additional chapter on details of mapping. This was because the thesis was substantially about the Ordnance Survey as an organisation, and how it came to develop from a hole-and-corner affair producing one-inch maps to an industrial concern dominated by 1:2500 mapping, rather than about map content. The book is still decidedly short on map content, but for the one-inch much of what it might have contained can be found in the study of the engraved one-inch family from the 1840s onwards that Roger Hellyer and I published in 2009.⁴ For the larger scales treatment is still fragmentary, despite what I have drawn together in my Concise Guide: there is so much that still awaits exploration.⁵ As it is, the decision to extend the thesis to cover the ‘long nineteenth century’ from 1783 to 1914 grew out the work on the ‘introductory essay’ – about 105,000 words of it – for Engraved maps. For ‘Margary Eight’, covering northern England, I could rely for background on my thesis: for anything more recent – after 1870 – there would be nothing for it but further exploration. And if there was to be enough

² Richard Oliver, ‘The Ordnance Survey in Great Britain, 1836-1870’, unpublished University of Sussex D.Phil. thesis, 1986. The writer would like to think that this will be the last reference to it in print.
background for the one-inch, why not do the job properly, and go the whole hog?

So the ‘whole hog’ is a book of over 600, instead of 350 to 400 pages, and it goes far beyond the maps to cover the politics of the Ordnance Survey. The original thesis did this, and explained the coming of the 1:2500 as a consequence of an interest in the 1850s in value-for-money in government spending: the 1:2500 might cost about four times as much per square mile as the one-inch, but the indications were that it would be more than four times as useful. By 1900 the Ordnance Survey was a department that seemed to be falling still some way short of its potential, partly because mid-nineteenth century expectations of general land registration had not been fulfilled. Whilst ‘make once, use many times’ was justification for an all-purpose general survey, ‘buy once, use many times’ tended to depress sales, and thus the dividend on the investment. It would take the technology of data licensing to resolve that, long after 1914.

One of the motives for bringing the six-inch to Great Britain in 1840, and for continuing to produce that scale after the adoption of the 1:2500 in 1853-5, was as a suitable base for geological mapping, and hence economic development. Yet mapping the rocks progressed slowly, and the number of copies supplied to the Geological Survey represented a modest return for the sums expended on the topographic survey and its subsequent revision. Geology was at its most influential in the development of the OS between the 1830s and 1860s, and was an expression of faith in scientific discovery: it only needed the skill of the geologist to discover mineral wealth in areas that seemed otherwise remote from any prospect of industrialisation. By 1880 geology had developed sufficiently to indicate that there was no likelihood of coal and iron ore in such places as East Anglia, and it would be a long time before many six-inch sheets bore geological markings.

Geology is one dimension of the nineteenth century Ordnance Survey that has been slow in receiving its due; another is Ireland, at any rate in terms of its influence on the Survey in Britain. True, Ireland was something of an OS backwater between the mid 1840s and the later 1880s, but there would have been no six-inch in Britain had it not been for its successful use in Ireland after 1824, to facilitate land tax assessments rather than geology, and the dominant activity of the OS around 1900 was not the revision of the 1:2500 in Britain, but the remapping of Ireland at that scale. If in the 1840s many of those who were mapping Britain were Irishmen, then in the 1890s and 1900s many of those who were remapping Ireland were Britons. This is not something that has hitherto received attention, and the agitation for grading and pay structures that culminated in Lord Ilkeston’s investigation in 1910-11 seems to owe as much to Irish as to British influence. The remapping of Ireland at 1:2500 was itself part of the ultimately doomed attempt, by reforming landownership, to hold together the United Kingdom created in 1801.

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6 An exception must be made for the late Roy Boud, who published a number of articles on the history of geological mapping, with its implications for the Ordnance Survey.
How far I may have been successful in telling the ‘political’ story of the Ordnance Survey must be left to others to judge. The semi-official history – ‘Seymour’ – of the OS that seemed to crawl into print in 1980, yet was actually a relatively quick job compared with my own work, has been criticised on a number of grounds, not least for an emphasis on administration rather than cartography. In fact, a problem with ‘administration’ is that it often makes no sense without an understanding of wider politics; for better or worse, that means politics of party and class. The assumption of ‘neutrality’ that underlies the British public service may have great merits in promoting even-handedness, but it is of no help to wider study, particularly in an age that seems dominated by relativities rather than absolutes. ‘Seymour’ is generally rather lacking in politics. It is also wanting in illustrations: two are of atypical specimens of the map series purported to be illustrated, and there are no illustrations at all of any of the associated personalities.

With the assistance of Ordnance Survey, I have included portraits of all but one of the heads of the survey up to 1914: the exception is the first head, Colonel Williams, of whom no-one seems to know a likeness. I have also attempted to provide a reasonable sample of map specimens, including one or two that rarely seem to emerge into daylight. Had I stuck to my original scheme of publishing the thesis substantially as it stood, only monochrome would have been necessary; extension to 1914 justifies sixteen pages of colour.

A few of the illustrations are of non-OS mapping. This brings us to another problem: if the OS cannot be treated independent of politics, neither can it be treated independent of other mapping. For this reason there is a relatively substantial section on the tithe maps of circa 1837-51, and Greenwood, Bartholomew, Johnston and others are both more than mentioned, and illustrated. A difficulty here is that, whilst we can no longer complain of obscurities in OS history, it is quite another matter with unofficial cartography of the nineteenth and twentieth centuries. Even the Bartholomew half-inch, that unofficial standard Edwardian map, is not free of obscurity: who had the original concept? Likewise, how many of the tithe maps were derivatives of existing maps, now possibly lost, and how many represented new surveys? Until we have a better idea of such things, we will not know how much capacity there was to present a possible alternative to the Ordnance Survey.

I have attempted to ‘do something’ for the OS up to 1914; it remains to ‘do something similar’ for the next century. Strangely enough, although from about 1930 onwards OS internal material survives in abundance – which it doesn’t, at any rate in Britain, earlier on – external material seemingly does not: what were the politics leading to the appointment of the Davidson Committee in 1935, for instance? What was the convincing argument? And so it goes on…

8 The ‘bad’ illustrations are plates 12 and 13.
Balta Sound and the figure of the earth
David I Walker

Introduction
In 1816, Francois Arago, on behalf of the French Academie des Sciences and Bureau des Longitudes, approached William Mudge, Superintendent of the Ordnance Survey, proposing a joint operation to improve the measurement of the shape or figure of the earth. Arago wished to extend into Britain the arc of meridian already measured by the French. This was welcomed by Mudge as an opportunity to compare their instruments, and by the Royal Society as an exercise in scientific collaboration. But in 1817 the disagreement that arose in the Shetlands between Arago’s emissary, Jean-Baptiste Biot, and Mudge’s chief assistant, Thomas Colby, frustrated the prospect of useful comparisons.1 It was left to the local laird, Thomas Edmondston, to support observations at his house of Buness, overlooking Balta Sound, by Biot in 1817 and by Henry Kater in 1818, both commemorated on this memorial stone at Buness.

In the ‘official’ histories, Seymour et al\(^2\) refer only briefly to the quarrel between Biot and Colby; Owen and Pilbeam\(^3\) focus on William Mudge’s mortification that their observations came to be made from different places; and Charles Close\(^4\) suggests that the operations ‘must not be looked upon as wasted, but as somewhat injured by the want of co-operation.’ However, Rachel Hewitt\(^5\) adds to Portlock’s memoir to provide a vivid and well-referenced account of the unfortunate affair, which this article supplements from sources including Admiralty records, Biot’s papers and very kind advice from Mr and Mrs David Edmondston of Buness.

This article illustrates the very different talents and temperaments of Biot and Colby, while leaving the reader to judge the reasons for their disagreement, and it goes on to describe Kater’s pendulum observations at Buness, those by Sabine, and their analysis by Professor George Airy. Although less conclusive than the geodetic evidence, this provided a stimulus for his determination of the figure of the earth in 1830 that endured as the basis for the Ordnance Survey’s principal triangulation, for its retriangulation and for the present-day National Grid.

**Monsieur Biot’s welcome in Britain**

At the time Jean-Baptiste Biot arrived in Dover in May 1817, the Ordnance Survey was interested in the figure of the earth in order to translate its trigonometrical survey into latitude and longitude; the French were also concerned with refining their definition of the metre (one ten millionth of a quadrant of the earth); and pure scientists wished to develop their knowledge of geodesy. Having agreed that the figure of the earth could be regarded as an oblate spheroid ie one having equatorial axes greater than the polar axis, they sought to refine these parameters by surface trigonometry and/or by measuring the increase in the length of a pendulum of constant period as gravitational force increased with latitude, the techniques being combined with the measurement of latitude by stellar observations.

Already well-respected as a scientist (and a Fellow of the Royal Society), Biot nevertheless felt flattered to be provided with an escort through the customs at Dover, and to be received in London by ‘ce vénérable compagnon de Cook’,\(^6\) Sir Joseph Banks, the President of the Royal Society.

From London, Biot with William Mudge travelled by coach to Edinburgh, where Mudge boldly published their objectives in Blackwood’s Magazine.\(^7\) From measurements of the frequency of a pendulum, he reported, Monsieur Biot had


\(^7\) ‘Communication from Col. Mudge’, *Blackwood’s Edinburgh Magazine*, vol 1, June 1817, 234-235.
estimated the force of gravity\textsuperscript{8} at points close to the measured meridian extending from Formentera in the Balearic Islands to Dunkirk. By extending this arc through Britain to triangulate 22 degrees of latitude, the grand design was to agree an international measure of length directly related to the circumference of the earth. Biot had by then established his pendulum at Leith Fort, and Mudge’s intention at that time was that, after collecting the Ordnance Survey’s zenith sector from Inverness, they would together make pendulum measurements and stellar observations at Kirkwall and then at Great Yarmouth (near to the Dunkirk meridian), at Blackdown in Dorset, and at the Royal Greenwich Observatory.

But while Biot was honoured in Edinburgh, and well supported by the Royal Engineers in making a series of pendulum observations at Leith Fort between 15 June and 2 July,\textsuperscript{9} Mudge to his chagrin fell ill, and had to entrust the expedition to Thomas Colby, who by then had extended the trigonometrical survey of Britain as far north as the Moray Firth,\textsuperscript{10} and had been measuring a new baseline at Belhelvie in Aberdeenshire. As Colby had set his sights on the Shetlands rather than the Orkneys, it was agreed that Colby, with Dr Olinthus Gregory from the Royal Military Academy and the Ordnance Survey surveyor James Gardner, should take the zenith sector to the Shetlands to observe for latitude; and that Biot supported by Mudge’s son Richard should observe latitude with the French repeating instrument\textsuperscript{11} from the same station, where he would also continue his pendulum observations for the measurement of gravity; and that the British triangulation would be extended to the Shetlands via the Orkneys and the convenient ‘stepping stones’ of Fair Isle and Foula.\textsuperscript{12}

On their way north from Edinburgh, Biot was honoured further in Aberdeen where he discussed Professor Copland’s collection of astronomical instruments and (with Colby) was made an honorary LLD (in absentia on 4 September).\textsuperscript{13} Then from Aberdeen on 9 July Biot, with Colby, Richard Mudge and Gregory, boarded the survey brig Investigator, which had embarked Gardner, seventeen artillerymen and the 36-inch theodolite at Dundee.

\textsuperscript{8} Clairaut’s theorem in 1743 had defined a relationship between the increase in gravitational force with latitude and the ellipticity or flattening of the earth. The relative increase in gravitational force could be measured in proportion to the increase in length of a pendulum beating seconds precisely. However variations in the length of the seconds pendulum were rarely measured directly, but derived in proportion to the square of the measured frequency of a calibrated pendulum.

\textsuperscript{9} Recueil d’observations, 528, 541, 543, 556 and 560.


\textsuperscript{11} By cumulating repeated measurements of the same angle, the French repeating circle was intended to average out errors of observation. It was used in the horizontal plane for triangulation, like Ramsden’s theodolite, and in the vertical plane for stellar observations, like Ramsden’s zenith sector.

\textsuperscript{12} Sir Charles Close, The early years of the Ordnance Survey, 67 and Recueil d’observations, 529.

\textsuperscript{13} JS Reid, ‘Patrick Copland 1748-1822: connections outside the college courtyard’, Aberdeen Univ Revie, no 174, autumn 1985, 226-250.
The Shetlands voyage of HM brig Investigator

*Investigator* was a 16-gun survey brig launched in 1811, of external dimensions 76 feet length and 19 feet beam, and about half the tonnage of Darwin’s better-known brig *Beagle*. Under her master and commander, George Thomas, *Investigator*’s normal complement of six petty officers and 25 seamen and boys had already been augmented by a second master, a surveyor and a pilot. Now they also had to make room for the five gentlemen and 18 artillerymen. Whether the gentlemen displaced the commander from his cabin, or the petty officers from the gunroom, Captains Colby and Mudge, Dr Gregory, M Biot and Mr Gardner had to share, day and night, a cabin which was no more than 16 feet (5 metres) square – and twenty-five seamen had to make room for eighteen artillerymen as well as the displaced petty officers. To make matters worse, a voyage that might have been completed in a few days was extended to ten days by light airs and adverse winds. The circumstances were enough to test even travellers of an equable temperament – which these gentlemen definitely were not.

Colby was regarded as a demanding companion even by his friends, and he remembered Biot as a collaborator with Don Rodriguez, who had challenged the accuracy of the Ordnance Survey arc from the Isle of Wight to Yorkshire. Gregory wrote religious tracts as well as mathematical tracts, whereas Biot, an even more distinguished scientist, was regarded as a free-thinker. In later years, Gregory wrote of Biot that ‘I do not hesitate to say that I never met so strange a compound of vanity, impetuosity, fickleness, and natural partiality, as is exhibited in his character.’ Biot in his journal of the expedition chose not even to mention either Colby or Gregory, although he wrote kindly of William Mudge and his son Richard. But Richard Mudge was junior to Colby in service and experience, and proved incapable of keeping the peace as his father had intended.

After landing an advance party at the south end of the main island on 17 July, *Investigator* anchored at Lerwick on 18 July, when Colby and Biot took up the introduction to Dr Arthur Edmondston received in Edinburgh. Biot would have liked to base himself there at Fort Charlotte in Lerwick but found himself bound north in thick fog to Unst, where the party went ashore at Balta Sound on 22 July. Here it was that Biot and Colby unfortunately established separate observing stations at the house of Buness and on the island of Balta. According to Portlock’s translation of Biot’s account, the artillerymen found themselves unable to establish a station on the most northern hill (presumably Saxavord) and selected the island of Balta instead. Biot at first concurred, but then felt that his operations

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18 Biography of Jean Baptiste Biot, MacTutor History of Mathematics archive, www-history.mcs.st-andrews.ac.uk
19 *Recueil d’observations*, 531.
would be endangered by the exposure, the remoteness, and a lack of solid foundations. So, with Mudge, he took up the hospitality offered at Buness by Thomas Edmondston (the brother of Dr Arthur Edmondston whom they had met in Lerwick). So were the concerns recorded by Biot sufficient reason for the breakdown of relations between Colby and Biot, and could they not have found a reasonable compromise? The Investigator’s logbook shows that the separation took place very hastily. After anchoring in a fresh gale on Tuesday 22 July, ‘the surveyors’ were landed for the first time – apparently to reconnoitre Unst. On the following day the wind dropped and ‘the ship’s company were employed disembarking surveyors’ instruments and luggage’ – presumably on Balta Island. Significantly, on Thursday afternoon, only 48 hours after their arrival in Balta Sound, they were employed ‘landing M Biot’s instruments etc from Balta Island to Unst.’

Colby’s achievements in the Shetlands
As the zenith sector had not (as intended) been collected from Fort George on the voyage north, Colby in Investigator sailed for the garrison on 1 August, taking only two artillerymen with him, and leaving the rest marooned on Balta with Gregory and Gardner. The voyage south took four days, landing to set up station staffs on the Outer Skerries and Fair Isle. After two days at Fort George, loading instruments and stores, the return north, unlike the previous voyage, was completed in two days. On the next day, Investigator ‘at 10 received on board as a prisoner for Captain Colby Bartholomew Stonecliffe Bombardier’. For an unexplained offence, the RA corporal, who had been with Colby to Fort George, was imprisoned for seven nights. This hardly could have improved the morale of the artillerymen.

