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As discussed at the 2018 AGM, recent Data Protection legislation has impacted the way the Society collects, stores and uses members’ names and addresses. The most obvious change is that it is no longer feasible to publish the Almanack, which has traditionally been distributed with August Sheetlines. We will also no longer publish the addresses of new members in the ‘welcome’ section inside the back cover of Sheetlines.

Our Privacy and Data Protection Policy, adopted at the time of the AGM is published online at www.charlesclosesociety.org/privacy

As a result of the demise of the Almanack, the formal Minutes of the AGM and the 2016-17 Accounts will be published in the Index, distributed with December Sheetlines. The names of the Officers and Committee members is published inside the rear cover of this issue.

Our preferred means of communication with members, by which we can keep you advised of news of latest developments, meetings and so on, is the Society email list. Again, Data Protection has influenced how we manage this list. A ‘check’ email was sent to everyone currently on the list at the end of July. If you did not receive this and wish to be included, please contact the Membership Secretary (details opposite). Similarly, if you did receive it and wish to be deleted, let us know.

The Society is keen to find ways of widening our appeal and reaching a new generation of map lovers. One obvious way forward is through Social Media and we now need someone with experience and enthusiasm in its use to develop and manage a CCS online presence to complement our ‘traditional’ website. We urge anyone interested to contact the Chairman as soon as possible and let’s get going!

The 2019 AGM will be on Saturday 11 May in Alnwick. As this will be a long-distance trip for many members, it is proposed to offer additional attractions to make the journey worthwhile and provide interest for partners. Possibilities include an out-of-hours visit to the National Trust reserve on the Farne Islands, late on the Friday night and a guided tour of Alnwick’s historic centre. To register an interest in these options and possible co-ordination of transport from Alnmouth station, please contact Bernard Anderson (details opposite).

The online Map Covers collection continues to grow; this a long-term project with over 1700 examples currently illustrated and many more in preparation to be added in the coming weeks. View them at www.charlesclosesociety.org and follow the links.
Visits and meetings

Recent activities have included a ‘show-and-tell’ event at Redbourn, Herts in March (top) organised by David and Caroline Watt, featuring ‘the third dimension’; how relief has been portrayed on maps.

In April a ‘walks and talks’ weekend was held at Shap Wells hotel (centre) and in June the Society visited the County records office at Durham (bottom) to view a specially-prepared exhibition of historic maps of the county (see page 17).

Future events include Bill Henwood’s talk on the Contoured map of the Thames Basin on 12 September at 7.30pm at Wall, Staffs (see page 45), another Redbourn show-and-tell, this time featuring railways and airfields on 15 September (to book contact david-watt@outlook.com) and Karen Rann’s talk on Schiehallion and Charles Hutton’s contribution to the invention of contours at Cambridge University Library on 13 October at 11am (see page 60).

Photos: Frank Iddiols, Michael Richardson, Ken Hollomby
The new reality of Britain ceasing to be a European country is requiring the development of new world-views and attitudes. Once Britain’s membership of the EU ceases, our trading relationships will need to be re-thought, and commercial links to countries on which we turned our backs in the 1970s will need to be recreated. In parallel we perhaps need to re-examine cartographic relationships that were once important and may once again be so. New Zealand is an obvious example of a country that used to have close commercial and cartographic links to Britain, and thus seems a good place to start. On a recent visit I was able both to use some of its present-day maps, and to examine some of its superseded ones.¹

New Zealand was ‘discovered’ by Captain James Cook in the eighteenth century and established as a British Colony in the nineteenth century. Gold-mining, the timber trade, and subsequently the expansion of farming, all led to British and European immigration and a rapid population growth that continues. The building of towns and settlements, with the associated clearance of native bush and the introduction of non-native plants, animals and birds, led to huge topographic change. Until the 1970s New Zealand considered itself to be very closely linked to Britain and to be a white-European country, however since Britain joined the EU the country has been actively re-evaluating its self-image and place in the world. The substantial Maori component within its society is now recognised and celebrated, while recent immigration has substantially been from many Asian and Pacific countries. As a result, Auckland in particular has become a rapidly-growing multi-cultural city whose trading links are focussed on the countries of the Pacific rim. These, and in particular China, are now the markets for New Zealand’s agricultural produce, and accordingly cattle-raising and dairy farming have substantially expanded while sheep farming has contracted. As a consequence, some marginal farmland has been abandoned and is returning to bush. Accompanying this is a new recognition of the importance and value of New Zealand’s native flora and fauna, with attempts to promote these, and to protect and rescue them from the effects of non-native imports. Biosecurity has thus become a major issue, and the importation of plants and animals is tightly controlled. The importance of maps for the recording, management and exploitation of all these changes is obvious.

The early history of the mapping of New Zealand was similar to that of other British colonies. The coastlines were charted by the Royal Navy and subsequently by the Royal New Zealand Navy, while survey and mapping of the interior became the responsibility of a Department of Lands and Survey. As in other

¹ I would like to thank Charlotte Middendorf and her team for showing us the magnificent topography of the Routeburn Track, Ken McDonald (formerly of the New South Wales survey) for some stimulating discussions about the maps we were using, and my son Paul for providing the excuse for our visit. While each thus made a contribution to this paper, none of them bear any responsibility for its final form.
British colonies, topographic mapping was not this department’s priority. Its primary task was the recording and administration of land-grants by the Crown with the production of cadastral mapping as required for these purposes. Topographic mapping was technically difficult and expensive, and in the absence of any military or other short-term imperative it could not be funded. The Boer War provides an instance of the difficulties that might arise when a military imperative suddenly arose in such a colony, nevertheless throughout Australasia, as in much of Africa, topographic mapping remained a low priority. A geodetic triangulation of New Zealand was begun in 1909, but was not completed until 1949. The first 1:63,360 topographic sheet was not produced until 1937, and it was only after the Second World War, during which both the techniques of, and equipment for, aerial survey were disseminated around the globe, that substantial progress could be made with topographic surveying and mapping. An additional consequence of wartime military experience was that from 1946 a system was adopted of numbering the various Lands & Survey map series as NZMS 1 to (eventually) NZMS 347. This numbering scheme was applied not only to the then current series, but also retrospectively to some older ones. It remains a useful basis for cataloguing and carto-bibliography.

Thereafter three principal phases can be recognised. The first is characterised by the use of imperial units for surveying and is exemplified by the publication of the NZMS 1 one-inch map, eventually completed in 1975. The second phase resulted from decisions in 1969 and 1970 to metricate all NZ Lands and Survey output. From 1977 the flagship publications thus became the NZMS 260 1:50,000 series and the NZMS 262 1:250,000 series. This phase was closed by the reorganisation of what had become ‘the Department of Survey and Land Information’ into ‘Land Information New Zealand’ (LINZ) in 1996, when map production was first ‘rationalised’ and then fully privatised. The NZMS numbering system also stopped. The third and present phase resulted from a decision by LINZ in 2007 once more to bring map production in-house. Accordingly, from 2009 publication of new 1:50,000 and 1:250,000 topographic map series of New Zealand itself and of its Pacific and other dependencies began.

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4 See the lists and notes available at https://gdh.auckland.ac.nz
My personal knowledge of the maps in imperial units is only based on a handful of second-hand sheets. However the first edition of NZMS 1 sheet N168 & N169 Palliser published in June 1953 provides a relatively early example. What is striking about this map is the close similarity of its hand-drawn lettering and the design of its marginalia to the OS practice of the time, while the purple grid looks like a GSGS grid. Nevertheless the symbol set is distinctly different, reflecting the differences in New Zealand topography. For example, there is little need in the UK for a symbol to represent mangroves, which are abundant in parts of the North Island. And indeed the annotation of road bridges with a letter to indicate the material of construction is more akin to Soviet practice. The real peculiarity of this map is in the depiction of relief. Although contours are shown in the table of conventional signs, there are none on the map itself. The only indications of relief are the spot-heights given for each trig point. Otherwise one has to guess the relief from the drainage pattern of the watercourses shown. A later example of this series is the third edition of NZMS 1 sheet S 27 Wairau, published in 1971. The styles of the lettering and marginalia have evolved substantially but are still reminiscent of OS practice. However on this sheet, relief is not only shown by spot-heights and 100 foot contours, emphasised at 500 foot intervals, but also by very beautiful, precise and effective hill-shading based on a north-west light. And while 100-foot contours may seem widely spaced in an English context, they are entirely suited to the very steep gradients and mountainous terrain of New Zealand’s South Island. On this sheet the valley bottoms are at 1,000 feet elevation or below, while the peaks rise above 5,000 feet. Closer contours would have added nothing.

While coverage of the one-inch was still developing, a number of less solidly based maps of tourist areas were also being produced. The first edition of the

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5 However the University of Auckland has developed a Cartographic and Geospatial Resources Repository from which images of successive states of a very large number are downloadable. See https://gdh.auckland.ac.nz Note that the one-inch maps of the north and south islands formed separate sub-series plotted on slightly different projections.

6 However see below.
NZMS 150 1:80,000 *Map of Tongariro National Park* published in September 1958 carries a reliability diagram indicating the source material. While about a third of the map was derived from aerial photographs, only the parts that had additionally been plane-tabled were shown with contours. Well over half the map was derived from ‘original maps not verified by reconnaissance’. Scattered across the map are the sort of comments that might appear on explorers’ maps: ‘fairly flat country scoured by watercourses’, ‘good climbing ground’, ‘shrub and grass country’, ‘good picnic ground’. Relief is shown by hill-shading, drawn with greater apparent confidence in the contoured areas. An inset shows a partly contoured plan of the lower Ruapehu Skiing Grounds (scale 1.4 inches to 500 yards) with a sketched indication of part of the upper ski field. This was manifestly a provisional map compiled from inadequate materials to respond to public demand for some sort of map of a popular National Park containing the only ski resort in the North Island. A somewhat similar map is the NZMS 105 1:100,000 *Map of Marlborough Sounds* (second edition, September 1963). This covers a popular holiday area of sheltered marine waters enclosed by a very complex pattern of peninsulas and islands with many bays and beaches behind which ‘bachs’ have been placed. While the unstated sources for this map seem more uniform (and could perhaps include the admiralty charts), only the vaguest representation of the complex relief of the area is given by hill-shading and occasional spot-heights. These two maps represent the beginnings of an important problem for the New Zealand mapping authorities. The demand at the time for such maps is quite obvious, yet in retrospect they may well have served to accustom a newly-leisured map-using public to second-quality maps with poor relief representation.