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20 Memoir of the Life of Major-General Colby, 77-79, translates Recueil d’observations, 531-532.
21 Captain’s Log, Investigator, 1811-1819, The National Archives, ADM 51/2474, July 1817.
22 Captain’s Log, Investigator, August 1817 and Ship’s Muster, Investigator, 1815-1819.
Timeline of a Quarrel in 1817
7 July:
*Investigator* sails from Dundee with Gardner and artillerymen.
9 July:
*Investigator* with Colby, Mudge, Biot and Gregory sails from Aberdeen.
17 July:
near Sumburgh Head 9.30 out Gig landed surveyors and five artillery
18 July:
*Investigator* anchors in Lerwick Roads
Colby et al received in Lerwick
19 July:
surveyors erecting pyramids
21 July:
*Investigator* sails from Lerwick.
22 July:
*Investigator* anchors in Balta Sound.
'surveyors go on shore'
23 July:
dismounting surveyors stores
24 July:
am landing larger theodolite belonging the
surveyors pm landing M. Biot's
instruments etc from Balta Island to Unst
25 July:
discharged Capt. Colby etc
1 August:
Colby in *Investigator* sails from Balta for Fort George with two artillerymen.
4-6 August:
*Investigator* at anchor at Fort George.
8 August:
Colby in *Investigator* returns to Balta.
17 August:
Mudge & Gregory depart from Balta for Aberdeen on Greenland packetboat
9 September:
*Investigator* with Colby, Gardner and artillerymen sails from Balta.
13 September:
*Investigator* sails from Lerwick Roads for Leith with Colby & Gardner.
19 September:
Colby & Gardner land at Leith en route for London.
24 September:
Biot sails from Balta (or Lerwick) arriving in Leith on the following day.
29 September:
*Investigator* sails from Leith, arriving in Lerwick Roads on 5 October
Hindered by the excursion to Fort George, and perhaps the weather, it was not until 10 August that Colby and Gardner employed the 36-inch theodolite sited on Balta to commence observations of stations on Yell, Fetlar and Saxavord (the northernmost hill of Unst) and for one day only, on 28 August, Gardner made observations from Saxavord. But it was not until 14 August that a party of men was sent in the cutter to erect a station staff on Fetlar and not until 27 August that Investigator journeyed to Yell Sound for her men to place a staff on Ronas, the highest hill in the Shetlands. After this, Colby apparently achieved nothing further before choosing to depart from Balta on 9 September 1817, perhaps exasperated by unsuitable conditions for observing, and his observations on Balta remained unpublished for decades.

On 12 August William Mudge had written to Colby expressing his dismay that a comparison could not be made between stellar observations made using the British zenith sector and the French repeating circle and tactfully enquiring as to progress with observations from Fair Isle and Foula. However this intended link with mainland Scotland was not achieved until 1822, when Colby returned on the survey brig Protector. Sailing from Leith on 28 April, the party landed at Fair Isle on 17 May, but Protector had to return to Leith to rectify some problem. Unfortunately, Fair Isle failed to live up to its name in June and Foula did live up to its name in July, and so it was not until August 1822 that Colby was able to complete sufficient observations in the Shetlands. In September he left Vetch and Drummond in the Orkneys to complete the link with the triangulation which had reached that far in 1819.

**Biot and the Edmondstons**

Reverting to 1817, while Colby was off to Fort George, Biot had settled at Buness, had started his astronomical observations on 2 August, and on 10 August commenced his pendulum observations within the massive walls of an empty sheep-house. By 17 August, assisted by Richard Mudge, he had completed eight days of pendulum observations and 270 astronomical sights. But Mudge’s health was suffering, which Biot sympathetically attributed to the climate – particularly the cold wind from Spitzbergen. However, on 14 August ‘arrived a Greenland ship from Greenland bound for Aberdeen’ and when on 17 August Investigator ‘observed the Greenland ship making signal for sea’ the decision was made and ‘embarked on board the Greenland ship for Aberdeen Dr Gregory and Capt Mudge.’

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23 Account of the Observations and Calculations of the Principal Triangulation etc, Drawn up by Captain Alexander Ross Clarke under direction of Lt Col H James etc, London: HMSO, 1858, 75 & 148.

24 Captain’s Log, Investigator, 1811-1819, The National Archives, ADM 51/2474, August 1817.

25 Memoir of the Life of Major-General Colby, 79-83.

26 Master’s Log, Protector, 17 Nov 1820-31 Dec 1826, The National Archives, ADM 52/3953 and Account of the Observations and Calculations of the Principal Triangulation etc, 89-166.

27 Recueil d’observations, 531, 561 and 563.

28 Verbatim extracts from Captain’s Log, Investigator, 1811-1819, The National Archives, ADM 51/2474.
Biot was at first alarmed at the loss of his assistant, but, after Thomas Edmondston found a young carpenter to take Mudge’s place, Biot was much impressed by the youth’s Scottish education in reading, writing and arithmetic, and appreciative of his timely and trustworthy assistance. So it was that they were able to complete 31 days of pendulum observations and 400 observations of latitude on 9 September – which was marked by the surprising turn of events described below.

Biot’s dislike of Thomas Colby was at least matched by his respect for Thomas Edmondston and his way of life. In his wide-ranging report on his journeys, Biot contrasts the savage scenery and climate of Unst with their admirable way of life, sustained by the land and the sea. He goes out of his way to express his delight with the Edmondstons’ hospitality, support and advice, which was marked by the gift of the miniature which remains in the family’s keeping, and by a letter of thanks from the Academie des Sciences.

Probably Biot would have found similar hospitality anywhere in Unst, but he was fortunate at Buness in finding himself in a culture which in many respects matched his own. Dr Arthur Edmondston of Lerwick had written a monograph on ophthalmia in 1806 and *A View of the Zetland Islands* in 1809. Thomas’s other brother, later Dr Lawrence Edmondston, was a keen observer of natural history and Lawrence’s wife wrote on local history.

**Biot’s return from Balta Sound**

Whereas the behaviour of Colby and Biot on 24 July seems unreasonable, the events of 9 September appear outrageous. At Buness, Biot was apparently engaged from morning until evening on his last of 31 days of pendulum observations. In Balta Sound, Colby, Gardner and fifteen artillermen came on board *Investigator* by 11am and at noon sailed for Lerwick, picking up stores there on 10-11 September, and in due course discharging Captain Colby, Mr Gardner and 14 of the artillermen at Leith late in the day on Friday 19 September. So had Colby failed to warn Biot of his departure or had Biot refused to board *Investigator*?

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29 ‘Jours et époques des observations comparées’, *Recueil d’observations*, 562.
30 *Captain’s Log, Investigator, 1811-1819*, The National Archives, ADM 51/2474, September 1817.
Portlock implies that Biot left Balta before Colby, having ‘returned southward before the \textit{Investigator} could be despatched to remove him’ \textsuperscript{31} but he fails to explain that it was not until 29 September that \textit{Investigator} was despatched from Leith. After Colby’s departure from Balta Sound, Biot had spent another two weeks in the Shetlands, finding a passage to Edinburgh about 24 September. His voyage south was dramatically quicker than his journey north: he recorded that ‘an equinoctial gale took me to Edinburgh in fifteen hours’. \textsuperscript{32}

Be that as it may, the Caledonian Mercury reported on Monday 6 October that Monsieur Biot had arrived in Leith ‘on Friday last’ after a very speedy voyage from the Shetland Islands, and ‘It is with no small degree of surprise that we have learnt that this eminent philosopher was entirely abandoned by the gentlemen who were sent to accompany him on his expedition’ although ‘From the inhabitants of Unst he received every kindness and hospitality they could bestow on him.’ The best response Gregory and Colby could muster (from Woolwich) was that ‘We have read, with considerable surprise, [this] paragraph …. A newspaper is not the place to enter into a refutation, point by point, of so strange a paragraph, resting upon anonymous authority, as that to which we refer’. \textsuperscript{33} Thus it was that the expedition which had been so celebrated beforehand was put at risk of public ignominy (at least in the eyes of the Edinburgh literati, who, interestingly, were subsequently provided in Edinburgh journals \textsuperscript{34} with reports of Biot’s observations in Unst).

Having enjoyed the hospitality of the Royal Engineers in Edinburgh, and paid visits to the Universities of Oxford and Cambridge, Biot, now joined by Arago, was received by the Astronomer-Royal at Greenwich, where they completed further pendulum experiments.\textsuperscript{35} These proved valuable later in providing the basis on which Biot’s observations could be brought together with those by Kater and Sabine which soon followed.

\textbf{Captain (RE) Henry Kater FRS at Balta Sound in 1818}

The House of Commons, under pressure to standardise weights and measures, in 1816 had passed a resolution directed at ‘ascertaining the length of the pendulum vibrating in seconds of time in the latitude of London, as compared with the standard measure in possession of [that] house, and for determining the variations in length of the said pendulum, at the principal stations of the Trigonometrical

\textsuperscript{31} JE Portlock, \textit{Memoir of the Life of Major-General Colby}, 83.

\textsuperscript{32} ‘Un coup de vent de l’équinoxe me ramena à Edinbourg en cinquante heures’, \textit{Recueil d’observations}, 538. But this would have required a speed of 15 knots, even from Lerwick, whereas the reputed top speed of a brig is about 11 knots.

\textsuperscript{33} Nineteenth-century newspapers, \textit{Caledonian Mercury}, 9 and 16 October 1817. \textit{The Times} on 16 October reported the kindness and hospitality of the inhabitants of Unst, but not the abandonment of Monsieur Biot.

\textsuperscript{34} M Biot, \textit{On the length of the seconds pendulum observed at Unst, Edinburgh Philosophical Journal}, 1819, vol 1, 77-79 and ‘Proceedings of Public Societies, Royal Institute of France’, \textit{Edinburgh Annual Register}, 1819, 197-199.

\textsuperscript{35} Sir Charles Close, \textit{The early years of the Ordnance Survey}, 68 and \textit{Recueil d’observations}, 538-540.
Survey extended through Great Britain; and also for comparing the said standard measures, with the ten millionth part of the quadrant of the meridian, now used as the basis of linear measure on (a part of) the continent of Europe’ – and the Royal Society had accepted this objective.  

Perhaps unimpressed by the results of the 1817 expedition, the Royal Society in 1818 entrusted the Commons’ task to Henry Kater, supported by a small party from the Royal Artillery and an Admiralty sloop. Kater arrived in Lerwick with a letter of introduction to Dr Edmondston, who made his brother Thomas ready to welcome Kater in Unst. After examining the outbuildings of Edmondston’s house, Kater chose to locate his ‘invariable pendulum’ (of his own invention) on a wall, three feet thick, next the building in which Biot had conducted his experiments in 1817. Frustrated by two weeks of fog and rain, he eventually was able over a few days to observe the stellar transits required to calibrate his pendulum and the solar observations he used to determine his latitude. On 29 July 1818 he took his leave, echoing Biot’s appreciation of Mr Edmondston’s kind hospitality and ‘every anxious exertion that could tend to forward the enquiry in which I was engaged.’

Capt Henry Kater FRS, ‘An account of experiments for determining the variation in the length of the pendulum vibrating seconds, at the principal stations of the Trigonometrical Survey of Great Britain’, *Phil Trans R Soc. Lond.*, 1819, vol 109, 337-358 – which is the source for most of this section.
Probably the watercolour opposite, attributed to one of Thomas Edmondston’s sisters, dates from Kater’s observations in 1818 rather than Biot’s in 1817. The photograph, taken in 2013, shows that little has changed, except that the memorial stone originally placed near the house has been moved to a site near to the road.

Kater then proceeded to repeat the same exercise at Portsoy on the Moray Firth; at Leith Fort on the Firth of Forth; at Clifton in Yorkshire; and at Arbury Hill in Northants. From Arbury Hill he hastened to the Isle of Wight at the end of October. Frustrated by the weather, he returned there to complete his observations the following May and yet completed his comprehensive paper to the Royal Society for delivery on 24 June 1819.

Kater was gratified to report that Biot’s estimate of ‘the acceleration of the pendulum between London and Unst’ differed only very slightly from his own estimate (which Biot confirmed when he published his detailed results in 1821)\(^{38}\). Kater had hoped from his pendulum observations to improve previous estimates (of around 1/300) for the ellipticity\(^{39}\) of the oblate spheroid representing the figure of the earth. But, having tabulated his observations of the length of a seconds pendulum compared with latitude, he was disappointed to find that stepwise comparisons of adjacent stations gave irregular results. These he attributed to differences in the density of the underlying strata causing variations in the force of gravity, and he concluded that to overcome this disturbing factor a more extended arc of stations was required, preferably of similar geological character.\(^{40}\)

**Expeditions in the 1820s of Captain (RA) Edward Sabine FRS**

In the spirit of the age, another army officer, Captain Sabine, was already prepared for this forbidding task. Having measured clock vibrations in London and the Shetlands in 1818 and on Melville Island at nearly 75 degrees north in 1820,\(^{41}\) he was able to secure support from the Royal Society and the Board of Longitude as well as the Admiralty for an ambitious expedition in the sloop *Pheasant*.

Sabine conducted measurements in Sierra Leone in March 1822, St Thomas in May/June, Ascension in June/July, Bahia in July, Maranham (similar in latitude to St Thomas but on alluvial strata) in Aug/September, Trinidad in September and

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\(^{37}\) Kater wrote: ‘The bell tent before mentioned was suspended over the transit from three spars lashed together at the top.’ The watercolour shows two similar vessels at anchor (with the Island of Balta behind), consistent with Kater writing that ‘On the 9th July [1818] we arrived at Unst, having been joined on the voyage by the Cherokee, bearing an order from the Admiral commanding at Leith to relieve the Nimrod.’ Capt Henry Kater, ‘An account of experiments etc’, *Phil Trans R Soc. Lond.*, 1819, vol 109, 346 and 340.

\(^{38}\) *Recueil d’observations*, 576-583.

\(^{39}\) Given \(a\) = equatorial radius, and \(b\) = polar semi-diameter, ellipticity = \((a-b)/a\).


\(^{41}\) Edward Sabine, *An account of experiments to determine the acceleration of the pendulum in different latitudes*, *Phil Trans R Soc. Lond.*, 1821, vol 111, 163-190.
Jamaica in October. The way in which Sabine adapted to circumstances and secured local support during the turmoil in the Spanish colonies is as impressive as the prompt and thorough documentation of his results. With even greater audacity, he extended his terms of reference to divert *Pheasant* to New York on the way home, where he secured free passage through the US customs, the support of the President of the University of Columbia in accommodating his instruments in the Cupola of the College Chapel, and the collaboration of the Professor of Natural Philosophy, to which he courteously and promptly responded by presenting a paper to the Philosophical Society of New York.

Having prepared the ground in letters from the tropics, Sabine on his return to London soon secured the support of the Royal Society and the Admiralty for a voyage to the Arctic, which commenced in June 1823 in the sloop *Griper* under the same Captain Clavering. As painstaking as he was bold, he recalibrated Kater’s pendulum at the Royal Society in Portland Place and adapted his equipment in the light of his previous experience. Sabine’s diplomacy and determination in finding sites for the pendulum proved as effective in the Arctic as in the Tropics, and over the short summer he made observations at Hammerfest in Norway, at nearly 80 degrees north in Spitzbergen, at nearly 75 degrees north in Greenland and at Trondheim back in Norway.  

Thorough as usual, Sabine recalibrated his pendulum at Portland Place on his return, and prepared the impressive account of his journeys which incorporated his earlier observations at Melville Island. This includes his comparison (by regression analysis) of the length of a seconds pendulum with latitude from the equator to the 80th parallel. Modest in his interpretation of his results, Sabine concluded that ‘The individual who has conducted the experiments is peculiarly disqualified for anticipating the general opinion as to their conclusiveness …. and the decision must remain with those, in whom maturity of judgment gives authority to opinion.’

**Figure of the earth published in 1830 by Professor George Airy FRS**

Sabine’s invitation was soon taken up by George Airy, who in August 1830 for the Encyclopaedia Metropolitana compiled a confident and (appropriately) encyclopaedic article on the figure of the earth. This from his desk at the Cambridge Observatory brought together scientific theory relating to the shape of the earth, a history of the expeditions devoted to its measurement, and his own conclusions derived from his collection of worldwide observations. Airy’s article explains the three quite different approaches: by triangulation – the geodetic approach; by measuring the gravitational force through the frequency of a standard pendulum; and from lunar observations.

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42 Edward Sabine, *An account of experiments to determine the figure of the earth by means of pendulum vibrating seconds in different latitudes*, John Murray, bookseller to the Board of Longitude, London, 1825.

43 *An account of experiments to determine the figure of the earth*, 354.

44 ‘Figure of the Earth’, *Encyclopaedia Metropolitana*, vol V, 1848, 165-239.
For pendulum observations, Airy felt able to separate those observations which he deemed reliable from those which he did not, and compiled a table of ‘first-rate observations’, of which 31 out of 49 were attributed to Biot, Kater or Sabine, comparing the length of a seconds pendulum with latitude between 80 degrees north and 52 degrees south. The laborious observations made at Balta Sound are summarised in a single line of data assigned to Biot and Kater at Unst. However, due to the irregularities of gravity which he attributed to the underlying strata, Airy found that this approach could provide only approximate support to his more precise geodetic conclusions.45

By selecting from fourteen arcs of meridian measured and documented over the previous century, Airy boldly concluded on 17 August 1830 that the earth’s surface at sea level might be represented ‘on the whole’ by an ellipsoid of revolution with polar semi-axis of 20,853,810 (English) feet, equatorial radius of 20,923,713 feet, and ellipticity of 1/298.33.46 In this country, Airy’s figure of the earth has endured well. These dimensions were put into use at the Ordnance Survey by the 1840s, used for the calculation of the principal triangulation in 1858, used again for the retriangulation of 1936 to 1962, and still continue to provide the basis for Ordnance Survey mapping at all scales and for the National Grid.47

Postscript
Airy’s autobiography,48 an interesting demonstration of his scientific versatility and lifetime enthusiasms, mentions that he with his wife visited the Shetlands in the summer of 1849. Later, in a letter to Biot,49 Airy reported that he had enjoyed the hospitality of Thomas Edmondston at Buness, that Thomas’s nephew50 had been named Biot Edmondston and that he had inspected the memorial stone – the very one which stimulated this article.

The author is a retired civil engineer whose family history research has been nourished by the resources of the map library of the National Library of Scotland.
Photographs by the author

45 ‘Figure of the Earth’, Encyclopaedia Metropolitana, vol V, 1848, 228-231.
46 ‘Figure of the Earth’, Encyclopaedia Metropolitana, vol V, 1848, 217-220.
49 RGO 6/362, Airy to Biot, 12 Feb 1850, Cambridge University Library Archives.
50 Born 1827, son of Lawrence Edmondston, later Revd Biot Edmondston and author in 1888 of Home of a Naturalist. Unfortunately Lawrence’s eldest son Thomas, perhaps the most talented naturalist of this talented family, had died in 1847. Having by the age of 12 identified an unexpected species of plant to the satisfaction of William Dawson Hooker, Thomas wrote a Flora of the Shetlands, and in 1846 was elected Professor of Botany in Glasgow, but instead became naturalist on HMS Herald. He died in an accident in Ecuador before reaching the age of 21 and yet achieved a place in the Oxford Dictionary of National Biography.
Northumberlandia, the lady of the north

In a recent issue of *Sheetlines*,¹ David Andrews described the use by Ordnance Survey of hachures to denote slopes associated with other topographical features. Readers may like this newish example; the human landform sculpture Northumberlandia, on the Blagdon Estate near Cramlington in Northumberland.

I work about a mile away, so I visit her quite often at lunchtime to enjoy the good views from the top. It would be interesting to see what the lady would look like with contour lines rather than hachures.

For more information, see www.northumberlandia.com

Photographs © Blagdon Estate, reproduced by kind permission of RJ Downer, Chief executive.

Paul Swindell

¹ ‘Ha-has – the last laugh’, *Sheetlines* 97, 48.
Charting the aeronautical landscape

Part 1: depiction of airfields on Ordnance Survey one-inch maps from the birth of practical aviation to the aftermath of World War 2

Ronald Blake

This essay marks the approximate centenary of the first reference to aviation on an OS ‘popular-scale’ map. Remarkably, while synoptic air navigation charts have inspired several scholarly reviews, the aeronautical content of general-purpose topographical maps remains largely unexplored. Efforts to narrow this gap began in 1996 with contributions to Sheetlines by John Nicholls and Richard Oliver, the essence of which persuaded this writer to promote greater awareness of airfields at two subsequent gatherings of the Charles Close Society. Confirmation that the subject was ripe for systematic research was provided by sundry observations on aviation-related landscape change in the various CCS cartobibliographies on classic OS series.

The aim here is to present an historically and geographically balanced account of airfield depiction practice on Britain’s most widely consulted map, up to the demise of the New Popular Edition, which proved a major threshold in the product’s stylistic evolution. For space reasons, the investigation focuses wholly on the regular coloured format of each series, purposely evading questions of revision policy beyond passing citations of existing CCS studies. A total of 1,375 officially listed sites are examined to ascertain the full range of written descriptions, footprint traces and collateral alterations to the landscape such as woodland clearance and highway closures.

To quantify patterns and trends, nationwide ‘trawls’ of seven different series were conducted and the yields evaluated against the scope of leading

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1 The study also accords with current commemorations of the outbreak of the First World War (WW1) in 1914.
5 Excluded are district, tourist, relief, outline, index and military (except ‘war revision’) variants.
air-historical sources. In the ensuing discussion the terms ‘popular’ (small ‘p’) and ‘the (OS) map’ automatically imply one-inch (1:63,360) scale, ‘series’ (in anticipation of OS usage) is preferred to ‘edition’, and ‘airfield’ loosely denotes flying venues in general. For consistency, all verbatim examples are in italic, followed by the sheet number, grid reference of site, and year of printing.

The Third and ‘Fourth (abandoned)’ Editions

Britain’s first sustained powered aeroplane flight took place in 1908 on Army heathland at Farnborough in Hampshire, and the following year the first purpose-built aerodrome was opened at Leysdown on the Isle of Sheppey in Kent. By 1914 a dozen or so military flight stations were active, clustered on Salisbury Plain and flanking the Solent and Thames estuaries. The busiest civil flying venues in this ‘pioneer’ period were Brooklands and Hendon on London’s southern and northern rims respectively, while in the provinces public air events were typically staged at race courses such as Lanark, Doncaster and Wolverhampton. A good deal of experimental flying was conducted beyond the public gaze on coastal sands such as Camber in Sussex and Filey in Yorkshire.

In principle, any one-inch Third Edition sheet could have indicated aviation as a ‘minor correction’, but no such amendment was made, doubtless due to flying still being controversial and of negligible landscape impact. Sheet 115 (1911), for example, showed nothing at Brooklands (F8), despite the presence of motor sports and aeroplane experiments. Beset by weightier

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6 For national (UK) completeness the review includes Northern Ireland and the Isle of Man, but excludes Eire before independence and the Channel Islands (which lie outside the British archipelago). Concise historical profiles of individual military airfields are available in two definitive regional series: Ken Delve, The military airfields of Britain, 7 vols, Marlborough: Crowood Press, 2005-10 and various authors, Action Stations revisited, 7 vols, Manchester: Crécy Publishing, 2000-09. Airfield Review (Journal of the Airfield Research Group, 1979-date) fills in much of the detail on civil airfields: see www.airfieldresearchgroup.org.uk

7 ‘Airfield’ is a loan-word of American WW2 provenance that has since become the UK preferred collective umbrella for flying establishments of all kinds (aerodromes, landing grounds, seaplane stations, airship bases, gliding sites, heliports). ‘Aerodrome’ (which dominated the inter-war period) now tends to evoke airfields frequented by powered, fixed-wing land-planes and equipped with hangars, a control tower, terminal buildings, etc.

8 Place-names bracketed in front of an italic generic label are provided to help readers trace sites via the recommended air-historical sources.

9 Claims on behalf of rival locations are well documented, but these can be discounted as involving only ‘hops’ and lacking infrastructure.

10 In 1912 the Royal Flying Corps (RFC) was created, comprising a Military Wing at Larkhill (Wiltshire) and a Naval Wing at Eastchurch (Sheppey). In 1914 the latter was elevated to an independent Royal Naval Air Service (RNAS), but in 1918 the twin co-equal arms were amalgamated to form the Royal Air Force (RAF).

11 Locations are given here by alphanumeric references (eg F8), the TM yard grid (eg 1,150,000-1,285,000) or the National Grid (six figures), as appropriate for the sheet being discussed.
concerns such as relief depiction, large-scale mapping and competition from commercial rivals, the OS clearly regarded aviation as a low priority. Notwithstanding, a sizeable portion of southern England was revised in 1913-14 with a fresh series in mind, but with Europe on the brink of war the results were shelved for five years.\textsuperscript{12}

Thus, for almost two decades into the twentieth century, British aviation had no popular cartographic face – with one modest exception. Prior to the revision initiative of 1913, seven sheets of an aborted ‘Fourth Edition’ were published for east Kent, one of which, 273 (1911), showed \textit{Aeroplane Works \& Garage} at Shell Beach near Leysdown (figure 1A). Though the flying field itself was not precisely delineated, the buildings plotted were indeed part of the aforementioned pioneer aerodrome and are fittingly acknowledged in the CCS volume on one-inch engraved maps.\textsuperscript{13}

\textbf{The Popular Edition}

World War 1 (1914-18) saw more than 500 airfields created on home soil, two-thirds of which were humble landing grounds, seaplane slipways and airship moorings with no popular cartographic legacy. Even the anti-Zeppelin and coastal reconnaissance aerodromes had quite rudimentary buildings and tents, leaving just a few dozen aircraft factories, flying training depots and airship sheds as landmarks likely to figure on a one-inch map.\textsuperscript{14}

The Popular Edition began with an uneven portrait of this core inheritance. In central-southern England the earliest printings were based on 1913-14 revision material, so only airfields of pre-war origin initially appeared. Typically, sheet 112 (1919) showed (Upavon) \textit{Central Flying School} (figure 1B) with buildings (but as yet no boundary). Stronger proof of discriminatory mapping at local level was sheet 122 (1919) which marked \textit{Aeroplane Sheds} at Larkhill (7C) and Netheravon (7A) while omitting any trace of newer aerodromes at Andover, Old Sarum and Boscombe Down. Similarly, sheet 114 (1920) showed \textit{Brooklands Motor \& Flying Gd.} (figure 1C) and (Farnborough) \textit{Ryl Aircraft Estabt} and \textit{Flying Track} (figure 1D) while effectively disguising Feltham air-training base (10C) in pre-war landscape ornament.\textsuperscript{15}

\begin{footnotesize}
\begin{enumerate}
\item\textsuperscript{12} Hodson, \textit{Popular Maps}, passim.
\item\textsuperscript{13} Roger Hellyer and Richard Oliver, \textit{One-inch engraved maps of the Ordnance Survey from 1847}, London: Charles Close Society, 2009, 82.
\item\textsuperscript{14} For dimensional data, see Ian M Philpott, \textit{The Royal Air Force: an encyclopedia of the inter-war years 1918-1929}, Barnsley: Pen & Sword, 2005.
\item\textsuperscript{15} Farnborough’s peculiar internal geography (noted by Aidan de la Mare, \textit{Sheetlines} 97 (2013), 34-5) echoes the early use of racecourses for evaluating pilots and planes. Stations like Andover and Feltham were initially excluded by the OS simply because their construction post-dated the last corrections of the OS sheets on which they happened to fall.
\end{enumerate}
\end{footnotesize}
At this juncture it is tempting to invoke Air Ministry uncertainty on which ‘Aerodromes’ were to be permanent, given the term’s sparse deployment on the earliest batch of sheets issued.\footnote{Hodson, Popular Maps, 152.} There was, however, one prominent exception, namely sheet 106 (1920) on which the pre-war flying mecca at Hendon was doubly labelled \textit{Aerodrome} and \textit{Aeroplane Sheds} (figure 1E), thus demonstrating how cartographic inertia could out-manoeuvre security rules.\footnote{One wonders whether the curators of today’s RAF Museum are aware of this esoteric link with OS maps.}

Across the Thames estuary and south-east peninsula an extended survey period (1914-19) encouraged further nuances, including an apparent Admiralty penchant for \textit{sui generis} descriptions. As examples, sheet 134 (1920) showed (Eastbourne) \textit{Naval Air Sta} (12G) while sheet 116 (1921) identified (Grain) \textit{Marine Aircraft Experimental Sta} (figure 2A) and (Leysdown) \textit{Aerodrome}
(Seaplane) (12D). Confirmation that sheet 116 was revised during or after the war was a group of (unlabelled) roadside sheds at Detling (G4), a fighter aerodrome opened in 1916. Intriguingly, though, the busy naval air training hub at Eastchurch (116, 10C-D) was initially marked only by a wordless sprawling camp, suggesting either censorship or dormancy. As for (Goldhanger) Flying Grounds (figure 2B), both the terminology and the activity were anachronistic.

North of the Thames basin most Popular first printings were based on topographic survey completed during or shortly after the war. These ‘northern’ sheets were also typically published a couple of years later than their southern counterparts, allowing a simpler vocabulary to emerge. The largest airfield cluster fell in Lincolnshire on sheet 47 (1923), comprising (Digby) Aerodrome (7J) and three unlabelled ex-training camps at Scampton (5B), Waddington (5F) and South Carlton (figure 2D). However, the wider picture in this Jurassic sub-region was not perfectly uniform: sheet 64 (1922) included (Wittering) Flying Ground (7G), whose variant description was perhaps influenced by the wartime base’s provisional peacetime role as an out-station of CFS Upavon.

Despite a tightening of national security in 1924 (which saw various arsenals, fortresses and dockyards erased), the OS successfully resisted Service wishes to have aerodromes denied, cleverly invoking the potential for civil aviation as an argument for on-going depiction. Indeed, in a spectacular hyper-correction Eastchurch Aerodrome (on the 1925 reprint of sheet 116) became the first permanent military air-base to bear a locality name at one-inch scale. Elsewhere in southern England the concise generic label gained currency on second and subsequent printings, eg at Worthy Down which, having at first appeared anachronistically as ‘Old Race Course’ (1919), was remapped as Aerodrome (1929) with its special GWR halt also indicated (figure 2E).

One sector, however, remained stubbornly inconsistent, namely ‘lighter-than-air’. The oldest such site was (Wormwood Scrubs) Airship Shed, dating from the onset of war (figure 1F). Next came (Polegate) RN Airship Sta (134 (1920), 11F) and Kingsnorth RN Aviation Depot & Wireless Tel Sta (Admiralty) (116 (1921), 4-5C), both already defunct when their host OS sheets went on sale. At Pulham in south Norfolk (77 (1921), 3D) giant sheds fed by a rail spur were repeatedly mapped as Wireless Tel Sta (Air Ministry), suggesting a non-flying peacetime role. Cranwell North (55 (1922), 6B) initially appeared as an unlabelled footprint, then on the 1938 reprint all infrastructure was erased in a botched attempt to deflect attention from the adjoining RAF College at

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18 This ambiguously described site lay about a mile north of the pioneer aerodrome and comprised both a grass landing ground and marine aircraft slipway.

19 Hodson, Popular Maps, 162-3.

20 Toponymic labelling at this stage was confined to four stations (of Admiralty origin) in the Medway area and also proved short-lived.