The metric NZMS 260 (1:50,000) and 262 (1:250,000) topographic maps produced from 1977 to 1996 (with private-sector issues for a further decade), clearly built on the successes achieved with the one-inch series. They were regarded with sufficient affection by both cartographers and users (two overlapping groups) that in 2011 the New Zealand Cartographic Society published a 100-page commemorative booklet to mark their passing, including articles by different authors documenting their evolution and a definitive list of all map editions and reprints. Conceptually both these series are rather like the familiar Joint Operations Graphic maps, in that they have the legend in the west and south margins, while the map itself comes to a bleeding edge at the north and south margins.
east sides of the sheet. To allow for printing irregularities there is a small (8mm) overlap with the adjacent sheets at the bleeding edges. The sheet-lines of the 1:50,000 series generally conform to a rigid grid plan (with some exceptions at the coasts) and are numbered with a letter to indicate the column and number to indicate the row. In contrast the sheet-lines of the 1:250,000 were staggered to allow efficient coverage of the whole country with minimum wastage of paper. The 1:250,000 sheets are numbered from 1 to 18 (from north to south); there are no overlaps beyond the standard 8mm, except between the northernmost and southernmost sheets and their adjacent ones. Each 1:50,000 sheet covers an area 40 km east-west by 30 km north-south, while the basic 1:250,000 sheet covers 200 km by 150 km, although some sheets are smaller from east to west and others larger, to minimise the total number of sheets required. The 1:50,000 sheets are clear and easy to read. Relief is well shown by 20m contours and precise hill-shading, with scattered spot-heights, mostly at trig points or on hilltops. One feature that I did find surprising is that on the 1:250,000 maps relief was initially only shown by hill-shading. Contours were only added to the hill-shading on editions from the 1990s onwards. The overall style of these maps had moved well away from that of the Ordnance Survey, and there are some clear differences to suit New Zealand’s needs. In particular, rural roads are named, and trig points are differentiated into those beaconed, and those not. Tree cover is divided into native forest, exotic forest, and scrub, with a separate symbol for ‘burnt and fallen bush’. Some features simply reflect the realities of New Zealand geography. On the first edition (1980) of NZMS 260 T24 Palmerston North (1:50,000) there is a printed note beside a gap in the road climbing steeply above the Makairo Stream into the Waewaepa Range: ‘Road closed bridge down’. Throughout New Zealand the rapidly eroding young rocks make road-maintenance and bridge-renewal an unending battle. The bleeding edges of these maps invited their pasting together, and I saw some huge wall maps formed this way. One, made up of sheets of the 1:50,000 map, is in the back room of the bar of the Glenorchy Hotel near the termination of the Routeburn Track. Another, at 1:250,000, is on a wall of the cafe opposite the second-hand bookshop in Omarama.

One marked difference of these maps from Ordnance Survey practice is that local government and other administrative boundaries are not shown. The explanation lies in the original nature of the Lands and Survey Department as a land registry. Thus at the time the above maps were issued, such boundaries were recorded and shown on an entirely different map, the NZMS 261 1:50,000 Cadastral Map. These plans, issued at the same time as the above maps (but on different sheet-lines), show property, local government, and survey-area boundaries plotted onto a minimal topographic base giving little more than trig points and the main roads and rivers. No indication of relief appears, even at trig points.11

11 Comments based on NZMS 261 141 Danseys Pass (1st ed. 1976). At the present time LINZ continues to be the national land registry, but all property surveys are now in electronic form only. For details of present procedures see: https://www.linz.govt.nz
A profusion of tourist and other maps, of various categories and scales, were published alongside the metric topographic maps. It is difficult to generalise about them except to say that they seem to have been simplified (or even dumbed down) derivatives of the main series, with additional tourist information and pictures in text boxes and on the reverses, plus sometimes town plans or enlargements of areas of interest as insets. Some were contoured (such as the 1:75,000 ‘Trackmaps’ of NZMS 335), but some were not. NZMS 336-06 ‘Holidaymaker’ 1:80,000 Lake Taupo has isobaths in the lake, but no contours on the land. One is left with the impression that the ordinary tourist, even one trekking for days through wild country, was not thought capable of reading a full-specification topographic map. Nevertheless they seem to have sold well, as judged by the number of surviving copies.

In very many ways the new ‘NZTopo’ maps published from 2009 onwards represent a fresh start. Such occasions for change can be a good thing, but my impression in this case is that some lessons learned in the production of the older series had been forgotten, perhaps because the personnel formerly concerned had been let go during the period of privatisation. Some important opportunities were also missed.

It must be said that the content of the new maps seems good. Based on my limited sampling of a few areas, they seem to represent the ground well and to be pretty much up to date. I personally dislike the traditional NZ symbol for a single-lane road-bridge (a black line that interrupts the continuity of the road colour), but this is trivial. And while the relief is, as on the previous metric maps, shown with both contours and hill-shading, on the new maps the hill-shading is printed so faintly as to be almost imperceptible. To my mind, to be worthwhile, the hill-shading needs to be much more in-your-face. Nevertheless this too is a minor point. At Turangi (sheet NZTopo50-BH35) we encountered a footpath (shown as a vehicle track on previous editions) on the left bank of the Tongariro.

![Figure 2. Extract from NZTopo50 sheet BH35 Turangi, edition 1.02 (selected change 2016).](image)
River downstream of the Upper Island Pool that is now impassable due to bramble and several years of shrub overgrowth. The former track surface can be followed some considerable distance into the tangle, but no further. This drew to my attention that very slightly separate symbols are defined for ‘vehicle tracks’, ‘foot tracks’, ‘closed tracks’ and ‘poled routes’. The symbol used looked as if the path should have been open, but it is difficult to be certain. A greater distinction between these symbols should be considered. Yet despite these things I found the maps easy to read, to use and to navigate with.

<table>
<thead>
<tr>
<th>ROADS AND TRACKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>State highway</td>
</tr>
<tr>
<td>Four lanes or more</td>
</tr>
<tr>
<td>Two lanes (includes passing lanes)</td>
</tr>
<tr>
<td>Narrow road</td>
</tr>
<tr>
<td>Vehicle track</td>
</tr>
<tr>
<td>Foot track</td>
</tr>
<tr>
<td>Closed track (see warning note below)</td>
</tr>
<tr>
<td>Polled route, track connector</td>
</tr>
<tr>
<td>Sealed</td>
</tr>
<tr>
<td>Metalled</td>
</tr>
<tr>
<td>Unmetalled</td>
</tr>
<tr>
<td>Tunnel, tunnel under road</td>
</tr>
<tr>
<td>Bridge; two lane, one lane</td>
</tr>
<tr>
<td>Ford</td>
</tr>
<tr>
<td>Gate, locked gate, cattlestop</td>
</tr>
<tr>
<td>Footbridge, cableway, walkwire</td>
</tr>
</tbody>
</table>

Figure 3. Extract from the Key to the NZTopo50 maps showing the classification of roads and tracks, and the symbols used for bridges

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12 The status of footpaths and other rights of access in New Zealand is complex and not always certain. See New Zealand Outdoor Access Code (Walking Access Rights and Responsibilities) published by the New Zealand Walking Access Commission (June 2010). Also www.walkingaccess.govt.nz
However, the new NZTopo maps are a standard size, which for the 1:50,000 series covers only 24km east-west by 36km north-south, while the 1:250,00 sheets cover an area exactly matching that of five sheets in each direction, i.e. 25 of the larger-scale sheets in total. These dimensions are substantially smaller than those of the earlier metric series. Furthermore at both scales the sheet-lines form a rigid grid pattern with no overlaps and only a very few adjustments to cope with awkwardly positioned offshore islands. The numbering scheme of the 1:50,000 series uses letters to identify each row, with numbers to identify the position of the sheet within that row. This reverses the scheme used for the earlier metric maps. The small sheet-size means that it takes three passes through the alphabet to identify all the rows, so each row requires a two-letter identifier. The nomenclature is further complicated by a decision not to begin at the beginning of the alphabet, but to begin towards the end of A, so the southernmost rows have identifiers beginning with D. I have not tried to count the number of 1:50,000 sheets, but at 1:250,000 there are 31 sheets now instead of only 18 previously. This rigid scheme, of small sheets with fixed correspondences of sheets at one scale to those of another, looks for all the world like the scheme adopted by the Ordnance Survey in the 1890s for its New Series. The OS maps of that scheme later became known as the small sheet series, which reached its zenith and downfall around 1904. The scheme produced a most elegant pattern of sheet-lines that no doubt delights map-librarians and the mathematically minded to this day. It also rendered Ordnance Survey maps almost unsaleable in competition with Bartholomew's better designed product. At around the time that Charles Close became Director-General of the Ordnance Survey it was realised in Britain that what both retailers and users wanted was large-sheet maps with overlaps as necessary to cover areas of likely interest. No retailer or user wants small coastal sheets covering only headlands and a few uninhabited skerries. No purchaser wants to spend his money on land maps covering large areas of sea. And the only way of reducing the number of places shown irritatingly close to the edge of a sheet is to enlarge the size of the sheets. More recently the commercial failures of both the Provisional Edition and the Second Series of the Ordnance Survey 1:25,000 maps were due to the same problem. Sales and public awareness of the scale improved dramatically when the sheet-lines were rethought and the sheet-sizes enlarged to create the Explorer Series maps.

There are, of course, examples of successful topographic map-series using small sheet-sizes, however the criteria for judging that success are not usually or directly commercial. An obvious example is provided by the Soviet topographic coverage of the world. Particularly in temperate latitudes, the Soviet sheets are very small indeed. However in peace-time the Soviet sheets were only issued in minimal numbers with a requirement that they be returned after use. Although combined sheets had been printed and issued before and during the Great Patriotic War, after that war all Soviet officers and sergeants were taught, as part of their basic topographic training, a method of pasting together up to six
topographic sheets to make a more useful size map.\textsuperscript{13} In essence, the Soviet maps were conceived as tiles, to be pasted up into larger sheets at will. Despite previous practice in country pubs and cafes, the current New Zealand map-reading booklet makes no mention of pasting sheets together.\textsuperscript{14} In Germany the series sheets are small and the sheet-lines form a rigid framework, but since the Kaisers’ time standard practice there has been to produce a multitude of combined sheets for military, administrative, tourist and many other purposes. Again, the series sheets are treated as tiles. In France the IGN has moved decisively in favour of large sheet sizes and flexible sheet-lines, and has abandoned the 1:50,000 scale with its time-honoured rigid small-sheet structure altogether.

A policy has been adopted that all LINZ data, including the maps, should be free to download under a Creative Commons licence. To a mapaholic this sounds like manna from heaven. Yet there are some problems with this policy. From their publication date in 2009 onwards, the entirety of the latest revision of each sheet, whether at 1:50,000 or at 1:250,000, has been available to download from the LINZ website as a TIFF file. The file sizes vary quite substantially depending on how much sea is shown, but sheets without any sea occupy about 70MB. Even with a good internet connection this takes 2-3 minutes to download. In this form you get not only the map but also the full marginalia including the integral cover panel, just as you would with the printed map. If one had a printer of adequate size one could print the map out, however my printer can only handle A3 paper, and so in practice I can’t get the maps to print at scale. Alternatively you can download each sheet as a GeoTIF file of the spatial area only, giving greater functionality, but an even larger file size (138MB for each sheet) and correspondingly longer download time. Because of this, LINZ recommend the use of their free ‘LDS’ (LINZ Data Service) system which allows one to use the full range of their data without downloading more than necessary. This seems however to be principally targeted at land surveyors and local authority users, rather than leisure users or travellers.\textsuperscript{15} The conclusion has to be that not only are the present NZTopo sheet sizes too small for convenient use as paper maps, they are too large for convenient electronic use. Indeed it looks as if the sheet size was


\textsuperscript{14} \textit{Topo50 Map Reading Guide}, (LINZ, n.d.), downloadable from \url{https://www.linz.govt.nz/land/maps/topographic-maps} Yet note that the bleeding edges of the earlier metric map series (NZMS 260 and 262) had positively encouraged the possibility of paste-ups.

\textsuperscript{15} All these facilities are available at \url{https://www.linz.govt.nz}
chosen as an awkward compromise between the two requirements, satisfying neither.

The effects of this small-sheet scheme on sales of the paper NZTopo maps should have been predicted. It has been exacerbated by marketing errors that also repeat mistakes made long ago in Britain. Retailers are provided with a stand for the maps that provides slots for many adjacent map sheets, and they seem to be required to stock not only the local map but also a large number of surrounding sheets. Many of these prove to be dead stock. Accordingly very few retailers are prepared to stock the NZTopo maps, and some that once did so (like the busy i-Site in the centre of Rotorua) have ceased to do so. Time and again I was informed that the only shops that would stock these maps were out-of-town hunting-shooting-&-fishing stores. And in such a shop in a mall on the outskirts of Rotorua the staff seemed surprised that anyone should want to buy these maps. Furthermore, even retailers who stock the 1:50,000 maps seldom stock the 1:250,000 sheets, which are clearly seen as unsaleable.