21 The old axiom that ‘the map gets out of date as soon as the surveyor leaves the ground’ is nowhere more apposite than with respect to airfields.
Figure 2: World War 1 and interwar airfields on Popular Edition Maps

2A top left: Grain, Kent: sheet 116 (square 7B) (1921)
2B top centre: Goldhanger, Essex: sheet 108 (square 7A) (1921)
2C top right: Barlow, Yorkshire: sheet 32 (squares 9C-D) (1924)
2D middle row left: South Carlton, Lincolnshire: sheet 47 (squares 4-5C) (1923)
2E middle row centre: Worthy Down, Hampshire: sheet 123 (square 3F) (1929)
2F middle row right: Westwood, Peterborough: sheet 64 (square 11H) (1937)
2G lower left: Fen Ditton, Cambridgeshire: sheet 85 (square 7C) (1932)
Cranwell South (which curiously clung onto its ‘Aerodrome’ label). In contrast, Cardington’s legendary airship factory (84, 8G-9G) was left totally blank on the two earliest (1919 and 1924) printings, but eventually marked as Airship Station (1936), albeit lacking any footprint details. Finally, two airship development bases south of York were treated quite differently from each other: whereas (Barlow) Aircraft Works (figure 2C) was described thus over a full footprint on all printings up to and including 1938, Howden was never openly indicated at one-inch scale.

Remnants of certain defunct airfields could also be discerned from non-aeronautical terminology and footprint evidence. These ranged from (Pembroke) Admiralty Wireless Station (99 (1922), 9F) to a row of seaplane slipways and sheds at Killingholme on Humberside (33 (1924), 10G), an (ex-RNAS) camp at Narborough in west Norfolk (66 (1921), 2E), and the buildings and boundary of Rochford ex-RFC fighter base (108 (1922-32), 6G) which later became Southend municipal airport.

By 1930 most entries in UK Air Pilot also appeared on the OS one-inch map, suggesting some formal arrangement between government departments. State-of-the-art RAF stations included Abingdon bomber base (105 (1934), 3D) and Peterborough flying training airfield (figure 2F), each concisely marked Aerodrome within clear boundaries. However, in 1935 this routine data transfer was abruptly cancelled when the RAF embarked upon a multi-phased ‘Expansion Scheme’ in response to the rise of Nazi Germany. While all existing military airfields continued to appear on Popular reprints up to 1938 or early 1939, none of the now-legendary ‘campus-type’ Expansion stations was ever mapped by the OS in its youthful configuration.

Civil aerodromes of the 1920s were overwhelmingly conversions of WW1 stations, a poignant example being Didsbury, which appeared fleetingly on the 1924 printing of sheet 36 (10G), just ahead of suburban Manchester's

23 Cardington was not mapped initially because sheet 84 was compiled before the base opened in 1916. Eventual depiction (in somewhat rough lettering) came well after the notorious R.101 disaster in 1930 and a switch to barrage balloon development.
24 Howden’s footprint was, however, shown on the contemporary quarter-inch map (Third Edition sheet 3, 1921). On the one-inch Popular map (sheet 32, 12C) the only hint was a change in road classification by the entrance to the site.
25 UK Air Pilot (from 1924) was the Air Ministry’s loose-leaf manual of flight regulations and site plans of currently active military and civil airfields. OS curtilages usually accord with the inset diagram accompanying each plan.
27 The last pre-Expansion station to be opened, in 1934 (and the first to be withheld from the OS map), was Mildenhall, Suffolk. Continued depiction of pre-1934 air bases was presumably because erasure costs were judged to outweigh the likely security benefits of excision. Ironically, aviation magazines and directories were at liberty to mention new RAF stations till at least 1938. For layout detail see Paul Francis, British military airfield architecture, Yeovil: Patrick Stephens, 1996.
southward advance. More durable switches included Castle Bromwich (72, 6B) and Filton (111, 3A) whose viabilities were underpinned by resident aerospace companies and RAF volunteer squadrons. By chance, the civil renaissance of Norwich (Mousehold) *Aerodrome* (67, 4E) has been captured in a neat time-series montage by Yolande Hodson, illustrating the Popular map’s value as a source on changing urban morphology.  

Among the few *ab initio* civil aerodromes before 1930 were Woodford (44, 12A), where Manchester plane-maker Avro opened a factory in 1925, and Cambridge Fen Ditton (85, 7C) which enjoyed a short life as a recreational flying venue before urban encroachment (figure 2G). The main wave of civil depictions occurred after 1930, driven by fashionable aero clubs, Sir Alan Cobham’s ‘flying circuses’ and ‘air-mindedness’ campaign, municipal ambitions to have air transport links, and government funding to relieve unemployment through public infrastructure works. Among municipal aerodromes created on virgin sites were Grimsby (40 (1935), 5D) and Nottingham (54 (1933), 7F). In all, the Popular map depicted about 150 airfields, four-fifths in words and the rest as footprint traces only. As many as 100 were at some point mapped ‘Aerodrome’, several having switched from *sui generis* descriptions at their first showing. Labelling in the 1920s was typically cramped and in many cases remained so, despite subsequent revision windows for stylistic upgrading. Sheet 87 (1938) still showed (Martlesham Heath) *Aerodrome* (4G) in barely legible lettering while awarding a larger and more elegant font to the younger and less land-hungry Ipswich airport (2-3H). In the case of (RAF) Manston in Kent (117, 7C), the generic placement was shifted (1926-38) one kilometre southward to fit site enlargement. A comparison of Croydon on the 1926 and 1934 printings of sheet 115 (2F) demonstrates how legibility could be improved over time.

**The Fifth Edition**

On sale from 1931, this re-designed series was distinguished by a new (Transverse Mercator) projection and (5000-yard) grid, a mixture of small-format and awkwardly overlapping large-format sheets, enhancements to road, rail and land-cover classification, and a generally sharper look. Air-historically, its chief shortcomings were a failure to progress much north of Oxford, a disappointing void in Kent and East Sussex, some confusing temporal overlap with Popular sheets, and a rather long-winded site-referencing system.

In the civil sector fresh *Aerodrome* depictions included Elstree (106 (1939), 1,126,500,1,321,500), St Just (146 (1939), 713,000,1,141,000) and White Waltham (figure 3A), each a welcome land-use up-date. Sheet 141 (1937) was

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28 Hodson, *Popular maps*, plate 9b-d. See also Chris Higley, *Old Series to Explorer: a field guide to the Ordnance map*, London: Charles Close Society, 2011, 40-1, where Norwich aerodrome is graphically used to demonstrate the map’s alphanumeric grid-referencing system.


notable for its trio at Hamble, comprising a Seaplane Sta and two contiguous private aerodromes (figure 3B). On sheets 115 (1934) and 125 (1936) respectively the obsolete wartime term Landing Ground was unexpectedly revived at Addington (figure 3C) and Penshurst (1,167,000-1,270,000), these being touch-down fields on the Croydon-Paris air route. Of longer-lasting significance, the novel descriptions London Air Port (Croydon) (115 (1934-38), 1,143,000-1,288,000) and Bristol Airport (figure 3D) signalled a new OS commitment to showcase emergent air transport hubs. As war approached, a number of civil deletions inevitably occurred, not least on the exposed Isle of Wight and in south Essex. Typically, Stapleford Tawney (107, 1,163,000-1,325,000), a private aerodrome first shown in 1935, was omitted from the 1938 printing, perhaps at the behest of Fighter Command.
In the military aviation sector the Fifth Edition bore relatively few fresh depictions, because the Expansion mainly took place beyond its geographical reach.31 The youngest base marked was Lee-on-Solent Aerodrome (figure 3E), opened in 1934 next to a WW1 seaplane base and thereby just pre-dating automatic censorship. Elsewhere, new military depictions were confined to a handful of Army Co-operation summer practice camps, eg (Okehampton) Landing Ground (figure 3F). Up to and including 1937 this territorially and security constricted picture held steady, but on all final (1938 and 1939) printings new ‘holes’ duly appeared, a prime censorship target being RAF Tangmere on Sussex coastal sheet 142 (1,099,500-1,225,000).

By 1939 the Fifth Edition had added a modest twenty airfields to the Popular’s accumulation. Conflating the yields of the two series, some 140 explicitly labelled sites testified to aviation’s inter-war development.32 Due to the wholesale censorship of Expansion bases, and a tardy mapping of new airports, the one-inch sheets in public circulation during the final year of peace contained little over half the infrastructure easily seen in the field.33

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31 The only sub-region where Expansion hangars and camp buildings might have shown up on OS sheets (assuming no censorship) was the Cotswolds.

32 Dozens of minor civil airfields listed in commercial publications such as Janes’s All the World’s aircraft (occasional) and Automobile Association Register of Landing Grounds (1929-38) were eschewed by the OS. As for the ‘big three’ absentees (Luton, Manchester Ringway and Birmingham Elmdon), their respective openings came too late for popular mapping.

33 No government statistic for the stock of defence-capable airfields in 1939 has yet been found. This writer’s doctoral research (RNE Blake, ‘The development of military and civil airfields in the United Kingdom since 1909, with special reference to land use’, University of London PhD thesis, 1989) gleaned 250 from various military and civil listings, of which 130 were indicated on various OS one-inch sheets circulating on the eve of war.
War Revision and Second War Revision (GSGS 3907, 3908)

Despite (or more likely because of) their titles, these maps were essentially stripped of airfields. Though intended originally for military purposes, their public availability from 1943 has given them a high continuity value in the evolution of modern British topographical mapping.\(^\text{34}\) As a consequence of being derived from ‘recycled’ Popular and Fifth revision material, a seemingly random handful of airfields were accidentally shown. Figure 4 exhibits three of these, each captioned by its inherited Popular sheet number and a War Office Cassini grid reference (which bore no direct relation to the post-war National Grid). Sheet 87 Isle of Man (standing in for a New Popular sheet that was never issued) usefully marked (Ronaldsway) Aerodrome until the Seventh Series eventually came on stream.

The New Popular (or Sixth) Edition

Compiled under conditions of heightened security and austerity, the New Popular was inherently weak in aviation content. Poignantly, its production was seriously impeded by the loss of recent revision and drawing material caused by Luftwaffe attacks on Southampton in 1940. During its sixteen-year span (1945-1961) barely 90 airfields (one in ten) were indicated either explicitly or suggestively. To its credit, the series introduced a truly national grid at 1-kilometre intervals, enabling any site henceforth to be concisely and uniquely expressed to an accuracy of 100 metres and readily compared across a succession of printings both within and beyond the series.

During WW2 (1939-45) the UK’s cumulative tally of ‘airfields on charge’ reached an all-time peak, exceeding 850, arguably Britain’s greatest construction achievement in any five-year period thus far.\(^\text{35}\) Sadly, due to blanket censorship, regional disparities in the topographic base, and advancing plans for a radical replacement, the New Popular was decidedly makeshift in composition and style, and failed to provide a convincing bird’s-eye view of town and country in any specific year.\(^\text{36}\) By focusing its ‘selective revision’ on south-east England, the map gave an unfair depictive advantage to civil airfields around the capital while grossly under-recording the scores of elaborately engineered wartime air-bases peppered across the nation’s central-eastern lowlands and coastal pockets further north and west.

The earliest New Popular sheets printed (1945) were overwhelmingly silent on aviation, and even the single prolific exception (sheet 170) was flawed in


\(^{35}\) The writer’s estimate of 850-plus is a conflation of several robust sources (there being no known consolidated statistic in print). Most existing air-historical estimates lie in the 600-700 range. The higher figure posited here includes numerous auxiliary landing grounds, but still omits temporary ‘cub strips’ and decoy sites that could push the final count towards 900. For a fully explained WW2 airfield typology see D J Smith, *Britain’s military airfields 1939-45*, Wellingborough: Patrick Stephens, 1989.

Figure 5: Airfields on New Popular Edition maps

5A top left: Northolt, Middlesex: sheet 160 (100850) (1949)
5B top centre: Aldermaston, Berkshire: sheet 168 (595635) (1949)
5C top right: Blackbushe, Hampshire: sheet 169 (810590) (1952)
5D middle row left: Calshot, Hampshire: sheet 180 (488025) (1952)
5E middle row centre: Broadwell, Oxfordshire: sheet 157 (250065) (1948)
5F middle row right: Tarrant Rushton, Dorset: sheet 179 (945055) (1948)
5G lower left: Marham, Norfolk: sheet 124 (725085) (1951)
5H lower centre: Beccles, Suffolk: sheet 137 (450880) (1953)
5J lower right: Ringway, Cheshire: sheet 101 (820845) (1951)
what it revealed.\textsuperscript{37} To meet pent-up demand, sheet 170 (1945) was compiled in haste from uncensored Fifth material, thereby reproducing London’s pre-war ring of airfields in blatantly obsolete footprints. Most anachronistic was Heathrow, still shown as a small, square, fenced and nameless \textit{Aerodrome} (080755). Also marked in this purely generic fashion was (RAF) Kenley (330580), a presumed mistake that nonetheless qualifies as the first reappearance of an active air-base on a one-inch sheet after WW2.

Thanks to selective revision, in 1949 Heathrow was duly renamed \textit{London Airport} over its now-iconic stellar footprint, while \textit{Croydon Airport} (305635) and \textit{Airpor (Heston) } (115780) were rendered in words indicative of diminished status. Elsewhere on revised sheet 170 at least three further depictions deserve comment: (Wisley) \textit{Aerodrome}, a Vickers test facility (075575), was unusually shown enclosed by an archaic Popular-style fence; Redhill’s pre-war airport (300475) was suggested solely by its WW2 perimeter track; and Gatwick (285405), despite having shyly resurfaced on the 1945 printing, was blanked till the end of the series.\textsuperscript{38} Appropriately, the Kenley \textit{faux pas} was now rectified by a discreet excision.

Though chiefly intended to catch up with new roads and housing estates, selective revision captured key facets of early post-war aeronautics. Sheet 160, which initially (1945) denied the existence of all RAF stations, added \textit{Northolt Airport} over runways to its 1949 revision (\textit{figure 5A}), this adjustment reflecting the historic Battle of Britain station’s transfer to Ministry of Civil Aviation control to assist Heathrow’s transformation. After the RAF resumed regular flying at Northolt in 1954, the OS blanked the site on its final (F/ 1957) New Popular printing.

Sheet 168 (from 1949) repeatedly showed (Aldermaston) \textit{Aerodrome} over runways, the pretext being the ex-RAF bomber station’s early post-war role as BOAC’s fleet servicing base (\textit{figure 5B}). By contrast, sheet 169 (F, 1952 and F/, 1957) described (Blackbushe) \textit{Airfield} over blank ground, this sparser image possibly constrained by a lingering US Navy presence (\textit{figure 5C}). Meanwhile, the government’s top experimental airfield at Farnborough (169, 860540) was totally denied on every New Popular printing, despite attracting huge crowds to its annual display of the latest military planes.

Coastal sheet 180 (H, 1952) was distinctive in showing \textit{Calshot (Flying Boat Base)} (\textit{figure 5D}), the only maritime patrol asset to figure on a one-inch map after WW2 (and, moreover, the only aeronautical usage of ‘base’ encountered in this research). Simultaneously, the re-depiction of (Lee-on-Solent) \textit{Airfield} (560020) marked the first application of this quintessentially post-1945 term to

\textsuperscript{37} Yolande Hodson (ed), \textit{An inch to the mile: the Ordnance Survey one-inch map 1805-1974}. London: Charles Close Society, 1991. This celebratory booklet makes special mention of Middlesex’s rich aeronautical landscape.

\textsuperscript{38} Gatwick’s omission may have been related to controversial plans to expand it as London’s second international airport.
an exclusively military base. Sheet 180 was further notable for inconsistencies on the civilian side: government-owned Southampton (Eastleigh) Airport (453170) was marked thus from 1952, yet Portsmouth civic airport (670035) and the Fairey company aerodrome at Hamble (North) (475075) were both blanked (apart from tell-tale buildings) for the rest of the series.