This is because the 1:250,000 map has a direct competitor. A firm called ‘Kiwimaps’ produces a 1:250,000 ‘topographic’ map of the country, available both as 18 individual sheets, or in spiral-bound atlas form.\footnote{http://www.kiwimaps.com/} The representation of relief is by hill-shading, which to my mind renders the ‘topographic’ descriptor questionable. Nevertheless the maps present an attractively clear image of all settlements, the road and trail systems and significant topographic features. The sheet-lines have been carefully thought out, with a result that is not unlike the sheet diagram for the old NZMS 362, but with extensive overlaps. This has been enabled in part by switching some sheets from landscape to portrait format. The underlying data derives from LINZ, but the country roads are both named and indexed, campsite and motorhome information has been added, as has much tourist information and the routes of the New Zealand Cycle Trails.\footnote{New Zealanders remain deeply attached to their motor homes for holidays and travel. Knowledge of the locations of ‘Motorhome Dump Stations’ is essential for their use.} All place-names are categorised and indexed on the reverse. The maps are even advertised as suitable for joining together, and a 19th sheet of ‘water only’ is available for squaring up the edges of such a paste-up. The sheets cost $2 more than the NZTopo250 sheets, but you get more map for your money. For a motorist or cyclist it is a far more useful map than the LINZ one. Furthermore it is available, and prominently displayed, at every small newsagent, bookseller and stationery shop throughout the country, even in backwoods settlements. This brings forcefully to mind the despair at Ordnance Survey when the Bartholomew maps were available at every railway bookstall while the OS product had to be ordered in advance at a post office, or from an agent in London, Edinburgh or Dublin.

The 1:50,000 maps do not have a direct competitor, but the Department of Conservation (DOC), which is a government body with protean responsibilities for both land management and tourism across much of rural New Zealand, has developed close links with two linked private-sector mapping companies who
have cherry-picked the routes of the DOC’s ‘Great Walks’ along with many other trail routes. They now dominate a market that was once the focus of many NZMS tourist maps by providing waterproof maps based on LINZ data, but printed at an enlarged scale and sold at a premium price through DOC offices. These companies also provide mapping support for many other DOC activities.\(^{18}\)

In Britain we are accustomed to National Grid references derived from Ordnance Survey maps appearing in all sorts of contexts. These include not only local and national administrative and planning documents, but also a wide range of geographical, geological, archaeological, historical, ecological and other academic documents and publications. In the seventy years or so since the system was first presented to the British public grid references have provided a stable and reliable means of identifying precise locations that continues in use in the age of GPS and similar technologies. This stability has been lacking in New Zealand, and as a result there seems little familiarity with the potential uses of a grid reference system, or the importance of using a grid system in a country-wide way. The primary problem is that each stage of the topographical mapping of the country has been associated with a different grid system, and each has been incompatible with all the others. The point was brought home to me by a geology book. Jocelyn Thornton’s *Field Guide to New Zealand Geology*\(^{19}\) is the sort of book that cries out for some grid references. It describes the find-sites of many, many rocks and minerals throughout New Zealand, and their origins and inter-relationships. Yet the find-sites are described using all sorts of transient landmarks, including the courses of public roads that have since been improved and realigned, disused mine access tracks with landmarks along them, and old mine entrances. all of which can (and probably have been) effaced by landslips and other forms of erosion, or by regrowth of bush, or by redevelopment for other purposes. No grid references are recorded for her museum specimens, and none are given in her book.

The NZMS imperial maps were constructed using two different transverse Mercator projections, one for each major island. Corresponding transverse Mercator grids were printed on the maps, but the coordinate values were given in thousands of yards, very much as had been the case on the OS Fifth edition one-inch maps of the 1930s. In New Zealand the yard grids were retained throughout the currency of the one-inch maps, and thus into the 1990s. However the metric maps produced from 1977 onwards were plotted on the New Zealand Map Grid Projection, a minimum error conformal projection. The grid was the New Zealand Map Grid, showing coordinates in metres in terms of the Geodetic Datum 1949, based on the International (Hayford) Spheroid.\(^{20}\) Use of this projection and grid

\(^{18}\) See [https://geographx.co.nz](https://geographx.co.nz) and [http://www.newtopo.co.nz](http://www.newtopo.co.nz)

\(^{19}\) Now published by Penguin: 1st edition 1985, with eight reprints, 2nd edition 2003, with three further reprints.

was unique to New Zealand, and while it covered the whole country it was incompatible with WGS84. Furthermore the 1949 datum applied only to horizontal position and did not provide a height standard. By the end of the twentieth century accumulated errors in the geodetic net combined with strains due to tectonic change in the shape of the country meant that a new datum became required. Therefore the current NZTopo maps have been plotted on a single New Zealand Transverse Mercator 2000 projection based on a new NZ2000 datum, which closely approximates to WGS84. The maps are printed with a corresponding Transverse Mercator grid.\(^{21}\)

In principle, this grid should be entirely suitable for the full range of military and civilian purposes. However there is a problem that has been rolled over from the older map series. The instructions for the use of the grid are printed in the margin in a box of familiar design. On the old NZMS metric maps this box directed the user to ignore the smaller grid figures at the sheet corners ‘which are for finding full coordinates’. The user was then instructed to give a six-figure map reference preceded by the sheet number. Furthermore the instructions given on the 1:250,000 maps differed from those on the 1:50,000 in that one gave a six-figure reference to the nearest 1000 metres while the other gave one to 100 metres. As a result quite different six-figure references were to be quoted for the same point. Effectively the user was directed to use a local grid system dependant on the particular sheet and scale being used, rather than the full national grid. The instruction panels on the current NZTopo sheets have been slightly modified, in that a full national reference to the nearest metre is quoted for the sample point, before giving exactly the same the directions for producing a sheet- and scale-dependant six-figure reference. There are plenty of short-range navigational and similar purposes for which such a local grid system can work satisfactorily. But as a national reference and recording system for general and academic use in an age of GPS devices, a scheme of sheet- and scale-dependant local grids is utterly useless and perverse, the more so as the sheet-lines of the paper maps need to be revised in the near future. Gridded maps were developed for artillery use during the First World War. It was rapidly appreciated then that sheet- and scale-dependant grids caused great difficulties, such that both sides progressively unified their grids to cover larger areas as that war progressed. By 1918 the Germans had unified their Western Front grids, while unification of all the Allied grids was scheduled for 1919, although implementation was aborted following the armistice.\(^{22}\) That a century later LINZ is still promoting the use of local grids seems almost disrespectful to the knowledge and experience of the ANZACs of 1914-18, who have recently been the subject of major exhibitions in the museums of both Wellington and Auckland. The value and use of the full form of the NZTM2000 grid should be appreciated, publicised and (most importantly)...

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21 For descriptions of the calculations necessary to transform grid values from one system to another see Where in the World are we? A Technical Guide to Datums and Projections in New Zealand, op. cit.

promoted by LINZ outside the cartographic community, very much as Ordnance Survey did with the British National Grid seventy years ago.

I commented above on the poor height representation on some New Zealand maps. But for LINZ and its predecessors the establishment of a consistent system of height measurement has been a continuing nightmare. That the 1949 Datum could not provide a height standard was one effect of this. Tide gauges were set up at 13 harbours around the coasts, and levelling traverses were measured outwards from them. Although traverses from some of these centres eventually met, it became clear that for gravitational reasons sea levels differed around New Zealand and measurements derived from different tide gauges could not be equated. Furthermore several of the tide stations turned out to be in tectonically active areas, such that their positions have been disturbed by earthquakes. The harbour at Wellington itself provides one example. Large areas of what is now dry land rose from below sea level in that harbour in the nineteenth century. The international airport is built on one of these, which is now high above the water. Even more immediate is the example of the Christchurch tide gauge which was at Lyttelton Harbour at the epicentre of the 2011 earthquakes. The solution adopted for the 2000 Datum was to relate all heights to the ellipsoid, the theoretical shape of the earth used for satellite navigation systems, however sea level in New Zealand differs substantially, although variably, from the zero height above the ellipsoid. Accordingly LINZ then had to publish the New Zealand Geoid 2005 (with updated versions in 2009 and 2016), to allow ellipsoidal heights to be converted to more useful heights above sea-level. All of which might explain a certain caution in previous years before publishing absolute values for heights alongside matching contours, particularly across an area the size of an old

Figure 4. Cover panel from NZTopo50 sheet CE18 Taiaroa Head, edition 1.02 (selected change 2015). Note the small land area covered by this sheet. Note also that the black colour is more intense than it should be, with loss of white line definition in the logo at the bottom of the image; it looks as if there has been a double impression of the black plate in this printing. This suggests that lithography is being used to print these maps rather than any more recent technology.
1:250,000 sheet. And of course, it seems not unlikely that further adjustments to the height system will before long be needed.

Nevertheless, while solutions have now been devised for the problems of defining and presenting height data, some even more intractable problems for LINZ remain. For as the woman in the DOC i-Site in Queenstown put it: ‘only the Brits buy the maps’. In Britain several generations have now been taught that to get out of one’s car without some sort of map to hand (even if only on a phone screen) is reckless and foolhardy. Going for a walk in rough country without a map would be universally condemned. Yet Kiwis indulge in an astonishing range of outdoor pursuits, in some very wild country indeed, without maps. They will set off up a trail without anything more than a descriptive leaflet picked up from an i-Site, perhaps augmented by a verbal description by a staff member there.²³ In part this reflects the efforts of DOC, and other sponsors of tracks and trails, to maintain them and to provide signage to prevent any wrong turns. But it also reflects an undervaluation of the present NZTopo maps by the public (who have presumably paid for their making), and also a lack of appreciation of the additional context that a map can add to a day’s activity, even when navigation proves straightforward. Overcoming these entrenched public attitudes is now the real challenge facing LINZ. It has taken Ordnance Survey well over a century of continuing effort to educate (or perhaps brainwash) the British public in the value and use of their products. That effort has taken many forms, in schools and in school examination boards, in university research and teaching, in Scouts and other youth organisations, in various adult outdoor-pursuit contexts, and in the aggressive retail marketing of OS products from the 1920s onwards. Branding one series as ‘the Popular Edition’ and another as ‘the New Popular Edition’ was part of this, as likewise are the present marketing labels: ‘Explorer Map’ and ‘Landranger Map’. LINZ has a long way to go in this, particularly since it is having to develop its own brand from scratch rather than being able to build on a foundation of the old NZMS brands. The fact that its relief representation is at last reliable, and thus far better than that of any i-Site leaflet, should (in the short term) be a major selling point. In the longer run, closer cooperation with DOC would seem desirable. And yes, the immediate recasting and relaunching of both the present NZTopo map series as ‘Large Sheet Series’, with the addition of more tourist information, would seem an essential part of this marketing and education effort. Indeed, it looks to me as if the 1:250,000 map cannot survive without such a transformation.

²³ This was made starkly clear to us when we set off from Kaueranga to climb the Pinnacles (773 metres). The DOC i-Site there was able to show us copies of the NZTopo maps, but had run out of sales copies except for those of distant areas. We, and by the look of it everyone else who went up that day, had to make do with a booklet giving brief descriptions of a large number of local trails with thumbnail sketches of their locations.
Visit to Durham Records Office

County Durham is well known for two related industries, coal mining and the development of railways, and illustrative examples of maps and plans for each of these were included in the display arranged for the CCS visit by county archivist Liz Bregazzi, assisted by CCS member David Butler.