As noted elsewhere, sheet 181 (1948) showed the A2024 road uncoloured in two places due to aviation. At Tangmere (910060) the disruption was eventually explained by the label Airfield (D, 1952), but at Ford (990030) no such clarification was offered on any version of 181. However, on the overlap section of sheet 182 (E/, 1959) Ford Airfield was at last acknowledged, thanks to the availability of revision material for the impending Seventh Series. At this late stage, Ford proudly became the single Service aerodrome to be identified by its locality name in the New Popular series.40

On the northern rim of the ‘roads-revised’ (south-east) region traces of WW2 aviation were sparser but intriguingly diverse. Airfield-rich Upper Thames sheet 157 (1947) showed hangars at Watchfield (253908) and a dispersed camp at Broadwell (figure 5E), hinting at transfers to civilian ministries responsible for bulk storage and emergency social housing. On the B// reprint (1952) both Watchfield and its neighbour South Marston (185880) were each labelled Airfield (albeit minus hangars), the latter occupied by a censored aircraft factory.41 In the centre of sheet 157 (1947), (RAF) Lyneham (010785) could be guessed at from a spacious censorship blank, refilled later (1952) by uncolored pre-war landscape detail minus the original yellow road infill.

A row of ‘not straightforward’ sheets extending to the Essex coast bore further cryptic traces of WW2 aviation. As well as road severances at Benson (158, 630915) and Kingston Bagpuize (158, 410970), scattered buildings were added at Bovingdon (159, 010040) in recognition of temporary civil flying (in support of Heathrow), while at Boreham (161, 740120) depiction of the RAF technical site reflected early land disposal for industrial purposes.

On the western margin of road revision, the former D-Day transport airfield at Tarrant Rushton in Dorset (figure 5F) appeared just once (1948) as a wordless three-runway layout plus dispersed hutted sites. Pondering this picturesque anomaly, John Nicholls noted that the site was then tenanted by Sir Alan Cobham’s ‘Flight Refuelling’ enterprise, to which Richard Oliver added that depiction may have occurred because the OS’s vetting officer was unclear as to the base’s security status. Despite bearing no descriptive label (and wiped from all subsequent New Popular printings), this premature image

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39 A settlement called Milvil appears on all printings up to 1953, but this enticing name has yet to be debated or explained by air historians.
40 Richard Oliver’s contextualization of this phenomenon was a key stimulus to the nationwide investigation summarised here.
41 Defence aerospace factories constitute a possible third primary category of airfield, straddling the simplistic military/civil dichotomy.
affords the earliest glimpse at one-inch scale of a typical full-size WW2 paved aerodrome.\textsuperscript{42}

Beyond southern England most New Popular airfield traces were either ‘fossils’ of inter-war mapping or recent ‘tinkerings’ to incorporate wartime highway realignments. Cartographic inertia certainly explains the three \textit{Aerodrome} placements on sheet 113 (1947), at Cranwell (015490), Spitalgate (940345) and Waddington (990630), whose archaic footprints were clumsy survivals from 1923 copperplates. In East Anglia several ‘aerodrome by-passes’ were indicated on reprints, most visibly at Marham (\textit{figure 5G}), Sculthorpe (125 (1951), 860315) and Lakenheath (135 (1952), 740910). Additionally, at least half a dozen minor road severances were mapped, mainly on sheets 136 and 137 covering large expanses of Norfolk and Suffolk. At Beccles (\textit{figure 5H}) a severed B-road was eye-catchingly overprinted \textit{AIRFIELD} (1953), this all-capitals label being unique not only to the New Popular series but also to the entire aeronautical history of the regular one-inch map.\textsuperscript{43}

As regards provincial civil airfields, scarcely half a dozen were showcased on the New Popular series. Atypically, sheet 156 (1946) included (Filton) \textit{Aerodrome} (600805), presumably an accidental ‘left over’ from Popular/Fifth mapping. \textit{Luton Municipal Airport} (120205) made its début on sheet 160 (1949) but never appeared on overlapping sheet 147 (which was not corrected after 1947). Civic airports in Wales, the West Country, Midlands and Eastern Counties were excluded \textit{en masse}, the chief absentee being Birmingham (Elmdon). In the Industrial North just three pre-war airports were added: Liverpool (Speke), Manchester (Ringway) and Leeds-Bradford (Yeadon): \textit{Manchester Airport} (\textit{figure 5J}) was given an improvised ‘farm-size’ label, perhaps to satisfy map-user complaints.

Overall, the New Popular marked just 85 airfields, 45 in explicit language (including 15 with locality names) and 40 by various degrees of cryptic landscape modification.\textsuperscript{44} Significantly, by the time of the final printings the neologisms ‘Airport’ and ‘Airfield’ together came close to outnumbering ‘Aerodrome’. In covering England and Wales the New Popular naturally contributed the vast bulk (90\%) of national airfield depictions in the ‘pre-Seventh’ decades, but the UK’s other geographical constituents were not barren and thus merit commensurate reviews for their aeronautical nuances and enigmas.

\textsuperscript{42} This writer suspects that the reviser may have seen Tarrant Rushton on a list of civil aerodromes (many of which had reserve defence roles).

\textsuperscript{43} The only other use of all-capitals for aviation at one-inch scale are those on the London Passenger Transport Map series (1934) and at \textit{GATWICK AIRPORT STA} on the final printings of sheet 170 (1957) and 182 (1959) which, though standard for railway stations, suggested civil flying nearby.

\textsuperscript{44} ‘Cryptic modification’ in this study means those indirect effects such as the downgrading of roads and blanking out of normal landscape texture.
Figure 6: Airfields on Scotland Popular Edition maps
6A upper left: Leuchars, Fife: sheet 64 (square 12E) (1928)
6B upper right: Perth (Scone), Perthshire: sheet 64 (square 2C) (1938)
6C left: Sollas, Harris: sheet 22 (NF 815760) (1947)

Figure 7: Airfields on Northern Ireland Popular Edition maps
7A left: Aldergrove, County Antrim: sheet 7 (squares 2-3D) (1937)
7B centre: Newtonards, County Down: sheet 7 (square 13F) (1937)
7C right: Sydenham, Belfast: sheet 7 (squares 9-10E) (1937)
The Scotland Popular Edition

The first sheets of the Scotland Popular Edition, with their potential to depict aviation ‘north of the Border’, were issued in 1924, and some were still current as late as 1961. Just five survivors from WW1 were explicitly marked, namely Leuchars (64 (1928), 12E), Donibristle (68 (1928), 2F-3G) and Turnhouse (68 (1928), 2K-3K, also 74 (1934), 1D-2D) on the military side, and Renfrew (72 (1925), 11F) and Macmerry (74 (1934), 10D) which provided civil air links to the two premier cities. In addition, seaplane sheds at Dundee (64 (1926), 11B) and a rail spur at East Fortune ex-airship station (74 (1927), 14B) could be discerned with local or air-historical knowledge. In the strange case of Leuchars (figure 6A) the label Aerodrome (Wireless Tel Sta) appeared to have been ‘scraped’ of a prefix (possibly ‘RAF’), and on the 1938 reprint the wireless reference was also erased, leaving only the core generic description Aerodrome intact. Ab initio civil airfields were similarly few and slow to appear, the two inter-war exceptions being Inverness (37, 13A) and Perth (figure 6B). Due to Scotland’s paucity of pioneer flying grounds and its generally lagging OS map publication, sui generis airfield descriptions were practically non-existent throughout, this being yet another symptom of the national south-north divide in aeronautical detail.

To integrate Scottish mapping with the New Popular, the national 1-kilometre grid was superimposed from 1945. Despite the elegant cartography, scarcely any ‘road and other revision’ was carried out; consequently evidence of Scotland’s considerable WW2 airfield expansion was limited to just two civil sites of contrasting size and importance. On the 1951 reprint of sheet 78 (Prestwick) Airport (365265) was shown with buildings (but no runways), while on sheet 22 (1947) a squeezed and easily missed (Sollas) Aerodrome (figure 6C) seemed a curiously random choice among numerous deserving islands.

The Northern Ireland Popular Edition

Aviation developed slowly in Northern Ireland, as did the Ordnance Survey of Northern Ireland (OSNI)’s Popular map. The sole survivor from WW1 was (Aldergrove) Aerodrome, and only two others (both civil) figured on the province’s inter-war map (figure 7). After WW2 a revised sheet 7 (1953)

47 During WW2 Scotland contained 120 active airfields, but barely a dozen (10%) were shown on any pre- or post-conflict one-inch sheet. National Library of Scotland website http//maps.nls.uk/os/one-inch-popular shows most of those cited here.
showed just one additional site, namely (Nutts Corner) Airport (190775). Discounting its trademark hypsometric tinting, arguably OSNI's most distinctive characteristic was the anticipatory labelling of (Belfast Sydenham) as Proposed Site of Aerodrome in 1937 (figure 7C), this being the only reference to a future development seen during the present nationwide study. Finally, in 1953 sheet 7 renamed all three pre-war sites Airfield as if to harmonise with emerging OSGB practice.

Summary and conclusions

By 1950 roughly two-thirds of Britain's (2000-odd) 'ever-listed' airfields were already embedded in the landscape. Yet, of the 1,375 sites created during what may be dubbed aviation's 'piston' age, only 240 (17%) made any discernible mark on OS popular mapping, either in aeronautical language, by footprint traces or as a collateral topographic change. This low 'hit' rate can be largely explained by three underlying factors.

First, for much of the period Britain was either at war or on a war footing, so public mapping of defence-capable installations was perforce restricted. Secondly, faced with a fast-developing transport innovation, the OS map was unavoidably a lagging indicator even without censorship. Thirdly, for a cocktail of cartographic, administrative and financial reasons, popular topographic coverage involved seven distinctively branded series whose patchwork of unsynchronised revisions was ill-equipped to track such a diffuse and capricious activity as aviation.

Regional disparities in the frequency and quality of airfield depiction were manifest in diverse ways, from the pioneer reliance on sui generis labels in southern England, via the mass suppression of large WW2 bases in the eastern counties, to the general omission of civil aerodromes in central and northern areas for several years after 1945. A northward fall-off both in basic coverage and ground detail had rather more to do with national mapping priorities than spatially variable defence imperatives.

While the role-neutral term 'Aerodrome' brought increasing consistency to the map during the 1920s, it also suppressed interesting locational contrasts between military and civil flying. This functional blurring was compounded by the (doubtless intentional) absence of any reference to the RAF (in contrast to several Royal Navy or Admiralty mentions in the early days). Moreover, the failure to deploy the status-qualifier 'disused' left silent footprints as the only

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48 Nutts Corner served as Belfast's main airport until Aldergrove and Sydenham were released from primarily military roles.
49 Inevitably, several historically significant airfields were missed altogether, among them Dagenham (experiments, 1909), Stow Maries (a preserved 'RFC heritage' site), Newmarket Heath (defence-active in both wars and civil-licensed in peacetime), Hounslow Heath and Cricklewood (short-lived proto-airports for London ca.1920), and Langley, Bucks (Hawker's manufacturing aerodrome, 1940s).
50 From 1919 to 1944 the Air Ministry had responsibility for both military and civil aviation, a fact that may explain the OS's ready acceptance of 'Aerodrome' as a unitary category on its standard public-sale map.
cartographic evidence of abandonment.\textsuperscript{51} Compared with the nation’s mature railway network, the adolescent infrastructure of aviation was not well represented at popular map scale.

On the positive side, there was a brief ‘golden phase’ (1925-34) when the great majority of active aerodromes were shown, thus providing a benchmark for gauging earlier and later mapping outcomes. In retrospect, the inter-war practice of interpolating aerodrome curtilages has facilitated the calculation of land-take, and certain sheets are now valued as primary sources for pinpointing ‘forgotten’ (and disputed) sites.\textsuperscript{52} Given the tense international climate of the period, posterity should perhaps be thankful that so much about British aviation was conveyed on a publicly-sold topographical map.

The appendix lists almost thirty descriptive variants garnered by this investigation. Noteworthy are the overwhelming long-term dominance of ‘Aerodrome’ (80\%), the array of early \textit{sui generis} categories, the presence of only two institutional titles, and the late appearances of the two modern generic rivals. Also germane (though not tabulated here), are the findings that only twenty sites bore locality names and just four (out of 475) WW2 paved runway layouts were shown by the time the New Popular bowed out.

Finally, from a wider academic perspective, it is not wholly surprising that a definitive historical geography of British aviation has yet to be written. Potential authors could well have been deterred by the weight of omissions and anomalies, while OS surveyors and cartographers might conceivably have fared better with a scholarly memoir to hand.\textsuperscript{53} Before embarking on this empirical exercise the writer had not appreciated just how broad was the lexicon of airfield description, or how helpful his prior knowledge of site locations and histories would prove to be.

As to the future, at least three tangential studies suggest themselves:

(1) a stratified sample analysis of OS ‘job files’ to ascertain how internal instructions and guidelines determined \textit{de facto} outcomes;

\textsuperscript{51} Up to 1939 Britain had no hard runways, so defunct airfields were not major disfigurements to the landscape. Immediately after 1945 only \textit{active} civil aerodromes were normally shown, the great concrete legacy of WW2 air-bases was under Cold War review, and with a new one-inch series in prospect it hardly seemed worthwhile correcting every sheet in depth.

\textsuperscript{52} An exercise by the writer for 1935 found 30,760 acres (12,450 ha) under airfields. Regrettably, after 1945 curtilages were rarely marked on one-inch sheets, making runway-and-camp layouts and amorphous security blanks the best visual guides to individual and aggregate land-take. Further examples of ‘lost’ airfields enshrined on Popular Edition sheets are Coal Aston near Sheffield (45 (1923), 13A) and Romford Maylands in south Essex (107 (1934), 10F).

\textsuperscript{53} Richard Oliver’s observation that ‘the study of the subject would be much facilitated were there a convenient hand-list of opening, closing, “mothballing” etc. dates’ (\textit{OS New Popular map}, 20) remains valid despite the burgeoning air-historical literature of recent decades. See also notes on airfields in Richard Oliver, \textit{Ordnance Survey Maps: a concise guide for historians}, third edition, London, Charles Close Society, 2013, 82.
(2) a comparative study of airfield images and descriptions on larger- and smaller-scale OS series;\textsuperscript{54} and
(3) a review of OS-based thematic maps to gain deeper insights into airfield site selection and development.\textsuperscript{55}

As a longer-term prospect, airfield depiction practice by comparable foreign topographic mapping agencies could also prove illuminating.\textsuperscript{56}

Meanwhile, a follow-up essay dealing with UK airfield depiction during the ‘jet age’ (covered by the one-inch Seventh and 1:50,000 Landranger series) is in preparation. The writer’s two-part effort, combined with those proposed additional perspectives, could form the foundation of a bigger ‘Mapping the Airfield’ project under CCS auspices.

Critical comment on progress so far will be much appreciated.

\textbf{Acknowledgements}

Special thanks are due to Richard Oliver for providing access to his personal map collection and helping shape this essay. The author is also grateful for the support of Christopher Board, John Cole, Roger Hellyer, Chris Higley, Yolande Hodson, Rob Wheeler and the map curators of the Bodleian Library, Oxford, Cambridge University Library, Nottingham University Geography Department, and the Royal Geographical Society (with IBG).

\textit{About the author:}

Dr. Ron Blake is a retired chartered town planner with early local government experience in East Anglia and subsequent lectureships at Manchester and Nottingham-Trent universities. His academic research and publications have focused on land requirements for aviation, the long-term imprint of airfield engineering on the countryside and policies for the conversion of associated buildings to novel purposes including their protection as part of the nation's defence and transport heritage.

\textsuperscript{54} For methodology and ideas see Roger Hellyer, \textit{Ordnance Survey 1:25,000 First Series}, 58-9, 72, and RC Wheeler, ‘The depiction of RAF stations on the Provisional (National Grid) six-inch’, \textit{Sheetlines} 97 (2013), 46-7. Another ‘adjacent’ scale with potential for aeronautical content assessment is the Half-inch. (Quarter-inch maps tend to employ airfield symbols and are therefore less suited to a ground-cover analysis). Bartholomew and Michelin maps are also worthy of examination in this context.

\textsuperscript{55} Thematic series relevant to airfield geography comprise: geology, soils, water-and contour, land utilization, town and country planning, archaeology and local; administrative areas.

\textsuperscript{56} Comparisons with French, German, Italian, Spanish and USA topographical maps would be of especial interest.
## Appendix

<table>
<thead>
<tr>
<th>UK airfields 1911-1952: generic descriptions found on OS one-inch maps</th>
<th>Year of first usage</th>
<th>Number of airfields mapped thus</th>
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<tbody>
<tr>
<td>Aeroplane Works &amp; Garage</td>
<td>1911</td>
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<tr>
<td>Seaplane Station</td>
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Note: The sum total of 190 descriptions is slightly more than the number of sites examined due to several double- and re-descriptions during the review period.
Confrontation at Latterwood

I discovered these letters the other day in the Gloucestershire Archives and thought they would interest readers of *Sheetlines*. I have cut out some of the Victorian verbosity! Colonel Kingscote was significant ‘landed gentry’.

31 Jan 1826, Lower Cam, near Dursley

… it may be necessary to premise that I and my brother are engaged on the Ordnance Trigonometrical Survey, under the immediate orders of Lt. Col. Colby of the Royal Engineers…..

My brother in pursuit of his official duties was on Saturday last surveying the High Road near Latterwood Turnpike, when he met with Mr Kingscote, who in a most haughty tone of voice demanded, ‘What are you measuring this road for?’

My brother, not conceiving that a question could be put to him in such a manner, and not choosing to answer it, had it been so, observed, ‘I presume you do not speak to me’. ‘No I don’t, I speak to your chain man there – and you – why don’t you answer when you are spoken to!’ My brother replied ‘If you sir had addressed me as a gentleman, I should have answered’.

Here Mr Kingscote made use of language which I do not choose to repeat, but which I certainly cannot but think highly unbecoming – concluded by raising his gun and swearing that he would knock him down. My brother demanded his name and upon Mr Kingscote giving it, observed, ‘I thought so – concluding that no one but a man of consideration in the county would act in such a manner’. Mr Kingscote then repeated the offensive language and again concluded by rushing towards him, raising the butt end of his gun and swearing that he would instantly beat his brains out if he said a word!

My brother now seeing his personal safety perfectly at the disposal of an armed and enraged man, immediately ordered his chain man to proceed whilst Mr Kingscote still continued threatening and observed that he only wished to know who and what he was. ….

I call upon you as a gentleman for that redress, which is in your power to procure …. and should I fail in procuring a satisfactory result, I shall feel myself compelled to resort to other means of redress ….

Your obedient servant, J Robinson Wright

2 Feb 1826, Kingscote

I am favoured with your letter and am extremely sorry to learn that any altercation has arisen between my nephew and your brother. … It appears that Mr Wright and his servant had been on my land and Mr Kingscote was therefore authorized to enquire what business they were upon and indeed to demand his name. … The principal witness states that the first enquiry was made in a civil manner to your brother’s chain man and the words were, ‘Pray my man where are you measuring this road from?’ Or to that effect.

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1 Letters between Colonel Robert Kingscote and JR Wright of O.S, D471/C9 Gloucestershire Archives.
After repeating it *three* times he angrily asked him why he did not reply. He then referred him to your brother. Mr Kingscote addressed him by saying ‘Pray sir, who are you measuring this road for?’ and the witness declares in a civil and quiet manner....repeated a second and a third time ..... when Mr Kingscote certainly became irritated at the incivility he met with, but that he ever changed the position of his gun from that it was originally in at their meeting, or threatened to use it in any way as your letter specifies he as well as the witness positively denies.

That much was said in the heat of passion I doubt not and have no hesitation in saying my nephew regrets it as he has no wish ‘to injure either the character or feelings of your brother’... I am sorry it should have occasioned you so much trouble.

Your obedient humble servant,  *R Kingscote.*

2 Feb 1826, Lower Cam, Dursley

I am favoured with your reply and am perfectly satisfied with your explanation, but you must allow me to observe that my former statement was correct, ... I am unwilling however to press this unpleasant subject further but I cannot avoid stating that with regard to the manner in which Mr Kingscote asked my brother his name, you appear to be entirely misinformed.

... I am disposed to make every allowance for expressions used in the heat of passion and as you have expressed Mr Kingscote’s regrets for the circumstances I shall not pursue the unpleasant matter any further.

Your obedient servant, *J Robinson Wright*

Roger Carnt

Extract from 1:25,000 Provisional sheet ST89 published 1951, taken from NLS website, with thanks.

Kingscote Park is in the south and Latterwood is at NE corner; the turnpike gate was at the adjacent road junction.
Great instrument station

On page 13 of *Sheetlines 98* there appears an extract from a Bartholomew 1:126,720 which includes ‘Grt. Instt. Sta.’ on Ben Hutig. This is indeed unusual, but it is not unique, as ‘Dunnose Gt. Inst.’ was added to the plate of 1:63,360 New Series sheet 345 before publication in 1876, and remained there through the various versions of the Revised New Series and the Third Edition (including Large Sheet Series sheet 145). It was removed when the plate was reworked in preparation for the Popular Edition.

Whereas the original New Series usually derives directly from the parent 1:10,560 and 1:2500 mapping, ‘Dunnose Gt. Inst.’ is unique to the 1:63,360, and therefore indicates a positive editorial intervention. By whom? Was it Sir Henry James, who retired from the direction of the Survey shortly before sheet 345 was published? It may be significant that Ben Hutig, Dunnose, Hensbarrow and Saxavord were used for the determination of meridional distances in the primary triangulation; by the time that the derived 1:63,360 mapping of the last two was in preparation, in the 1880s, James was in his grave.¹


Richard Oliver

John Cole adds a further comment to the photograph of revision point 91A at Exeter Central station, which appeared in *Sheetlines 98* (reproduced here).

He points out that the nasty black cloud at the top left is in fact a security deletion – hidden behind the cloud is Exeter Gaol.

¹ H James, *Account of the… Principal Triangulation…*, London [HMSO], 1858, 496-508. The presence of the station at Ben Hutig and the absence of that at Dunnose from Bartholomew 1:126,720 mapping probably says more about Bartholomew’s compiling and editing than it does about the OS’s.
National Library of Scotland is pleased to announce that the OS six-inch to the mile County Series mapping of England and Wales is now available on our website. Our map digitisation work is now all externally funded, and this has led to a prioritisation of areas beyond Scotland in recent years.

We are using our standard Find by Place viewer http://maps.nls.uk/geo/find, allowing searching through a gazetteer of placenames, street names, postcodes and grid references, as well as by zooming-in on an area of interest with smaller-scale locational mapping. The six-inch sheet lines are clearly displayed forming a clickable index to the maps. We also plan to geo-reference layers of the mapping and make seamless mosaics available soon.

View the maps at: http://maps.nls.uk/os/6inch-england-and-wales/index.html

*top:* Plymouth, with conspicuous security deletion of naval dockyards. From OS six-inch Devon CXXIII.SE, revised 1892-3, published 1896.

*bottom:* Central London: St James’s Park, the Houses of Parliament and River Thames. From OS six-inch Surrey III.NW, revised 1893-5, published 1898.

Chris Fleet
The military map of the United Kingdom and its impact on Ordnance Survey mapping

Peter Collier

Introduction
In Seymour's *A History of the Ordnance Survey*, the chapter discussing the Dorington Committee mentions in passing that a committee of the War Office sat to consider the need for a military map of the United Kingdom.¹ Later, in the chapter covering the period 1894-1913, it states "Early in 1897 sanction was received from the Treasury for the publication of the experimental one-inch map in colour, which had been produced for the War Office, and which embodied revision lately carried out for the one-inch engraved map".² What is not made explicit is that the committee mentioned on page 188 produced recommendations for significant changes in the design of a one-inch map for the Army, and that these account for most of the changes between the New Series with hills edition and the Third Series Ordnance Survey maps authorised in 1897. While it is generally recognised that the one-inch map was originally produced to meet the need of the British Army for a map of the United Kingdom, it is less well known that the British Army continued to play an important role in influencing the contents and design of the one-inch maps. The report of the War Office’s committee allows us to get a valuable insight into how the military were to use that influence.

Context
Before considering the work of the War Office committee, it worth considering why the committee was established in the first place. Military concerns about the suitability of Ordnance Survey maps for the needs of the British Army arose fairly soon after the transfer of responsibility for the Ordnance Survey from the Board of Ordnance to the Office of Works in 1870. In 1872 the War Department had requested the production of new one-inch maps as the Cadastral Survey proceeded. New sheets were produced from time to time but were generally found to be unsatisfactory from a military perspective as they contained too much detail of no military importance. By the early 1890s, with increased concerns for the security of country from invasion, the Army believed it needed a new map of the United Kingdom. As is usual in Britain, the response was to set up a committee, although in this case it was not to kick the problem into the long grass, but rather, to come up with a solution. A committee was therefore established following an instruction issued on 22 March 1892 by Lord Stanhope, Secretary for War to take evidence from a range of military personnel, both map makers and map users. The evidence was given either orally or in response to a written questionnaire. The evidence was then collated by the committee and a report with recommendations was published on 21 June 1892. Unfortunately, other than the final report, we have no papers relating to the work of the

² Seymour, page 201.
committee. We do not know how the committee members were chosen, nor how individuals were invited to give evidence. No minutes of the meetings of the committee have been found in the National Archives.

**Medium scale military mapping in the late nineteenth century**

By the late nineteenth century all the nations in Europe were producing a medium scale military map of the home territory. In the United Kingdom this was, of course, the one-inch Ordnance Survey map, which had been on sale to the general public since 1801 (*figure 1*). On the Continent, the equivalent maps had frequently been regarded as secret, and in Russia they remained secret. While the continental maps were at different scales (usually smaller than the one-inch scale), for example 1:80,000 in France (*figure 2*), 1:75,000 in the Habsburg lands (*figure 3*) and 1:100,000 in the German Empire (*figure 4*), they all bore family resemblances. They were all monochrome maps, with relief shown by hachures. Whether printed from engraved copper plates or by zincography, monochrome hachured maps could only display a limited range of features, and this was a particular problem in upland areas where heavy hachuring obscured almost all other detail.

![Figure 1. Part of the First Series sheet of the Aldershot area, hand coloured](image)
Figure 2. Extract of a French 1:80,000 sheet of Briançon (Type 1889)

Figure 3. Extract from Austrian 1:75,000 map of Fiume und Denice, 1915
In France there had been some moves towards the introduction of multi-coloured maps, but this had been limited to North Africa and rejected for metropolitan France due to cost. Instead, the decision was made to enlarge the existing 1:80,000 maps to 1:50,000. As the enlarged sheets would have been too large for printing and handling, each was divided into four for publication. In Germany the 1:100,000 map, which was introduced following unification in 1871, involved taking the larger scale (usually 1:25,000) maps from the constituent states and producing a uniform map covering the whole country. The source maps were usually multi-coloured and contoured, which makes their use for the compilation of a monochrome hachured map difficult to understand. While the maps of the North German Plain are reasonably clear, those of alpine areas are almost illegible.

If the committee had wanted to look to the continent for a model for a new map for the British Army, it would have looked in vain at the staff maps of the major powers in western and central Europe. The only major power that was embarking on something suitable was Russia, but it is not clear how aware the British were of the new maps being produced there.

**The work of the committee**

It is often said that to get the right decision from a committee, you first need to make sure that you get the right people on to it. The committee only had three members, plus a secretary. The chairman was Lieut.-General Sir TD Baker, Quartermaster-General of the British Army. The other members were Major-
General EF Chapman, Director of Military Intelligence, and Sir Charles Wilson, Director-General of the Ordnance Survey. The secretary was Lieut.-Colonel JC Dalton RA, Deputy Assistant Adjutant General. As far as it has been possible to ascertain, General Baker had little knowledge or interest in mapping, and was probably appointed solely because of his organisational responsibility for military mapping. General Chapman would have been responsible for the production of maps within the Intelligence Division of the War Office, but there is no evidence of an active interest in mapping. Large parts of Sir Charles Wilson’s career had been involved with mapping, so in this context he would have been considered the expert on the committee. However, Colonel Dalton was someone who was also interested in mapping. He was on the council of the Royal Geographical Society (RGS) and corresponded with its secretary a number of times on mapping related matters. In particular, he had recommended that the society should follow the example of Petermann’s *Geographische Mitteilungen* in providing a list of sources on the maps they published. Further correspondence dealt with the use of RGS equipment by a serving officer who was to undertake covert mapping in Anatolia. Given what we know about Wilson’s views on what the Army needed (see below), it is likely that Dalton was the decisive influence on the outcome of the committee. Given what we do know about Dalton, it would be useful to know if it was Dalton who chose those who gave evidence to the committee, but the lack of any additional documentation means it unlikely that we will ever know how they were chosen.

The committee took oral evidence from eight officers and written evidence from a further 21 officers and NCOs. The officers were drawn from all levels of command, and all branches of the army. It is not stated how those who gave oral evidence were chosen, but it may have simply been convenience since all were based in south-east England. It is the oral evidence which is most interesting, in part because of who was called to give evidence, but also because they were interviewed and because committee members made comments on their evidence. To understand their views, it is useful to know something of their backgrounds. The most senior, and the first to give oral evidence, was Lieut.-General Goodenough, who was in command of Thames District, and hence had responsibility for the defence of London. Goodenough was an experienced officer who had commanded artillery during the Egyptian campaign of 1882. As an artillery officer he would have appreciated the need for the quality of roads to be shown, but his evidence on this is rather vague. He was followed by Colonel AG Durnford, Commanding Royal Engineer for Southern District of whom little is known.

Lieut.-Colonel Everett, Professor of Military Topography at the Staff College was next. Everett was unusual in being an infantry officer with a deep interest in mapping. Originally commissioned into the Camerons in June 1864, he

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transferred to the Duke of Wellington’s Regiment later that year. In 1870 he was appointed instructor in military drawing at the Royal Military Academy, a post he held until 1878. In 1879 he was on the Turco-Bulgarian Boundary Commission, which was followed by eight years as a Vice-Consul or Consul in Anatolia. During that time he also served on the Turco-Persian Boundary Commission. During his time in Anatolia Everett carried out survey work and is listed as a source on IDWO 1522, Eastern Turkey in Asia. It was following his time in Anatolia that Everett was appointed to the staff college. Subsequently he was to serve in the Intelligence Division, during which time he also worked on various West African boundary commissions. He was therefore one of the most experienced and knowledgeable officers to give evidence.

The next to give evidence was Major Verner, Deputy Assistant Adjutant General for Instruction in the South-Eastern District, about whom little is known other than that his experience had led him to have very firm ideas about what should and should not be shown on maps, particularly if they were to be used by soldiers on horseback.

Colonel Hildyard, who next gave evidence, had originally served in the Royal Navy before becoming an infantry officer. Hildyard had a reputation as an intelligent, efficient and competent officer (he was one of the few officers to emerge from the Second South African War with his reputation enhanced). A year after giving evidence to the committee he was appointed Commandant of the Staff College and was responsible for a number of reforms leading to a more practical course.

The next to give evidence was Colonel Elliot Wood, Assistant Adjutant General for Royal Engineers at Headquarters. Elliot Wood had also served in Egypt in 1882, and also took part in the 1884 Sudan expedition and the campaign of the following year. He was followed by Colonel Grove Assistant Adjutant General at Headquarters. His evidence is useful because of what he has to say about map usage by the Army. When asked to whom maps would be issued following mobilisation, he replied “to all officers and regimental sergeant-majors”, implying that no one below the level of a senior NCO was expected to have map reading skills. The final oral witness was Major MG Talbot RE. Talbot had served in Afghanistan in 1880, when his ability was recognised by Major-General Ross in his report. Talbot was experienced in survey work but also in intelligence. Surprisingly, his evidence is rather thin, although he is emphatic that relief should be shown by contours.