An estate plan of Gibside dating from 1716, then owned by the Bowes family, illustrated early coal mining activity. Later coloured plans illustrated both ownership and workings in specific coalfields and showed the extent to which coal extraction had become a major industry. Another example of a coal-related item was a plan drawn up to assist in the investigation of the underground explosion in Easington Colliery in 1951. The explosion caused the deaths of eighty-one miners and two members of the rescue teams. The plan showed the location of roof falls and displaced supporting structures, as well as where, in the complex of mine roadways and tunnels, the body each of the miners was found. A plan showing lead seams at the head of Derwent Water represented another extractive industry, lead mining.

To maximise the value of coal extraction, effective transport infrastructure was essential. The precursor of railways were waggon ways and a plan of the Derwent Valley Waggon Way (1720) and the New Washington Colliery and associated works (1790) showed the early developments in this area. Plans concerning water transport, the development of staithes and the proposal to canalise rivers to improve the movement of coal by boat were evidence that mine ownership was not the only source of wealth in the area. Also on show were the plan and Book of Reference for the Stockton and Darlington Railway prepared by George Stephenson.

An international flavour was provided by two maps of Africa, the most important aspect of these was a series of annotations by Viscount Castlereagh, then serving as foreign secretary. In these he noted that despite the slave trade having been abolished by both Britain and the United States, it was still active. Ostensibly this was by ships flying the Portuguese flag but in fact they were operating at the behest of British or American interests, as until this period there had been no Portuguese slave trade.

Ordnance Survey was not ignored and several examples of large-scale maps were laid out to enable comparison with estate plans and other town plans, for example those of Foster 1754 and John Wood 1820. The importance of surveying and mapping by serving military officers was superbly illustrated by an exercise book belonging to General de Lisle and a map of Sandhurst produced by him while a cadet there in 1882. The final example of OS material was a copy of 1:100,000 map of Lens, once the property of Lt HH Nicholson (6th Batt Durham Light Infantry). It had been in his tunic pocket when he was shot and as a result saved his life, blood stains and holes in the map were evidence of its value for this purpose.

Bernard Anderson
Merely rivers
Paul Bishop

The articles on mereing have been very interesting and most informative.¹ I here amplify a comment on one simple issue, that of riverine boundaries.²

In clarifying the terminology “C Tk O C R” and “O C R”, David Andrews might be taken to imply that riverine boundaries necessarily have to coincide with the centre of the river, although David did not actually say this. I previously noted in my ‘moving river boundaries’ comment that riverine boundaries do not have to follow the centre of the river and more recent riverine boundaries are more likely to coincide with the thalweg (the line of deepest water, a change that probably reflected the nineteenth and twentieth centuries’ growth of riverine trade in larger vessels that needed deeper water). Older riverine boundaries, such as between Scotland and England, are more likely to be centre (median) line boundaries.

The riverine boundary marked by the Mekong River between Thailand and Laos, as agreed in 1926 by Siam (Thailand) and France, the Indochina colonial power, lies along the line of deepest water:

“Where there is only a single channel [of the Mekong] the thalweg marks the boundary; where there is more than one channel, the thalweg of the channel nearest the Thai bank forms the boundary.”³

The effect of the last part of this statement is that islands in the Mekong channel belonged to France, even when the channel between the island and the Thai side was actually shallower than the ‘main’ channel. This arrangement presumably reflected the relative powers of the two negotiating sides – France, the colonial ruler of Indochina, and Siam, the neighbouring SE Asian country that was trying (successfully) to retain its own sovereignty and so was willing to cede on some points. Thailand is now more powerful and wealthy than Laos but the islands remain the property of Laos. It was also agreed in 1926 that “if the channel nearest the Thai bank dries up then the boundary will continue to follow it, unless the joint permanent high commission for the Mekong decides to move the boundary to the nearest channel with water”.⁴ In other words, until such time as the joint permanent high commission decided to move the boundary, a channel that had dried up between an island and the Thai bank remained the boundary. Until the boundary was moved, a little bit of Laos (the former island) was attached to the Thai side.

These issues, plus bank erosion on the Laos side that has been perceived as being caused by engineering and bank protection works on the Thai side, continue to cause friction between Thailand and Laos. As a fluvial geomorphologist, I consulted to the Mekong River Commission twenty years ago on these matters.

⁴ Ibid.
Map representation of such thalweg borders is difficult because (a) by definition, the boundary moves, and (b) we all now have immediate access to boundary representations via the internet, which should be continually update-able but is not. For example, the boundary between Thailand and Laos near Vientiane, on which I consulted 20 years ago, is determined by the 1926 Treaty noted above. However, all the internet-based mapping packages that I have consulted place the border in only a general way down the channel of the Mekong River (figure 1). Indeed, all

Figure 1. Representations of the Thailand-Laos border near Vientiane by Bing Maps (top left), Google Maps (top right), Google Earth Pro (bottom left), and, bottom right, the UN’s map of Mekong River Flood Waters for Vientiane and Surrounding Region, Along Thai-Laos Border. At the bottom of the meander bend shown here, the 1926 Treaty places the border between the mid-channel island and the river’s right (southern) bank, but the various representations place it in a range of positions. The border at top left in the upper two representations is also misplaced with respect to the island. (https://reliefweb.int/sites/reliefweb.int/files/resources/BB322D233905805D852574AB0060FCDD-unosat_FL_tha080820.pdf; consulted April 19, 2018).
packages run the border variously through some islands in this reach, which is clearly incorrect. It is noteworthy how Google Maps and Google Earth Pro do not agree with each other. The UN’s map of floodwaters (bottom right in figure 1) includes the usual ‘escape clause’ that “The depiction and use of boundaries, geographic names and related data shown here are not warranted to be error-free nor do they imply official endorsement or acceptance by the United Nations.”

Such statements are of course necessary on the UN’s part but it is easy to envisage a tense military situation in which a ground-based force is relying on Google Earth or some such for guidance as to the location of an international boundary. Google Earth does not warrant the accuracy of its representation of borders but uncertainties and disputes can arise. For example, in 2010 Nicaragua entered part of Costa Rica due to a misplaced riverine boundary in Google Earth. The boundary was misplaced into Costa Rica, thereby justifying to the Nicaraguans their decision to cross the river, leading a blogger to wonder whether this was the first Google Maps war. Jacobs reports in this blog that, “On Nov. 3 of [2010], Edén Pastora, the Nicaraguan official tasked with dredging the Rio San Juan, justified his country’s incursion into neighboring Costa Rica’s territory by claiming that, contrary to the customary borderline, he wasn’t trespassing at all. For proof, he said, just look at Google Maps.” These sorts of issues will probably only escalate in the future as mobile phones and mobile phone coverage become more and more widely available.

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**OS MasterMap data to be freely available**

The government announced on 13 June that key parts of the OS MasterMap will be made openly available for the public and businesses to use. It is estimated that this will boost the UK economy by at least £130m each year, as innovative companies and startups use the data.

The release of OS MasterMap data is one of the first projects to be delivered by the new Geospatial Commission, in conjunction with Ordnance Survey. The aim is to continue to drive forward the UK as a world leader in location data, helping to grow the UK’s digital economy by an estimated £11bn each year.

Commenting on the announcement, the Open Data Institute said This is significant, not only for us geospatial data fans but for the UK economy and its citizens. It means that property boundaries, derived from OS Master Map, will be published as open data, for anyone to access, use and share. It also means that OS will start adding Topographic Identifiers (TOIDs) to OS OpenMap-Local, which contains street-level data, making it easier to create links with other datasets.

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London area AD map – has the mystery been solved?

Bernard Anderson and Deborah Stebbing

In April 2015 Gerry Zierler reported the acquisition of an unusual, if not unique, map,\(^1\) a large composite map with the title *London area AD map*. His article describes the map and in particular makes reference to the symbols that are marked on it – “dumbbells”, single dots and open circles. *(figure 1)* These are arranged around the capital to form a circle. He also noted that attempts to find an explanation of the purpose of the map or alternatively find something which reflected the content more-or-less exactly had drawn a blank.

In a meeting in London later that year, at which several members of the Charles Close Society were present, Gerry showed the map and asked for suggestions that might assist in shedding further light on the map and its purpose. The authors of this article were among those present and one of them (DS) was interested to see that on the north-eastern section of the map several places around Chelmsford had been marked. Photographs of this part of the map were requested and supplemented by additional photographs taken by the other author (BA) at later committee meetings. This article outlines investigations undertaken to establish the role of what will be referred to as the AD map.

The initial approach sought to determine what, if anything, could be found on the ground at some of the identified locations in mid-Essex and whether the locations themselves gave any clue as to their possible significance in relation to air defence. The possibility being considered was that the ends of the dumbbells were bases for a device such as a pelorus and used to determine the height and position of approaching aircraft, particularly given the orientation of the dumbbells and the assumed direction of approach. To this end three dumbbell sites near Chelmsford were visited – Ingatestone, Highwood and Roding. Perhaps not surprisingly given the intervening century nothing could be found on the ground and growth of trees and other development made interpretation difficult. With one exception, Roding, the ends of the dumbbell were not within sight of each other and only at Ingatestone was there a clear view extending for several miles. A subsequent visit to the approximate positions of the two ends of the Tower dumbbell in London (Tower Bridge and the entrance to London Docks) followed by a visit to Meath Gardens the site of a single dot on the map, gave similar results to those of previous site visits.

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\(^1\) ‘London area AD: A mystery map’, *Sheetlines* 102, 36-40.
The second approach considered home defences in the period around the time of the map’s production. At the outbreak of war in August 1914 there were no effective anti-aircraft defences for London.\(^2\) A letter dated 4 August 1914 requested that three anti-aircraft guns be installed on the top of specific government buildings in central London, to avoid public alarm they were to be camouflaged.\(^3\) Later, early in the course of the conflict a number of airfields were established which ultimately played a role in home defence and among these was Stow Maries, near the River Crouch south of Maldon in Essex. Although decommissioned by the end of the war it was left largely intact and some of the remaining buildings have now been refurbished and converted into a museum. A visit provided little further information concerning the AD map but confirmed the general outline of the development of the London Air Defence Area (LADA) as indicated on the diagrammatic map in Gerry’s article.\(^4\)

By 1915 the real possibility of air raids and thus the necessity of protecting some important sites around London and the Thames Estuary had received attention.\(^5\) (figure 2) Despite this by mid-July 1915 London remained poorly prepared for air raids, there were only 18 guns and 23 searchlights by way of protection.\(^6\) At this time air raids on London and the south-east, as indeed on other parts of Great Britain such as Hull and Sunderland, used Zeppelin airships. The Essex Record Office in Chelmsford contains documents reporting the activities of these aircraft including the two brought down in Essex, one near Billericay and the other near Wigborough, a few miles from Colchester. There are also contemporary reports of church services being cancelled or interrupted due to air raids. However, with one exception there were no reports of defensive action or the location of anti-aircraft guns. The exception was a report in a journal kept by a local clergyman living in the village of Stondon Massey near

\(^2\) Lt Col M St. L Simon, Paper on Home defence at AA School, TNA AIR 1/2393/241/1.
\(^3\) Letter requesting three AA guns, TNA AIR 1/652/17/122/480.
\(^4\) ‘London area AD: A mystery map’, *Sheetlines* 102, 36-40.
\(^5\) Maps to show areas where AA fire may be expected, TNA AIR 1/1259/204/9/7.
\(^6\) Lt Col M St. L Simon, Paper on Home defence at AA School, TNA AIR 1/2393/241/1.
In this he describes both air raids and the activity of an anti-aircraft gun located at nearby Kelvedon Hatch.