Of the officers providing written evidence, Lieut.-Colonel J Farqharson will be a familiar name to Sheetlines readers. In 1892 he was an Executive Officer in the OS, and was to become DG in 1894. The most senior was General Wolseley, whose answers were very short and to the point. The rest were mainly Lieut.-Colonels or Colonels drawn from various arms, but with one Sergeant, WD Short RE, who was assistant to Major Verner.
What did the committee recommend?
A number those interviewed or supplying written evidence recommended the adoption of two scales for use by the Army, either one-inch or two-inches to one mile for troop movements and six-inches to one mile for fixed positions, such as fortifications. Opinions were divided with regards the contents, although most were agreed that the current one-inch sheets were too cluttered by unnecessary names and features of no military significance. Opinions were very much divided about the portrayal of relief. Many were of the opinion that contours without any additional methods should be adequate if at a close enough interval. However, others wanted hill-shading (although not always referred to as such), while others wanted some form of hachuring. Wolseley’s evidence was interesting in recommending the use of a one-inch grid (although he does not use the word ‘grid’). However, he does not recommend it for referencing purposes, but instead wants it as a way of making easier the estimating of distances. Inevitably, given the range of opinions expressed, the final recommendations of the committee were a compromise.

The committee came down on the side of those wanting a one-inch map, to be issued in two forms. One would be an outline edition, while the other would have hill features of the kind being produced for the ‘with hills’ editions of the New Series. Both versions would be contoured in red with contour numbers being right reading from the bottom of the sheet (not up the slope as is now common practice). The contours would to be extended beyond the neat lines and numbered in the sheet margins. All roads were to be classified into three classes, metalled roads of 14 feet or wider, other metalled roads, and unmetalled roads. Footpaths were to be shown as a dotted line. Railways should distinguish between double and single line tracks, and cuttings and embankments should be shown more clearly. The recommendations also called for greater clarity in the depiction of bridges and that ferries and fords should be shown by words or abbreviations.

Prominent features, such as windmills and churches should be shown, with churches being shown in different symbols depending on whether they had a tower, a steeple, or neither, but that their names should be excluded. Public houses were also to be shown. The depiction of woodland should distinguish between deciduous and non-deciduous by convention signs. Marshes and bogs were to be shown and the symbol for heather should be changed to make it more easily distinguishable from that for marsh. Rivers over 15 feet wide were to be shown as a double line. It is clear from these recommendations the committee’s main concern was that the map should show communications, points to aid orientation and navigation and barriers to cross-country movements.

The committee also wanted altitudes to be marked on hill tops, and spot heights of roads so that ascents and descents could more easily be determined, an important factor when all road transport was horse-drawn. On the colour edition some additional feature, such as forges, wells and post offices were to be show and woodland shown in green. On colour versions the metalled roads were to be distinguished by the use of a burnt sienna fill.
The committee also recommended the introduction of a grid, not for the reason advanced by Wolseley, but as an aid for finding locations on the map. This was to be facilitated by having letters and numbers in the sheet margins. It is interesting to note that John Ardagh, while working for military intelligence in India, was independently coming to the conclusion that a reference grid was needed (he was finding it difficult to locate places mentioned only by name in telegrams from Burma).

**The outcome**

Following the publication of the committee’s report the Treasury gave permission for the trial production of a one-inch map in colour. The first map to be identified as resulting from the committee’s report was the one produced for Autumn Manoeuvres of the Aldershot Division in 1893. The map (IDWO 971) is of the downs north-west of Lambourn. However, the map differs from the recommendations in a number of ways. Firstly, it is at two inches to one mile, not one-inch as recommended by the committee. The map also differs from the recommendations in its treatment of contours. Instead of the red lines recommended by the committee, they are shown as broken black lines, alternating dots and pecks, with the contour values shown above the line, not breaking it. The lines are also not carried beyond the neat line and there are no contour values in the margin. The relief is also shown in colour, using the same method as on the ‘with hills’ editions of New Series maps. Roads are classified, but as first, second, third and fourth class, not by width and metalling. However, first and second class roads do have a fill in ochre. A blue fill has been provided for the Kennet and Avon canal, but it was applied by hand. There is a communication line shown as a double pecked line, but as no key was included it is unclear whether this is a track or an unfenced unmetalled road. Smithies are marked, as are springs, well and pumps with ‘s’, ‘w’ or ‘p’ respectively. The map also includes a north point and magnetic declination and the reference system that the committee recommended. Only one colour version of this map is known to exist (British Library Catalogue R.U.S.I. A2.21), the monochrome one referred to in Jewitt is a later copy since transferred to the British Library from the MCE superseded collection and catalogued as MOD IDWO 971.

The first map that more fully complied with the recommendations of the committee was the Cannock Chase map produced for the 1894 manoeuvres (IDWO 1030; fig 5). Although even this map is not at the recommended scale as it is two inches to one mile. Copies of this map are quite rare. Jewitt identified a copy in the British Library (5110.9), but none in the MCE superseded collection. In addition to the poor copy illustrated here, the only other known copy is in the Staffordshire County Record Office.

Following the Dorington Report, the Treasury refused to fund production of a colour map by the Ordnance Survey for use by the public, but as it had approved

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production of the military map, so the Ordnance Survey was already producing a coloured map when, in 1897, the Treasury finally gave permission for production of a coloured map for sale to the public. It was therefore a logical step for the Ordnance Survey to accept the military specification for what became the Third Edition one-inch map.

Curiously, the one person who seemed not to agree with the recommendations was Charles Wilson who, later in 1892, wrote to Douglas Freshfield, then secretary to the Royal Geographical Society ‘I do not think.... the days of uncontoured maps and black and while hachuring are numbered. It is well known to experts that, for very obvious reasons, every country in Europe has and always must have its map in black and white corresponding to the British one-inch map’. He then cites the German 1:100,000 map as an example of European practice. The fact that Wilson sent the letter to Freshfield on 20 October, when the report came out in June shows that Wilson was clearly at odds with the

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6 CW Wilson, Letter to Freshfield, dated 20 October 1892, in RGS Archives.
recommendations of the committee on which he sat. He seems to have been unaware that the French had wanted to adopt a colour map and had only been stopped by the lack of money, or that the Russians had started to produce coloured maps for military use. He seems to have been obsessed by the example of Germany, where the General Staff was taking the contoured and coloured 1:25,000 maps being produced by the individual German states, and from them producing a hachured black and white map. What modern observers would regard as a very retrograde product from Germany, Wilson was advancing as the ideal. Fortunately, the more farsighted members of the committee must have paid little attention to his advice. My own belief is that the report was largely the work of Dalton, who knew well in advance exactly what he wanted.

**Longer term implications**

Although the new Third Series derived from the military map was considered a great improvement on the Old and New Series one-inch maps, both the Army and Charles Close, when he became Director-General of the Ordnance Survey, were not happy with the maps. The relief portrayal was regarded as inadequate, as was the road classification. This resulted in the decision to develop what became the ‘Popular’ edition, which was adopted in 1912. This map was available in two versions, with or without the addition of hachures. The design of this series was to influence the design of the military mapping being prepared for the anticipated war in Europe, particularly the 1:100,000 maps of Belgium, which are very clear and devoid of the kind of visual clutter that characterised much of the previous mapping. All subsequent British mapping of the Western Front followed a similar design, and because Britain was to be a major map producer during the First and Second World Wars, the design of its mapping was to have a major impact on the design of allied countries’ military mapping. This impact was to continue with post Second World War mapping with NATO’s adoption of STANAGs. In addition, through the Colonial Survey Committee and the involvement of British military surveyors in colonial territories, the ideas about map design were spread throughout the British Empire. The half-inch maps produced for the Orange River Colony were probably the first colonial maps produced along the lines recommended by the committee. It is interesting to note the Survey of India maps went through a complete redesign at much the same time, but whether this was directly linked to the work of the committee is still to be explored.

*About the author:*

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The mystery traveller
Anne Taylor

In the last issue of *Sheetlines*¹ I described a recent acquisition by the Archive – four six-inch County Series sheets of three discrete areas in the vicinity of Plymouth, printed in 1941, 1944 or 1945 with (mostly) blue stencilled and hand drawn annotations with the word ‘TRAVELLER’ in blue at the top.²

The purpose of these maps was a bit of a mystery and so I asked if anyone could provide more information. I am very grateful for the replies I received.

**David Andrews wrote:**

‘I haven’t come across an example of the one you have shown in your article, but the term *Traveller* was a generic one used by OS to record the progress of a particular task on a base map. The type I have seen in the past were used to record the progress of the resurvey or revision of areas by local field survey sections. I used them on the following:

- 1:1250 resurveys of Stalybridge, Ashton-under-Lyne, Douglas IOM, Scarborough, Stockton-on-Tees, Barnard Castle
- 1:2500 revisions of Lake District, North and East Yorkshire, Mid Wales
- 1:10,000 resurvey of Mid Wales.

The grid of a one-inch base map was coloured in as shown (left) and sent between the local field section and the Region Office as a record of the survey work on an individual plan basis, either quarter km for 1:1250 surveys or km squares for 1:2500 surveys.’

Since our maps do not have any of this colouring David added:

‘The marking on your Traveller suggests to me that it was used, not for progress of survey or revision as such, but maybe for a levelling task or similar.’

**In addition, Michael Hyde wrote:**

‘My thoughts went immediately back to the second world war and the post-war years when you mentioned 1941, 1944 and 1945. 1941 was the time of the blitz in Plymouth which devastated the city. However the local story confirmed by the authorities was that the city fathers were planning the rebirth of the city even as bombs fell. Pre-war the city consisted of rows of tightly knit terraced housing, many back-to-back. Whilst the plan was to completely demolish what Hitler had not done and rebuild a stunning new city centre, the city needed new housing on

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¹ News from the archives, *Sheetlines* 98, 3-4.
² Classmark CCS_OS_L130, see the full catalogue records at https://tinyurl.com/q2je6y8
a large scale. Trapped between two large rivers the only way to expand was inland. Before the war the city boundary was just south of the lower edge of your map but it has since moved miles further out with major housing estates and factory premises. So when I saw the coloured lines I wondered if these were a number of proposals for a new city boundary?

Alternatively the Crownhill area on the map was an important military base, so are the lines related to the Services?

Finally, there was always talk of invasion and plans were drawn up to defend the city to the last – were these lines anything to do with defensive lines?

All three suggestions will probably turn out to be well wide of the truth. I cannot advise on ‘Traveller’. However, thank you for an opportunity to look over old pictures and recall life as a young Plymouthian in the 1940s.’

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**Another party poser**

In ‘A survey party poser’ (Sheetlines 75,26) Richard Oliver attempted to identify the location of an illustration from The National Plans.1 Pictured was a group of soldiers on large scale work in Exmouth, Devon being detailed by the corporal in charge. Richard Porter (Sheetlines 78,43) went further by identifying positively three of the men and possibly a fourth. He also posed a question about the nature of the reversed stripe on Jock Stewart's tunic. In fact I believe this to be a 'good conduct' award.

Here is a further photograph dating from the 1930s for which I can supply no information other than that the sketching cases shown were still in use for Land Registry casework surveys undertaken by Ordnance Survey into the 1980s, old County Series traces or paper copies being held at local offices for such work, if no National Grid plan had been published (most had by 1980).

Whilst a Lance-corporal of the Royal Engineers is in charge of the instruction, the man on the right appears to be part army, part civilian, going by his boots or puttees.

*John Cole*

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In the latest of his useful contributions on military matters, Mike Nolan asks why it is that a blue grid is used on the OS 1:50,000 (military series M.726). The short answer is: ‘cartographic design and economy in printing’.

There are two considerations in the ‘gridding’ of a map: one is the functional one, of ensuring that the grid or reference system is easily legible; the other is the economic one, of ensuring economy in printing. If a series functions either as a wholly civil or as a wholly military one, or – like the OS 1:50,000 – as a joint civil-military series, then design is much easier than if one basic series is issued in separate civil and military versions. This can be demonstrated by briefly considering the development of the ‘one-inch family’ – 1:63,360 and 1:50,000 – civil and military map series in Great Britain between the 1910s and the 1980s.

When Colonel Close began redesigning the 1:63,360 map in 1912 there was apparently no thought of producing separate civil and military versions, and what emerged as the ‘Popular Edition’ in 1918-19 seems to reflect this: the two-inch squaring, on the black ‘outline-and-names’ plate, was designed for military needs, but was available for civil use. However, at the same time the Army adopted the ‘British System’ Cassini ‘Dunnose’ metric grid, and from 1923 the Popular Edition was printed in an alternative version for military use. This military version omitted the squaring and carried the ‘Dunnose’ grid in purple; this striking colour may have been chosen in order that the grid could easily be read against the other, rather strong, colours of the parent map. Although from 1931 there was a wider divergence between civil and military practice, with the military version using a modified colour scheme and now carrying GSGS serial numbers – 3907 for England & Wales, 3908 in Scotland – as well as the Modified British System (MBS) grid, the two versions continued to depend on one basic set of material: evidence of this is sometimes to be seen in the incomplete removal from military printings of the two-inch squaring characteristic of the civil version.

In 1940-44 most of GSGS 3907, and a little of GSGS 3908, were reissued in a ‘Second War Revision' that was designed for military use only. Presumably to facilitate speedy printing, the map was designed to be printed in four colours (pre-war printings had required five to eight printings): the grid lines were in black on the outline-and-names plate, and the grid figures were in blue on the water plate.

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2 This article amounts to a summary only of the development of ‘the military one-inch’: for details see Roger Hellyer & Richard Oliver, *Military maps*, London: Charles Close Society, 2004.
5 From 1943 GSGS 3907 and 3908 were available to civilians, but this does not detract from their being purely military mapping in concept and design.
In 1937-8 the OS began work on remodelling the 1:63,360 map so that the civil version could easily be adapted for military purposes: the ‘New Popular Edition’. As there was expected to be some civilian opposition to a 1km interval grid dominating the map, light rouletted lines were used. These were adequate in open areas, but were not very legible in built-up ones. Evidently this was not to the Army’s liking, as the standard military version of the New Popular, GSGS 4620, had the grid – now the Transverse Mercator National Grid – overprinted in purple.

In 1947-51 there was a further redesign of the one-inch, resulting in the Seventh Series. The civil and military versions used the same basic drawing, but there appear to have been separate sets of plates. At first the civil version was printed in ten colours and had a grey grid: the military version had a black grid, on the ‘outline-and-names’ plate, and was at first printed in eight colours, with blue grid figures, and then in six colours, with red grid figures. From 1961 the civil version was also printed in six colours, and the military version now differed only in addition of the red grid figures and some marginalia, also in red. The blue figures had been on the ‘water-outline’ plate; the red figures were on the ‘first-class roads’ plate.

The basic principle of a minimal modification of the basic civil design for military use was followed when the design of the 1:50,000 map – military version M.726 – was worked out in circa 1968-72. In order to make the map as ‘transparent’ as possible, whilst at the same time economising on printings, the grid was in blue, on the ‘water’ plate: military printings added grid figures on the map face in blue. Thus the choice of colour was a combination of clarity in design and economy in printing. From 1981 the 1:50,000 was produced to what was grandly announced as a joint-civil-military specification, which really amounted to little more than grid figures on the map face – a belated convenience for civil users – and a little additional marginalia. The 1:50,000 therefore came full circle to the original concept of 1912-14 for what became the Popular Edition.

Although the Transverse Mercator National Grid continues to be the standard reference system in Great Britain, a few 1:50,000 sheets have been produced with the Universal Transverse Mercator (UTM) grid for military training purposes. On GSGS 5670, which is based on standard printings of M.726 with blue grid, the UTM grid is overprinted in purple, presumably to provide maximum contrast.

The treatment of the grid on 1:63,360 military mapping of Ireland reflects practice in Great Britain. The series produced for Northern Ireland from 1931 onwards, GSGS 3917, was based on a mixture of civil material, and carried a purple grid, no doubt so as to assimilate its style as closely as possible to GSGS

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6 After abortive experiments in 1972, in 1977 four-colour process printing was adopted for the 1:50,000, with both water and grid on the cyan plate. For the evolution of 1:50,000 design see J.G. Price, ‘A review of design and production factors for the Ordnance Survey 1:50,000 map series’, Cartographic Journal 12 (1975), 22-9.
The wartime all-Ireland, series, GSGS 4136, resembled the Second War Revision in Britain in that it was produced purely for military use and had black grid lines on the ‘outline’ plate and red figures on the ‘roads’ plate. In 1965 GSGS 4136 was replaced by M.723; this was a military version of the Ordnance Survey of Northern Ireland 1:63,360 Third Series, and carried a purple grid, presumably to ensure legibility in conjunction with the hypsometric tinting of the parent map. This in turn was replaced from 1979 by a 1:50,000 series, M.728, which resembled M.726 in that blue figures were added to a basic blue grid.

Purple grids or graticules were standard on inter-war 1:253,440 military and aviation mapping, presumably both for legibility against hypsometric tinting and because of dependence on ‘non-gridded’ civil material. In contrast, GSGS 4042, of North-West Europe, which was produced from 1936 for military use only, carried a black grid with blue figures, enabling an ‘integrated’ approach to map design (no layers) and printing (no alternative civil version). Although the ‘Dunnose’ grid continued to be the standard in Britain until 1950-1, sheet 1 of GSGS 4042, which extends across the Channel into south-east England, carries the Nord de Guerre grid throughout. Can anyone explain this?

The accompanying extract (below) shows that the mapping of Britain in GSGS 4042, which reused material drawn on the Delamere meridian, lay at a marked angle to the Nord de Guerre grid.

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7 Five sheets were in a style, including coloured roads and contours, similar to GSGS 3907-8; the remainder were in black, with purple grid.
Some time ago, I came across a couple of things on the internet that set me thinking. The first was about a group of doctors in the Derby area who read all the James Bond books, noting the number of days during which the action occurred and how much he drank, concluding that his love of the bottle would leave him impotent and at death’s door. Matthew Davis set himself the challenge of reading all the Charles Dickens novels in 2012, and someone else decided to watch every available Dr Who episode. When much younger, I knew an old gentleman who read the bible, cover to cover twice a year. Thus, the scene is set. Would I be interested in doing something like that? Not really, I hate anything repetitive, day after day sort of things and am not sure I could force myself. However, for the benefit of our members, I will press on and suggest that we all set ourselves to study every one of our maps. Individually. Open them up. Yes, study each one, which is very different from looking at them. I assume this would be a first amongst CCS members, given that most of us have never actually studied every map we own, even when first acquired, flush with the thrill of finding them. So often, we arrive home, pleased to have got something, tick the list, leave it on the table for a week or so, gloat over it, and then file it away, never to be inspected again, if indeed it was inspected on arrival. Go on, admit it.

Right, on to the practicalities. Firstly, in which order should one look at the maps? This might seem a silly question, but really does need consideration. Looking through endless maps will certainly/might possibly/could in time become boring. Even our own hand-picked treasures. “Come on, I would never buy a boring map” you say. But if you have a few dozen Seventh Series, and study them as intended, it will be become boring. After all, in a general way all maps look the same. Otherwise, seeing one from thirty yards, we would not be able to say “Oh, look, there is a map over there”. And if they all look the same, it will be boring to work your way through them. So, how might one relieve the boredom?

Study randomly? Luckily, this is possible for me. A good chunk of my personal accumulation, is in small boxes of various sorts, the best boxes being those from the greengrocer, having previously contained cooked beetroot. A better size and stronger than shoe boxes. All the boxes have been moved countless times, so they are not in any order, with no obvious place to start looking, except at the top of the nearest pile. Probably as near to random as one will get with minimum effort. The first box contains half-inch layered and hill shaded, with modern six-inch town maps in the box below. Sounds promising. But having looked through forty boxes, one might then have to slog through a near set of Thirds or Populars, which would not be much fun. For those who disagree, I say “Try it”.

Any order in which sets of maps occur, will almost certainly be unwelcome. This is bad news for those lucky members who have their own map room. In such a haven, the owners always have sets, arranged on shelves around the walls and within plan chests, suggesting the obvious, that one starts nearest the door.
and proceeds around the room, following the order on the shelves, one inch, half-inch, quarter-inch, .... But for those who do not have their own well-ordered map room, there is still the problem of deciding whether to go for sets or near sets, followed by individual maps without a series number, or to study flat sheets before folded examples, and within the above, by area, Wales, Ireland, Scotland and England. Maybe all maps of Wales first, whatever the scale and format? Already it seems complicated.

With both the organised and random approaches, sets are a drawback, so maybe we should consider a chronological attack. Chronologically, by date published, or purchased? Looking at maps by the date of publication has attractions, especially once the Ordnance Survey got into their stride with a lot of different scales being issued, rather than just the one-inch and large scales. Added to which, the OS have tended to issue individual maps when ready, rather than take the earliest Popular Edition or 1:50,000 First Series approach and issue blocks or even sets of maps. Once we get going, we would study a couple of one-inch, then a quarter-inch, three half-inch, another one-inch and so on. Of course, we would need to know beforehand what the order would be. This would be easy if one had a complete set of the OS publication reports, giving details of which maps were issued in any given month. One could then work from a marked-up set of reports, or failing that, throw everything on the floor and re-shelve the collection in publication order. A retirement job in itself.

A number of people would find it easier to use the order in which maps were purchased, given that they have a note of where and when they bought each gem, and the price paid. These lucky few could just work through their notes, a ready-made and ordered list. A big advantage of studying maps in the order they were brought home, is that most people seldom buy sets, thereby lowering the boredom possibility considerably.

For many, I am sure that such an exercise might prove rather emotional. Specific maps bring back memories. All of us can look at items in our collection and remember the circumstances in which they were acquired, a holiday or the book shop one always visited on certain business trips. We might remember the joy of finding a specific sheet, followed by sorrow as a whole bunch of others had been bought by the previous customer, most of which we have never seen again. I defy anyone who looks back through their map collection, not to get a little nostalgic. Proceeding chronologically will be similar to a cartographic autobiography, allowing one to re-live the excitement of finding the first map in a green cover, the first white cover or Middle Thames. Many will then remember the slight smugness of later years when they realised that they were more knowledgeable than many who sold maps. And then the barren years, with the frustration of finding so little that actually appealed.

Right, assuming we have decided on an order of study, made preparations for keeping track of our progress and set a start date to begin studying, we must now decide how long is needed to study a map. I would suggest an evening per map, 7.30 to 10.00. However, a year to read Dickens was fine, but who has a mere 365 maps? Even an evening might be insufficient if each map is to be studied,
properly, with no skimping. Why? Because like many of us, I find that if I study an area, I want to know what the situation was before and after the scene in front of me, so I get out another map or two to see the changes. Even of an area one is unfamiliar with it would frequently be impossible to stick rigidly to a single map per evening, as most of us are so easily diverted. Do maps on different scales need different times, with an automatic requirement of two evenings for large scale town plans? Surely an 1890s six-inch of London needs far more time than a 1:50,000 of Norfolk? Or am I being unfair to Norfolk, even ignorant of Norfolk? And what about sheets that are mostly sea? Less time surely?

So, let us agree that one or two evenings per map should be sufficient, and prepare to start at 7.30 prompt. This is the point at which I would probably give up. I find it very hard to look at maps cold, so to speak, and usually need an introduction or a reason for looking. If I open a map to trace the line of a canal, or find a building, I am then drawn into it. Otherwise, a good written or oral introduction is needed to spur me on. Over the years, I have seen various displays, where someone has set out a number of very special maps for inspection. Others bend over and study, bowing before the great paper god, giving homage, in an uncontrollable automatic and natural reaction. I wander round, thinking that many maps do indeed look really interesting, but do not study them. Why? Because I like to be introduced to a map, to be told why it has been taken out and what is special about it, just as we should record for others, details of anything unusual concerning our own maps before we vanish beneath the contours. With maps, I like the guide book approach that I detest with so many other things in life. If a dozen world-class maps lacking captions or a spoken introduction have no interest for me, what chance do I have of working my way through so many far less interesting items? Certainly, the best thing with a map of an unknown area is to be shown around it, to be guided through its features, and here, the Alan Godfrey maps reign supreme, with the CCS map reprints and Brian Harley’s introductions to the David & Charles Old Series a short way behind.

Having suggested it, I believe the whole exercise would be totally pointless, especially if to catch up on maps ignored when purchased. I see no reason why anyone should do more than just glance at a new acquisition before putting it away. How many people read every book they purchase before buying another? No, one should set some unstudied maps aside for a rainy day, reserving something to fit your mood when you fancy sitting down to relax with a map. One would be far better making a list of favourite and outstanding maps to revisit. Either that or read every issue of Sheetlines again. Now, that would be a pleasant challenge.

.. and don’t forget, every issue of Sheetlines can be found at www.CharlesCloseSociety.org/SheetlinesArchive

Previous Kerry musings are at www.CharlesCloseSociety.org/Kerry
Letters

I sometimes wonder if I am alone in feeling disappointment with the standard of presentation of some recent books on cartography. Whilst much effort has been put into the maps themselves, contempt seems to be shown for any reader who has a genuine interest in the contents beyond the desire to browse through the illustrations at the ‘coffee table’ level. Having a lively interest in both maps and railways I have made several attempts to read Mark Ovenden’s *Great railway maps of the world*, but the slender, minuscule pale grey font stretched across whole pages, sometimes superimposed on a strong colour or, worse still, on a patterned background makes me give up almost before I start, and the captions are designed not to be read. Even in Mike Parker’s recent tour-de-force *Mapping the roads*, rightly given such a positive review in *Sheetlines* 98, the captions are too small and faint, and it requires an act of the will to read them. Modesty should forbid me because of my involvement with the series, but in the *Poster-to-Poster* books by Richard Furness for which I have drawn the maps, the text on each page is legible and, unusually by present-day standards, the captions are large and clear. I hope that authors – and readers – of future books celebrating cartography will be better served by their publishers.

Alan Young

John Henry raised the question of the identity of Sandford Fort in his report of the British Library visit. It is not listed in any of my references, but I suspect it is Sandsfoot Castle built by Henry VIIIth as part of his anti-invasion defences in period 1539-43. It was located on the south side of Weymouth Bay to balance Portland on the north and is now mostly lost through marine erosion. See works by Andrew Saunders, who was, according to his Times obituary (26 March 2009), ‘Renowned expert historian of Britain’s coastal defences who rose to be Chief Inspector of Ancient Monuments and Historic Buildings’.

Ken Hollamby

I was posted as a very young surveyor following my basic survey course in Southampton to spend three months on the 1:1250 scale Resurvey of Ashton-under-Lyne and Stalybridge, based in a local office. The address of the office was Ordnance Survey, Government Rehabilitation Centre, Windmill Lane, Denton. How motivating was that for a 17 year old embarking on a career?

David Andrews

I always enjoy reading the reports of CCS visits to places with mapping interest at home and abroad and the Liverpool report by John Henry is no exception. Just one point I must bring up is the statement that the *Titanic* crew was mainly from Liverpool – records show that of the 897 crew members, 714 listed their address as Southampton or nearby, with others from Belfast, London and Liverpool plus a few other places. Of the 685 crew members lost, 538 were registered as from

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1 *Sheetlines* 98, 50.
3 *Sheetlines* 98, 46.
Southampton, which is understandable given that the *Titanic* and her sister ships were planned to be based in the town after the White Star company moved their headquarters from Liverpool in 1910. However, these figures need to be treated with caution as researchers have identified at least 115 crew who had links to Liverpool and it was the practice for men to use their lodging address when signing on, but even so it shows that Southampton suffered the greatest loss, particularly from the stokers, trimmers and firemen who were mostly local to the town and almost all were lost. It is fitting that there are crew memorials to the disaster in Belfast, Liverpool and Southampton.

**Nigel Smith**

Earlier today, I was reminded of the letter from OGS Crawford which Bill Riley found tucked into *Said and Done*¹ when I came across two similar items. The first was a copy of a letter from the late Denis Cullum to John Paddy Browne, and John’s reply. Denis noted that the illustration for the neighbourhood map of Horsham, East Grinstead, Haywards Heath and Crawley, on page 121 of *Map cover art*, ‘is not of High Street, Crawley, but of The Causeway, Horsham, one of the few remaining bits of old Horsham. I passed this house and its lamp this morning on the way to shop.’ The second item was pasted inside the rear cover of some bound Ordnance Survey *Professional Papers*, and was from the *Daily Telegraph*, 7 March 1981. In it, Enoch Powell reviews *A history of the Ordnance Survey*, edited by WA Seymour, together with *A paper landscape* by John Andrews, and tells of his love of OS maps, ending with: ‘That was to be the 1:50,000, which it would be a mistake to suppose that map users like. They have to have it, because they can get no other; but it is an unhappy map, too large for the amount of detail it contains, too much of nothing, too obtrusively emphatic. There will never be anything to touch the one-inch and the six-inch. As long as I walk the roads of England or climb the hills of County Down, they shall be my companions still.’ Perhaps members can offer other finds?

**David Archer**

Visitors to the Olympic Park in east London will find a number of stone markers situated alongside the Jubilee Greenway Walk. The photograph, left, was taken in October 2011 when the Park was still a huge building site, and shows a marker between Pudding Mill Lane and Old Ford Lock on the River Lea, approx. map reference TQ376838. At this point the Greenway runs atop Bazalgette’s Northern Outfall Sewer. My interpretation of the lettering incised on the stone block is ‘9.87 (metres) above ordnance datum’. The figure of 9.87 metres equates well with the 32.6 feet spot height at this point given on 1:1056 London sheet VIII.21 of 1895. Can any reader provide information on these markers? Are they purely ornamental or did they serve some purpose during site construction?

**Chris Bartlett**

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¹ *Sheetlines* 97, 35.
Keith Stevens, *Yorkshire Dales trigpointing walks*, Sigma Leisure, £9.99

This book describes 25 walks in the south-west of the Yorkshire Dales National Park, visiting 39 extant Ordnance Survey pillars from the 62 in the Park. The walks are to one primary pillar, Whernside, built in 1936, 37 secondary pillars built in 1949 and one secondary pillar, Great Knoutberry, built in 1955. Where possible the routes combine a pair of pillars into a circular walk; the walks average 4 to 5 hours.

The book opens with a note about Ordnance Survey, Hotine and the Re-triangulation, and the National Grid. Information is also given about the levelling work that was done in this area. Thus information is given about the less well-known Fundamental Bench Marks, together with the more often encountered flush brackets and cut-marks. The Ribblesdale FBM is visited on one walk, perched in an unlikely position on the limestone pavement 100 metres above Selside, whilst the Skipton FBM, seemingly forgotten within a neat set of railings, is on the outskirts of that town.

The author must have gone round these walks with a GPS, since the description provides (two letter plus) 10-figure grid references for each trig point and 8-figure grid references for the waypoints that define the routes. There is also information and grid references for the (surprisingly large) number of benchmarks, mainly cut-marks, that the author has been able to identify on each route. Included is one rare protruding bracket benchmark on Horton church.

For each route there is a map, a profile and a list of waypoints, and for each trig point, a photograph, a table of pillar details, together with a star diagram giving bearings and distances to other pillars in view. Photographs of other features of interest are given when space permits. Overall, a useful summary of information in a pleasing package at a modest price.

Peter Haigh

Anne Armitage & Laura Beresford, *Mapping the New World: renaissance maps from the American Museum in Britain*, Scala, £19.95

Whilst possibly not relevant to the study of Ordnance Survey, this book earns a place on a map-lover’s bookshelf by virtue of the copious colourful illustrations and scholarly descriptions of early maps and mariners’ charts. Of particular interest to British eyes are several maps that include these islands, such as Vesconte’s 1320 *World map*, showing recognisable Anglia, Scotia and Hibernia; *Map of the British Isles from Ptolemy’s Geographia*, printed in Florence in 1480, with Scotland jutting out to the east from the northern end of England; and Mercator’s *A description of Northern lands*, published posthumously in 1595, which features the Shetland islands in an inset roundel. Map study apart, the joy of this book comes from the many pictures of explorers and cannibals, sailing vessels and grotesque sea monsters, swirling gusts of wind and ornate compass roses which adorn early maps and are lovingly reproduced here.

John Davies