A more detailed account of the development of London’s defences against air raids is contained in Sir Alfred Rawlinson’s memoir covering the period when he served as one of the five London sub-area commanders who had responsibility for defence against attacks, first by Zeppelins and later by fixed wing aircraft.

A map in this book identifies the location of both guns and searchlights in south-west and north-west London (the Western Sub-Area) as well as lines of communication between them and the control centre in Putney (Figure 3). The area covered by this map included some of the sections of the AD map which had been photographed and despite the difference in scales and the absence of detail, comparison of the two was possible. Several locations were recorded on both this map and the AD extracts, for example Kenton, Acton, Hounslow and Norbiton. Each of these locations was the position of both a gun and a searchlight. On the AD map these were the positions of dumbbells with similar orientations to the lines of communication between guns and searchlights on Rawlinson’s map. Interestingly, although Rawlinson clearly identifies the positions of guns and searchlights, the ends of the dumbbells on the AD map do not employ different symbols for guns and searchlights. However, the correspondence between the two maps gave the first possible clue to the meaning of dumbbell symbol. Unfortunately, although the boundaries of both North and East sub-command areas were indicated on the map in Rawlinson’s memoir, it has not proved possible to trace similar diagrammatic maps for them.

The forward in Rawlinson’s memoir was written by Admiral Sir Percy Scott. Scott’s role in the development of London’s air defences is mentioned in several
books which cover air raids on London, for example those by Castle \(^9\) and Simpson.\(^{10}\) During his career in the navy he had become recognised as an expert in gunnery and following the early Zeppelin raids he was brought out of retirement, in September 1915, to take charge of the development of air defence artillery for London. In addition to identifying suitable guns and ammunition he was responsible for the establishment of fixed gun positions in and around London. His key recommendation in February 1916 was the formation of a protective barrier around London comprising two rings of guns, the inner following a path through Kenton, Mill Hill, Finchley, Wanstead, Blackwall, Honor Oak, Somerstown, Kingston and Richmond before returning to Kenton.\(^{11}\) The outer ring of guns followed a path through Hoddesdon, Epping, Hainault, North Ockendon, Southfleet, Crockenhill, Purley, Windsor, Mill Hill, Potters Bar, Tylers Causeway, and Essenden, before returning to Hoddesdon. In the Central area guns were to be located at Regent’s Park, Tower Bridge and Battersea. Searchlights were also to be concentrated in this central area. Scott considered that a total of 100 guns would be required.\(^{12}\) The proposals for these defensive gun rings were outlined on two maps which have not yet been discovered.\(^{13}\) However, several of the names mentioned occur on the AD map extracts, Kenton, Finchley, Blackwall, Norbiton (Kingston) and Richmond, from the inner ring, and North Ockenden, Crockenhill, Purley, Windsor, Tylers Causeway and Epping, from the outer ring.

Scott further recommended that the fixed gun positions be linked with searchlights. In this he was following a recommendation made in December 1914.\(^{14}\) Details of searchlight positions is found in an official list dated 6 March 1916.\(^{15}\) Table 1 shows the location of lights mentioned in this list which can be linked with places identified on the extracts of the AD map and the symbols used on the map extracts.

In addition to Rawlinson’s memoir, evidence for the pairing recommended by Scott is provided by a brief account of an air raid in Hyde’s book.\(^{16}\) This mentions that the commander of the Tower gun station on returning from a meeting at the War Office on 13 June 1917 arrived at the Tower just as the alarm for an air raid was raised and went first to the gun station before moving to the nearby searchlight. Castle also comments on the links between guns and searchlights \(^{17}\) and Simpson’s book \(^{18}\) provides the locations of the searchlight and gun in Chingford which conform to the ends of the relevant dumbbell on the AD map. This seems to be

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11 Memorandum Col M St. L Simon TNA AIR 1/2393/241/1.
12 Lt Col M St. L Simon, Paper on Home defence at AA School, TNA AIR 1/2393/241/1; see also Rawlinson op. cit. p. 161.
13 Memorandum Col M St. L Simon TNA AIR 1/2393/241/1.
14 Proceedings of a conference concerning responsibility for defence against aerial attack TNA WO 32/5260.
15 Position of searchlights around London TNA AIR 1/611/16/15/292.
further evidence that the dumbbells represent the positions of guns and searchlights in the pairings recommended by Scott in 1915. (Rawlinson refers to the searchlights paired with guns as “fighting lights”.) On this basis single spots could indicate the position of a single resource, either gun or searchlight.

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<th>Location</th>
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Table 1

Scott also suggested the establishment of a searchlight ring further out, approximately 45 miles from the centre of London sometimes referred to as aeroplane lights. Although at the time of Scott’s recommendations the airborne attacks on London were undertaken by approach from the north or north-east, the defensive rings he proposed would be effective against aircraft using any approach to London.

Official documentation detailing responses to air raids and giving the location of guns exists in the form of map tracings, for example one of north-east London outlining the routes of Zeppelins on 23/24 September 1916 shows a number gun positions including Tunnel Farm, Belhus Park and Clapton. On the same tracing positions of searchlights are also identified including Rainham, North Ockendon, Romford and Clapton. All these locations appear on the AD map. Two of the books already mentioned note the locations of a number of guns which correspond with dumbbells on the AD map as does a book covering the history of South West Hertfordshire in the Great War which mentions the placement of guns and searchlights at Hemel Hempstead, Boxmoor, Bovingdon and Flaunden, all of which are sites of dumbbells on the AD map.

The construction of gun and searchlight sites was supervised by Lt Col Simon who had been brought home from overseas service for this task in December 1916 and was appointed area commander for air defence in London.

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19 Rawlinson op. cit. p161.  
20 Ibid.  
21 Map showing routes of Zeppelins during an air raid on 23/24 September 1916 TNA MPI 1/604/5.  
22 Hyde op.cit., Simpson op.cit.  
23 E Russell, Q Russell, Watford and South West Hertfordshire in the Great War, Pen and Sword, 2015  
a total of 403 fixed and 78 mobile guns had been authorised. Of this total 169 had been delivered. However, due to an increased threat to merchant shipping from U-boats, the balance was diverted to the Admiralty. As a consequence, the gun defences around London were re-modelled. Where previously double-gun stations had been the norm, with the exception of Hyde Park, these were abandoned in favour of stations equipped with a single gun. The guns rendered surplus by this new policy were deployed to strengthen defences north and east of the capital.

Daylight air raids in June and July 1917 used fixed wing aircraft rather than Zeppelins. Reports of two air raids by Gotha bombers provide details of the locations of guns and indeed the number of rounds fired by each but obviously do not mention searchlights.25 As with the map tracing already mentioned there is a clear correspondence between the sites identified in the report and the information on the AD map (see Table 2).

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<td>Horsenden</td>
<td>Dumbbell</td>
<td>Romford</td>
<td>Dumbbell</td>
</tr>
<tr>
<td>Bromley</td>
<td>Dumbbell</td>
<td>Kenton</td>
<td>Dumbbell</td>
<td>Shooters H'</td>
<td>Dumbbell</td>
</tr>
<tr>
<td>Chingford</td>
<td>Dumbbell</td>
<td>Newmans</td>
<td>Dumbbell</td>
<td>Temple Ho.</td>
<td>Dumbbell</td>
</tr>
<tr>
<td>Crayford</td>
<td>Dumbbell</td>
<td>Norbiton</td>
<td>Dumbbell</td>
<td>Theydon Bois</td>
<td>Dumbbell</td>
</tr>
<tr>
<td>Dulwich</td>
<td>Dumbbell</td>
<td>N.Ockendon</td>
<td>Dumbbell</td>
<td>Tower</td>
<td>Dumbbell</td>
</tr>
<tr>
<td>Enfield</td>
<td>Dumbbell</td>
<td>Outfall</td>
<td>Dumbbell</td>
<td>Tunnel Farm</td>
<td>Dumbbell</td>
</tr>
<tr>
<td>Epping</td>
<td>Dumbbell</td>
<td>Palmers Grn</td>
<td>Dumbbell</td>
<td>Warlies P'k</td>
<td>Dumbbell</td>
</tr>
<tr>
<td>Erith</td>
<td>Dumbbell</td>
<td>Parliament H'</td>
<td>Dumbbell</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2

This suggests that by early summer 1917 many of the guns and searchlights were already in position and operational. Surprisingly, even as late as mid-July 1917 there was competition for resources between the Army which had responsibility for the anti-aircraft artillery and the Navy, as both required similar guns. However, following the second daylight air raid on London in July concern over the vulnerability of London mounted and resulted in a demand for action. Lt General Jan Smuts was commissioned to report on ways to improve co-ordination in the event of attack. In his rapidly produced report, he noted that the defence of London was provided by four different agencies, Royal Naval Air Service, the Observation Corps, the Royal Flying Corps and the Anti-aircraft Artillery, each with its own command structure. This fragmented command structure reduced the effectiveness of the response in the event of an attack. The key recommendation in this report was establishment of a single organisation with an overall commander for London’s

25 Reports on Air raids 13 June and 7 July 1917, TNA AIR 1/2393/241/4.
air defence. LADA was the organisation and General Edward “Splash” Ashmore was appointed as its commander and charged with developing the air defences.

A hand-annotated quarter-inch sheet (O.S 1916) which records the locations of guns and searchlights on 1 December 1917 gives a comprehensive outline of air defences for London at that point. The annotations are in green and yellow and although there is no key it is reasonable to assume that the green marks represent guns paired with searchlights while the yellow is used to indicate a searchlight working on its own. (figure 4) There is a clear correspondence between this and the AD map, particularly in relation to the ring of guns surrounding London. The arrangement of gun stations around London rather than in the centre reflects Scott’s recommendation to intercept the approaching aircraft before they had reached the capital. Further confirmation of the organisation of anti-aircraft guns and associated searchlights is found on a map showing the anti-aircraft defence scheme in January 1918 and a ten-mile version of the same map in the official history of the Air War. The air defence scheme was still under development but the arrangements are generally similar to both the AD and late 1917 maps and confirm the association between guns and searchlights. (figure 5) This provides further evidence that the dumbbell symbols represent pairing of guns with searchlights rather than the bases for range finding and height determination as initially thought.

Having considered possible explanations for the “dumbbell” and single spot on the map. We can now turn to the third annotation, namely the open circles which are found in east and north-east Essex. Nearer to central London the Metropolitan Observation Service played an important role in identifying and reporting the approach of hostile aircraft. Its value is documented in reports which also record the position of the observation stations around the capital. These are listed and shown on OS half-inch sheet 34 covering the capital. As with the map in Rawlinson’s memoir this map shows the both location of the stations and their lines of communication with a central control in Spring Gardens near Admiralty Arch (figure 6). Observer stations more distant from London are recorded on map tracings which detail the courses and times of approaching aircraft, for example one produced in conjunction with an air raid on 23/24 May 1917 signed by A Rawlinson shows two related cordons. A comprehensive arrangement of observer stations formed into several cordons appears to have been put in place and details of this can be found on a 1:1 million map (figure 7).

26 Smuts Committee initial report 19 July 1917 available at: airwar19141918.wordpress.com; accessed 3 March 2018.
27 Map of London and the surrounding counties showing the positions of anti-aircraft guns and searchlights TNA MPI 1/510.
28 London Area Map, TNA MR 1/1907/1
30 Reports on Metropolitan Observation Service TNA AIR 2/88.
31 Map of Southern England showing an observer cordon and the course of hostile aircraft TNA MPI 1/610.
32 Map II showing the positions of observer cordons TNA MPI 1/516/1.
Fig 4 (top) Extract from quarter inch map of London and the surrounding counties showing the positions of anti-aircraft guns and searchlights 1 December 1917. (National Archives TNA MPI 1/510).

Fig 5 Extract ten-mile map OS 1935 showing London Anti-Aircraft Defence Scheme January 1918. Red and blue dots represent gun and searchlight positions, yellow searchlights alone. Larger dots to the North and East are the positions of paired guns. (H A Jones, The War in the Air vol V, Oxford University Press, 1935).
Fig 6 (top) Metropolitan Observation Service stations. Original half-inch sheet 34 (National Archives Reports on Metropolitan Observation Service TNA AIR 2/88).

Fig 7 Extract from 1:1M Map II showing the positions of observer cordons around the North of London (National Archives) TNA MPI 1/516/1.
The map itself is dated 1916 but there is no indication of the date of the printed annotations. The positions of some of the open circles on the AD map follow the approximate lines of cordons R and D. (Table 3, below)

<table>
<thead>
<tr>
<th>Cordon D</th>
<th>Cordon R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doggetts</td>
<td>Steeple</td>
</tr>
<tr>
<td>Tyle Hall</td>
<td>Brook House Farm</td>
</tr>
<tr>
<td>South House Farm</td>
<td>Heckford Bridge</td>
</tr>
<tr>
<td>Woodham Walter</td>
<td>Skytree</td>
</tr>
</tbody>
</table>

The sketch for an air raid on September 4/5 1917 shows the observer posts in a single cordon which stretches around the north of London as far as Pangbourne with the following stations in Essex (Table 4, below).33

<table>
<thead>
<tr>
<th>Downham</th>
<th>Witham</th>
<th>Stisted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galleywood Common</td>
<td>Tiptree</td>
<td>Castle Hedingham</td>
</tr>
<tr>
<td>Danbury</td>
<td>Coggeshall</td>
<td>Birdbrook</td>
</tr>
</tbody>
</table>

These observation stations are more obviously part of observer cordon R which starts near Southend and stretches north and west in an arc around London. The map and air raid reports give some credence to the idea that the open circles were the locations of observer posts. These like the positions of guns and searchlights were probably subject to change in accordance with the needs of the time.

What conclusions can be drawn? We suggest that the AD map probably depicts the state of air defences at the beginning of July 1917 rather than being simply a plan or proposal for development of such defences. Since in the majority of cases neither guns nor searchlights were on permanent bases their positions could be changed if or when required, hence the absence of any sign of permanent fixtures a century later.

Does this solve the mystery? Not entirely since the “hitherto unrecorded states” of the maps used in the compilation of the AD map remain unexplained. Similarly, the hand-written details at the top of the label on the front cover of the map continue to defy identification despite the best efforts of several persons who have expertise in reading old handwritten documents. In addition, there is the confusion over dates, namely the implication that the date of the information appears to precede the date of publication rather than the reverse. Finally, there remains a question concerning the annotations using red pencil. However, the majority of the red pencil marks are on dumbbells located in the north-west and south-west of the capital. The redeployment of resources away from these areas has already been noted. Thus it could be that these indicate stations where either the number of guns was to be reduced to strengthen defences east of London or the type of gun was to be changed as indicated on the London Area map.

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33 Map of Southern England showing an observer cordon and the course of hostile aircraft TNA MPI 1/608.
**Representation of railway track layouts on the County Series**

Rob Wheeler

**Introduction**

Railway historians make extensive use of County Series maps to show track layouts of stations. Despite this, there appear to be areas of uncertainty about the rules followed at certain times. Useful though it would be to offer a definitive guide to this topic, in the absence of new documentary sources, all that I can offer in this article is to describe the changes that can be seen on the published maps.

Because the greatest uncertainties affect the earliest period, it seemed best to abandon any attempt at a chronological narrative and to organise the account by scale of map, starting with what is most certain and expanding to areas of increasing doubtfulness.

**Town scales**

The town scales provided space for the depiction of every running rail. This is particularly valuable where a mixed-gauge layout is recorded. The questions it raises are not so much cartographic as relating to railway practice.

Narrow-gauge and broad-gauge trains used the same platforms. It was necessary that the edges of the carriages should be a similar distance from the platform edge. The common running rail was therefore that closest to the platform. Since the Great Western – at least for lesser stations – preferred not to use island platforms, it followed that on double-track lines the common running rails were to the outside of the formation. All was straightforward. At major stations this pattern could not always be followed and the paths followed by narrow- and broad-gauge trains might be different. Figure 1 shows an example.

To switch a broad-gauge train in this way, it is necessary to press one tongue against the common rail, to switch a narrow-gauge train an additional tongue was employed; but if a broad-gauge train encounters the point thus set, it will be derailed. So how was such an accident prevented? Was there a treadle against the broad-gauge-only rail that would force the tongue back? Or was reliance placed on the signalman with, perhaps, different bell codes for trains of the two gauges?

**Figure 1. Bristol Temple Meads.** For clarity the tracks in question have been marked in yellow at the edges of the extract. For broad-gauge trains to pass to the left-hand branch, a tongue connected to the rail coloured purple has to be pressed against the common rail; for narrow-gauge trains it is the tongue belonging to the rail coloured maroon.
The depiction of the rails was left to the Plan Examiner. The logic for this is clear enough: a complicated track layout was best drawn directly on a map rather than through the surveyor’s notebooks produced at the chain-survey stage. Even at this stage, surveying a complicated set of sidings, largely occupied by wagons, and with shunting in progress, can hardly have been easy. Given that the railway company will have had its own plans, one wonders how often the plan examiner copied them and carried out a few checks.

The intelligibility of a plan of sidings depends on the spacing between each pair of rails being distinguishable from the spacing between adjoining pairs. All too often the drawing and the lithography are inaccurate and all one can make out is a large number of approximately parallel lines. The depiction of tie bars linking the tongues at points serves as an occasional reminder of which pairs of lines constitute a track, but these tie bars are often omitted. When they are omitted at diamond crossings, it removes the only evidence this scale offers for the presence of slips (figure 2).

The later six-inch

The six-inch scale presents the greatest problems. Railway historians sometimes offer the view that depiction of track layout on this scale is inaccurate and cannot be relied on. This evades the issue. All maps are inaccurate to some extent. What we need to know are the nature of the omissions / generalisations on the six-inch along with the nature and frequency of downright errors. Whilst the investigation may be somewhat academic for derivative six-inch sheets, it may throw light on what can be expected in those areas and periods where survey was at the six-inch scale. Some examples of outright errors are offered in an appendix.

One widespread omission affects crossovers between parallel tracks. Where the tracks in question are depicted by a double-track ladder symbol, the omission might be regarded as inevitable, though in fact one does occasionally find crossovers that have been drawn underneath the ladder. When the parallel tracks in question are both depicted by single-track symbols, a higher proportion of crossovers are shown, but by no means all of them. By the later-nineteenth

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2 Eg Newark (MR) station on Notts 30SE of 1884, Dagenham on Essex n87 of 1921.
century, it was considered bad practice for a siding to debouch directly on a running line. Even if there was not space for a head-shunt, there should be buffer-stops to catch runaway wagons and exit from the siding should be by a crossover onto the running line. Omission of this crossover on the map renders the track layout well-nigh incomprehensible; nevertheless it happens occasionally.5

The biggest change in the appearance of the six-inch took place in 1889 and is illustrated by the two states of the first edition covering the centre of Lincoln (figs 3 & 4) The earlier state is largely a photographic reduction of the 1:2500 – though of course railways had to be redrawn. The later version was entirely redrawn on the basis of photo-reduced ‘blues’. The thinning-out of sidings may be considered a regrettable consequence of the obsession with removing ‘clutter’ which at the same time led to the omission of those parts of parish boundaries which ran through dense urban areas - an omission which often makes the rest of those parish boundaries difficult to interpret, it no longer being apparent to which parish any particular spot belongs. So far as railways are concerned, it means that states after 1889 are liable to understate the number of parallel sidings, whereas earlier states do appear to show the correct number.

At Greenhill Upper Junction, the Scottish Central Railway joined the Edinburgh & Glasgow. The six-inch (Stirlingshire 29, published 1865) shows the former converging on and running alongside the latter but with no connection. The 1:2500 makes it clear that there were crossovers by which a normal junction was effected. In contrast, on Stirlingshire 31 (published 1865) the Slamannan Jct Rly is shown joining the Edinburgh & Glasgow by a normal junction. From the 1:2500 it is apparent that trains could only pass from one to the other by reversing across crossovers.

Use of the double-track symbol

On figures 3 & 4, two pairs of tracks are shown by the double-track ladder symbol. Comparison with the Great Northern Railway’s own plan indicates that these were the through passenger lines and the through goods lines. The status of the latter as running lines could not have been deduced from the printed 1:2500, so one wonders whether there was any indication on the Plan Examiner’s trace. The limitation of the double-track symbol to running lines does appear to be normal practice by this date.

In contrast, its use in the early years seems to be more arbitrary. On a double-track railway away from stations, the two tracks linked together are necessarily the running lines - there is nothing else. Mere continuity of drawing often ensures that when a station with sidings is reached the running lines continue to be picked out by the double-track symbol. But this is by no means invariable. For example, figure 5 shows the tracks a little north of Guildford station. On the left is the line to Aldershot, on the right, that to Woking; but reading upwards from the bottom what appears to be the Up Woking line becomes the Down Woking line, its former companion having turned out to be merely a siding. The track layout shown looks implausible and perhaps an error has crept in, but that is not the point: the draughtsman has, by the standards of the end of the century, seriously misused the double-track symbol. Within stations, such misuse is extremely common in this period.

In the 1850s and 1860s, there was a willingness to extend the double-track convention to larger numbers of tracks. By making the spacing between rungs of the ‘ladder’ equal to the spacing between cross-bars on the single-track symbol, a style of drawing was evolved which merged multiple-track and single-track symbols into a coherent pattern (fig 6). I have gained the impression of a particularly large number of examples in Hampshire, but this may be a consequence of my own interests and good coverage on the NLS website. Occasionally one finds the rungs ‘jogged’ to produce a brickwork pattern (fig 7). This is perhaps an improvement, in that it assists the counting of tracks.
The early six-inch

The six-inch survey of Lancashire started in 1842. However, Colby must have been thinking about the issues before that. One of those issues was the depiction of railways. The English map-user had become accustomed to seeing railways on his maps. The private surveyor’s approach of just showing a swathe of blank territory would not do. How ought a six-inch map to show railways?

If we go back to the late 1830s, it would be fair to say that there were three sorts of railways.

(1) There were railways like the London & Birmingham offering a fast passenger service with a level of comfort (for 1st class) surpassing that of ‘insides’ in a stage-coach, and with separate lines of track for trains in each direction. They handled merchandise as well, but that was secondary to the coaching service.

(2) There were railways like the Leicester & Swannington or the Bolton & Leigh, which were built primarily for mineral traffic but which were nevertheless public railways established by Act of Parliament. They usually carried passengers, often in a mixed train with goods, and at slow speed. They typically made do with a single line of rails.

(3) Lastly there were tramways connecting collieries to staithes and suchlike. These were private undertakings not sanctioned by Parliament and they did not offer a passenger service.

The one-inch employed a ladder symbol for pukka railways and a closely-spaced pair of lines for tramways. Category (2) above must have presented problems. Initially the Leicester & Swannington was shown as a tramway, the Bolton & Leigh as a railway. This may have been occasioned by the different dates at which the respective one-inch sheets were produced, or it may have been because the Bolton & Leigh functioned as a branch of the Liverpool and Manchester, or it may indicate a genuine perplexity about where to draw the line between the two symbols. So perhaps Colby tried to ease the problem by introducing a third symbol for category (2): the single line with cross-bars.

Perhaps definitions were produced using expressions like ‘a first-class railway will normally have two lines of track’. In consequence, the ladder symbol did not indicate two lines of track, so much as the sort of railway that would normally have two lines of track. This is evident from the depiction of stations and sidings. For example, a later generation would interpret the depiction of Patricroft (Fig 8) to indicate a double-track branch line covering the short distance to an iron works with a tramway, which almost (but not quite) connects with the double-track branch. Looking at a later edition of the map suggests that what was actually

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5 These things are relative.

6 The German 25k recognised 3 categories of railway (Haupt-, Neben-, and Kleinbahn) but then confused matters with concepts such as nebenbahn-like Kleinbahnen.
there was a goods yard, one of whose sidings continued across the road to link with the iron works. The ‘double-track branch’ should be understood as a spur which indicates a goods yard. The double-track symbol is not used because there were two parallel sidings but because they were part of a Class-1 railway.

One finds the same phenomenon sometimes in Yorkshire. At Durnford Bridge, figure 9 appears to show a very short double-track railway which crosses the main line.7 Again it is necessary to go to a later edition for clarification, where we find a goods yard each side of the railway line. Figure 10 shows the goods station at Manchester with tracks set at right-angles, reached by turn-plates. There are two double-track symbols side by side merely because that was the number the engraver needed to fill the space. In this case we can look at the contemporary Town Scale to see that there were actually six. There were also four tracks through the station, even though just one double-track symbol appears on the map.

By the time that Edinburghshire had been started in 1850, depiction had switched to something akin to later practice: all tracks are shown; the double-track symbol is predominantly used for running lines; other lines are usually shown with cross-bars but sometimes lack them where they might clutter the map. Railway tracks without their cross-bars are indistinguishable from fences, unless one traces them until they become unambiguous. The resulting confusion affected draughtsmen as well as map-users: sometimes what starts out as a railway track turns into a fence. Confusion sometimes led to generally erroneous representation, as can be seen if one compares the western approach to Edinburgh Waverley on Edinburghshire sheet 2 with the contemporary 1:1056.

This of course poses the question of when (or where) the change in convention occurred. Can one state that the whole of Lancashire and Yorkshire originally followed the early convention? One might suppose that the question could be answered by looking for examples where single-track and double-track symbols appear alongside one another, as in fig 11: surely that indicates the ‘modern’ convention was being followed? Not necessarily. At Newton Junction, a railway of single-track type comes in from the north-west to join a triangular

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7 Note the narrower gauge of the symbol. This appears to be associated with subsidiary features like goods yards, but I cannot present sufficient evidence at present.
junction of ‘pukka’ railways. All the single-track ‘sidings’ are connected to the former. Whether they were really exchange sidings or whether the surveyor was trying to draw the map in a manner as close to the ‘modern’ style as the Lancashire rules allowed, one cannot tell. The other problem is that the six-inch map was subject to revision, and alterations to railways might be drawn in ‘modern’ style. Thus the exercise postulated would have to be conducted using a set of six-inch maps in their original states.

**Tramways**

The division between tramways and the second class of railways seems to have been more fluid than the definitions above might suggest. It was also perhaps less controversial. In Lancashire one finds at least one instance of the single-line symbol annotated ‘Tram Road’: should this be regarded as a last-minute correction? As the century progressed, the practice of distinguishing public from private railways was abandoned altogether.

At Walton Junction, in Liverpool, the Lancashire & Yorkshire had an engine shed with a triangle for turning engines. The draughtsman evidently wanted to show it as a triangle rather than as some sort of generalised spur, but to show it as a double-track triangle was nonsensical, so he narrowed the double-track symbol and omitted the cross-bars. Was he declaring it to be a tramway? Treating it as such was perhaps permissible and provided a fairer picture of what was to be seen on the ground than any other option, but it nevertheless shows how impracticable the official policy could be.

The tramway symbol took up more space than the single-line symbol; it was therefore necessary to simplify track layouts, even when policy for other railways was to show every track. One can see this in figures 12 and 13 where the six-inch and Town scales are compared. The generalisation appears competent, although the turn-plate without its side connection looks odd. Elsewhere on that same tramway one finds a pair of parallel tracks represented on the six-inch as a single track: two parallel tramway symbols took up too much space.

*Figure 12 (left). Fisherrow (Edinburghshire. 3, published 1854)*

*Figure 13. Fisherrow (1:1056)*
Conclusion

The most important point to emerge from this short study is that depiction on the six-inch follows different principles up to about 1850; after that, it attempts to show every track (albeit only selected cross-overs) until 1888; from 1889 generalisation is introduced again. There is scope for a lot more work to refine details. This will be greatly facilitated when the NLS scanning of Town Scales reaches Lancashire and Yorkshire but it will still be necessary to use original states of six-inch sheets for these comparisons.

Appendix: Some examples of outright errors on the six-inch.

1. At Doune (Perthshire 125, published 1866) the track next to the station’s only platform appears to be a siding; there is also a very short passing loop just east of the station. Comparison with the 1:2500 shows that the apparent siding is actually a through track, and forms part of a much longer passing loop.

2. At Perth (Perthshire 98, published 1866) the large goods shed between St Leonard’s Bank and the Dundee line is bounded north by a single transverse line, and south by a double transverse line. Their significance is unclear from the six-inch. Inspection of the 1:500 shows that both of these represent a single transverse track, linked in by turntables. The northern one might be regarded merely as poor draughtsmanship: without crossbars or turntables, one has no idea what the line represents; but the southern one can only indicate a misunderstanding by draughtsman or engraver.

3. At Paisley (Renfrewshire 12, published 1864) the sidings west of the station, and perhaps to be understood as a coal depot in view of the lettering above them, are drawn with several crossovers that are most unlikely to have been approved by the Railway Inspectorate, involving facing points leading from a running line straight into a siding. Comparison with the 1:2500 shows that this is another case where the depiction of a track by a pair of lines at the larger scale has confused the draughtsman or engraver. What has happened here (multiple times) is that a crossover to an adjoining track has been drawn at the six-inch scale as though it led to the next track but one.

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UK Mapping Festival 2018

UK Mapping Festival is a unique collaboration between all those who create, distribute, use and enjoy maps in all their forms. It involves professional bodies, learned societies, government agencies, commercial companies, educational bodies, interest groups and enthusiasts, working to put on a series of events over a six-day period during the week of 2 – 7 September 2018 at ILEC Conference Centre, London. The overall aim of the festival is to increase awareness of mapping in its many forms, providing forums for learning how to use maps, training in the latest techniques for creating, managing and displaying maps and educating young and old into the great diversity and rich heritage that are maps past and present.

These illustrations are from a recent donation by Tim Langner to the Charles Close Society archive at Cambridge University Library. The document was produced in 1964 by MHLG to advise local authorities on methods of showing Rights of Way on monochrome copies of OS maps.
A map in my collection

Derek Deadman

Place’s Waterproof Paper treatment was used on a wide range of OS maps in the 1930s. One-inch Popular and Fifth (Relief) series maps of the period from England & Wales and one-inch Popular series maps of Scotland are known with at least some treated sheets available in covers for sale to the public, normally at a price higher than the corresponding untreated sheets. One series, namely the Fifth non-relief series in blue covers, seems not to have been noted before as having sheets available in water-resistant form. Tim Nicholson,¹ reporting information from an OS leaflet, does include Fifth non-relief maps in his list of series with waterproofed maps. Subsequently,² however, when efforts were made by members of the Charles Close Society including Tim Nicholson to identify which waterproofed maps specifically were known in various series, the only Fifth non-relief maps to be included were flat sheets of the Aldershot Command. Richard Oliver ³ only details Fifth (Relief) sheets known to have been offered on waterproofed paper and not Fifth non-relief sheets.

Sheet 114 (S.W. London and Windsor) in blue non-relief bookfold covers can now be added to the list of known OS sheets on waterproofed paper. It has a printing code of 6036 and E.R. initials around the Arms. Unusually, the printed cover price of 1/9 was the same as for the untreated map, rather than being more expensive. The front cover carries the code ‘W.R.P.’ (for Water Resisting Paper) top right. Interestingly, the map itself has the exact same wording describing the benefits of the new waterproofed paper stamped in red on the top right margin that has been reported on a copy of The Peak District map also printed in 1936.⁴ Place’s name does not appear in relation to the waterproofing but the paper has now become ‘a new water-resisting paper’ for which comments were invited. Hellyer remarks that ‘The number of surviving copies in this style suggest it had even less success than its predecessor’.

It will be recalled that OS had remaindered their existing stock of OS maps printed on Place’s Waterproof Paper in June 1935.⁵ Sheet 114 was printed in 1936, as was The Peak District map,

¹ Sheetlines 14, 10-13.
² Sheetlines 22, 19-21; Sheetlines 23,25-26; Sheetlines 27,25-6; Sheetlines 28,19; Sheetlines 31,53.
⁵ Sheetlines 22, 20.
confirming Hellyer’s suggestion that a ‘new’ method of waterproofing was being tried in that year. The sheet under discussion has the red stamped message about the benefits of the waterproofing method over-stamped with the word ‘cancelled’. According to Nicholson,⁶ ‘By early 1936 the end had come. The entire remaining stock – 18,673 maps – had been ‘cancelled’ (OS terminology for ‘scrapped’).’ Thus it seems that the experiment of a new waterproofing method for OS maps had been abandoned and that examples of maps treated with this new method had been consigned to be destroyed along with the remainders of the stock of Place’s Waterproof Paper. As it seems probable that other sheets in the Fifth blue cover non-relief series would have been published using this water-resisting paper, perhaps members would search their collections for further examples.

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⁶ Tim Nicholson, Sheetlines, 14, 13.
Mapping river basins

Richard T Porter

In Sheetlines 109 the editor asked for suggestions for the CCS Maps from the past series. May I put forward: Ordnance Survey England and Wales. Rivers and their catchment basins, 10 miles to 1 inch, 1867.

The map has extensive tables of catchment areas, river lengths, etc. It appears to be still listed in Stanford’s catalogue A resumé of the publications of the Ordnance and Geological Surveys of England and Wales, September 1909, p.42 (David Archer reprint 1994), which gives a size of 55 x 43 inches, scale 10 miles to an inch, 2 sheets, price 16 shillings, and also lists maps with same title for Scotland and Ireland, each 28 x 41 inches (no dates given).1

Of the various desirable attributes for the series, it is [1] unfamiliar, [2] attractive, [3] scientifically interesting. I can’t vouch for its rarity (though the dearth of references in Sheetlines may be indicative) or its OS-historical significance, but see discussion on doubts over the use of Airy’s projection.2 HSL Winterbotham 3 refers to the 1861 ‘river map’ for the Royal Commission on salmon fisheries, and says “In 1867 a Royal Commission on water supply used this same map”; Hellyer reports 4 that an unfinished proof was submitted on 11 May 1868.

It has one disadvantage: size. But would it be possible to reproduce, say, just the South sheet; if that met with approbation, then produce the North sheet and possibly the Scottish and Irish sheets on later occasions.

It had a number of thematically linked ‘successors’ – usually at smaller scales and less complete, or even degenerate. Some of these may be of interest, but I have not been able to compare them with the 1867 map. Most may well have originated independently; they seldom cite sources.

My first ‘successor’, distinctly simpler, is Map of the British Isles shewing river basins and water partings [c. 1:4,840,000]. It is plate II (a double-page spread) in TH Huxley, Physiography, an introduction to the study of nature, Macmillan, 1878. In England he has nineteen named river basins (including Severn, excluding Tweed) and many more, mainly the smaller ones, that are not named, but have their rivers shown (two of the larger ones are Nene and Test / Itchen). No rivers are shown on the Scottish islands, Anglesey or the Isle of Wight, while Orkney and Shetland are off the map. Some of the rivers (eg upper Medway, lower Bann near Coleraine) cross the water-parting [hyphenated in his text] lines. The river basins are grouped according to the sea into which their waters flow; the “general water-parting of Great Britain” (shown by the thicker pecks in extract below) thus separates the waters draining east to the North Sea, west to the Atlantic-Irish Sea-St George’s Channel and south to the English Channel. In Ireland, the “four great systems … drain to the north, south, east, and west”.

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2 Hellyer, p.181.
3 A Key to Maps, 1936, p.79.
4 Hellyer, p.51.
Relief on Huxley is by ‘woolly caterpillar’ hachures. The map is credited to Cooper & Hodson, Lith. Red Lion Sq. WC.

The 1904 revision of Huxley’s book, ‘revised and partly re-written by RA Gregory’ replaces Plate II with fig 31 ‘River basins and water-partings of England and Wales’ [and southern Scotland], at a smaller scale (c. 1:6,350,000). The same 19 named river basins in England are shown, but dozens of the smaller un-named ones are not delineated. The water-partings that are shown are depicted in greater detail than in 1878. Relief is by hill-shading. Credit, bottom right-hand corner is W&C [ie Walker & Cockerell].

Between the two editions of Huxley, falls HJ Mackinder, Britain and the British seas, 1902, but his figure 58, ‘The river-systems of England’ [and Wales] shows only four divides, all incomplete, and designed more to illustrate his arguments on drainage evolution than to record the present topography.

The first atlas-sized comparator that I have seen is in Stanford’s London atlas of universal geography. It has 110 maps (first edition, 1887, 90 maps; second edition 1893, 100 maps). Plate 9, ‘A hydrographical map of the British Isles’, 1:1,600,000, is not listed in the preface as one of the twenty appearing for the first time in 1904, so it presumably first appeared earlier. Six maps in the previous edition are said to be omitted in 1904, but this implies an increase of 14 maps, not 10.

In England, 46 individual river basins are now named and colour-tinted, with areas in square miles. Many other areas, however, are left grey and un-named, such as minor basins (eg Lymington / Beaulieu), Anglesey, Isle of Man, the Scottish

islands, most of the Western Highlands, (Orkney and Shetland are again not mapped). The divides of the river basins correlate well with Huxley 1878 and are slightly more detailed but are still mostly sweeping curves of around a dozen miles in wavelength.

Instead of Huxley’s seven great systems defined by the main water-partings of Britain (3) and Ireland (4), Stanford has five ‘great natural divisions’:
1. Central Basin, or river system of the Irish Sea – all streams of both Britain and Ireland which drain to the Irish Sea or St George’s Channel.
2. River system of the North Sea or eastern coast of Gt Britain (as per Huxley, except that while Huxley has the Lochy draining into the North Sea, Stanford has it in division 3).
3. River system of Western coast of Ireland and that of Great Britain not included in 1 – ie rivers of W. Scotland north of Corsewall Point (The Rhins of Galloway).
4. River system of the Bristol Channel (includes all rivers of S. Wales coast and N. side of SW peninsula as far as Land’s End).

The leading mid-twentieth century textbook, LD Stamp and SH Beaver, *The British Isles: a geographic and economic survey* 6 has a figure ‘The chief rivers of the British Isles’ (scale c.1:9 M) showing five of the larger basins, but chiefly of interest for ‘the main water parting’. While Huxley 1878 conceded that “the northern drainage is insignificant”, he had it almost all flowing to the Atlantic by taking his water-parting to the sea at John O’Groats (Dunnet Head now marks the division between Atlantic and North Sea); Stamp takes his more generalised line directly north to the sea at Whiten Head, east of Loch Eriboll; then the south end of Stamp’s main water-parting heads from the Parrett sources SSW direct to Lyme Bay, thus breaking up Huxley’s and Stanford’s English Channel / south coast river system and producing a single, simpler, N-S water-parting for Britain. A similar figure appears in Stamp’s *A regional geography for Higher Certificate and intermediate courses, part V, Europe and the Mediterranean*.7 Interestingly, this line direct to Lyme Bay precedes by up to thirty years the line in the *Water Areas* 1963 map (see below), where it passes west of Frome headwaters and east of the Bridport streams to separate the Avon and Dorset water area from the Devon water area.

The later editions of Stamp & Beaver also include a map of almost all England and Wales at 1:4,500,000 showing the river network in detail and either ‘Statutory catchment areas under the Land Drainage Act of 1930’ or ‘Water areas under the Water Resources Act, 1963’, accompanied by lists of the areas – 47 for 1930, 26 for 1963. Many of these areas are river basins and, where they have divides in common, their depictions are identical, all being far more detailed than in Huxley 1878 or 1904, but, especially in 1963, more are county groupings such as “26 Lancashire and Cumberland” (though the Act itself, Schedule 1, has “26 The Lancashire River Board Area, 27 The Cumberland River Board Area”).

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7 eg 7th edition, 1938.
The Oxford *Atlas of Britain and Northern Ireland*, 1963, p.36 has a map, River flow, 1:2,000,000 that shows, inter alia, 104 hydrometric areas (HA) covering the whole of the United Kingdom plus the Isle of Man. The only significant area not shown as an HA is the coastal area of Northern Ireland; greater London is an ‘excluded area’; the only other areas, usually mapped in the atlas but not defined as HAs, are the Isles of Scilly and the Channel Islands. England has 43 HAs, Wales 12, Scotland 44, N. Ireland 3, Isle of Man 1. The authority for the HAs is given (Notes and sources, p.iii) as ten-mile maps prepared by the Ministry of Housing and Local Government.

In England, the boundaries of the HAs almost always follow those of the areas in the 1930 and 1963 Acts in Stamp where possible, but despite the larger scale they are slightly more generalised in the Oxford atlas. There were 47 areas in England and Wales in 1930, 26 (or 27) in 1963 and 56 in the Oxford atlas, but comparisons are not straightforward, partly because of the use of ‘groups’ (eg Cheshire rivers group) in the atlas; about 20 HAs had not been covered by the 1930 catchment areas, mainly in peripheral zones, while ‘Lancashire and Cumberland’ was one or (Act) two water areas in 1963 but six HAs in the atlas. The Oxford ‘groups’ are basically amalgamations of small adjacent river basins, often approximating to water areas defined by county name in 1963, although here too they are usually delimited by river divides.

These notes cover in outline the first century or so since the 1860s OS maps. Winterbotham \(^8\) mentions that the catchment areas were added from the One-inch map. It would be interesting to compare this result, derived largely from the hachured map, with that obtained from the metric photogrammetric contours of the *Landranger*.

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**Midlands meets**

Lez Watson is reviving the Midland Group informal meetings. The next three meetings will take place at 19:30 on Wednesday, 12 September 2018, 9 January 2019 and 8 May 2019 at the Village Hall, in the Roman town of Letocetum (**left**) – aka Wall, Staffordshire (Grid reference: SK 0972 0651).

The village is within easy reach of the M6 Toll (junction 5), A5 and A38/A5148. The nearest railway station is Shenstone (2 miles), mainline at Lichfield (Trent Valley, 4 miles).

The first meeting will feature Bill Henwood, who will be giving an illustrated talk on *The 1870 contoured map of the Thames Basin*.

More information from Lez Watson on 07812144675 (text is better) or via his website contact form at [www.watsonlv.net](http://www.watsonlv.net)

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\(^8\) *A Key to Maps*, 1936, p79.
**Mapping of caves in Co Clare, Ireland**

Michael Richardson

I’m sure that many of us will have experienced the thrill of finding a copy of a particularly rare early sheet in pristine condition but maps by their very nature are made to be used and hence are often grubby, damaged or carry indications of their previous ownership and use. I believe that in many cases this can actually add to their interest (if not value) and some of the most fascinating examples in my collection are those where the previous owner is known and the use to which it was put can be identified. Amongst my collection of Irish half-inch sheets are two Ordnance Survey of Ireland 1950s reprints of sheets 7 and 14, the former with the initials CLR on the cover and the other giving (more helpfully!) the original owner’s name as C L RAILTON. In the right-hand margin of sheet 14 *Galway and Aran Islands*, (10-55 reprint, partly revised 1951) he had made a series of notes about caves in Co Clare and South West Galway which suggest that he was a caving enthusiast (figure 1). In fact, he was one of the foremost British cavers of the 1940s and 1950s, who did much to put caving, and particularly the surveying of caves, on a proper scientific footing.

Courtenaye Lewis Railton was born on 25 February 1907 in Purley, Croydon and trained as an electrical engineer; he worked first for Metropolitan-Vickers and later for a number of companies within the Tube Investments Group, being named as the inventor on two patents; he later became an engineering consultant. In 1941 he married Marjorie Morrison in Manchester and


See Formoyle Road junction on River Caber (for) Alpine plants

5. Caberbullog. Pot-hole near road 60’ deep 100’ diam 1830 yds long. Poulnaelva large pot SE ¾ mile from 5.

3. Disappointing swallets but cave mouth 680’ plus, Poulwillin.

4. Caves along side of small river by site of old castle, Ballynalackan.

1. Devil’s Punch Bowl, 3 risings. Blackwater, Ladle, Churn then to Coole Lough (underground to Kinvarra Bay, Balleen).

2. One mile S of Carran, small cave 45° pitch all mud & H2O (wild horses stabled legend).

**Figure 1. Railton’s annotations on OSI half-inch sb. 14**

1 Baptismal registers for the parish of Coulsdon, www.ancestry.co.uk
she accompanied him on many of his expeditions. Railton had begun caving before the war and was active mainly in Yorkshire. When the South Wales Caving Club (SWCC) was formed in 1946 he was one of the founder members and in the same year he helped to found the Cave Research Group (CRG) whose objectives were scientific rather than recreational. Lewis Railton set the benchmark for cave survey and presentation with his survey of the Ogof Ffynnon Ddu system in the upper Swansea valley, published by the CRG in 1957. It was during one expedition in connection with this survey that he made headlines around the world when he was trapped with his colleague Bill Little for almost 60 hours by rising flood waters.

The SWCC newsletter No. 19 (1957) includes a report on an expedition to Ireland by a group of club members which included Lewis and Marjorie Railton. After visiting Cork and Kerry they moved on to Clare, where their investigations are recorded in notes in the margin of his copy of OSI half-inch sheet 14, though it has not been easy to reconcile Railton’s notes with some of the descriptions given in the newsletter. Only two of the six locations marked on Railton’s map are referred to in the newsletter report and this describes two other caves not marked on the map. Of the six locations marked by Railton only one – the Punch Bowl south of the town of Gort – is named on the half-inch sheet and indeed there would have been no reason for the original surveyors to mark any underground features. However, I have studied the relevant Ordnance Survey of Ireland (OSI) larger scale sheets and found that virtually all of the features visited by Railton or named in the newsletter appear to be accurately mapped and, in some cases, named.

Details of the six locations follow, in each case starting with his marginal annotation in italics. Figures 2, 3 and 4 are reproduced with the permission of the Board of Trinity College, Dublin.


\[4\] Published online at www.swcc.org.uk/joomla-swcc/club/newsletter

1. *Devil’s Punch Bowl, 3 risings, Blackwater, Ladle, Churn then to Coole Lough (underground to Kinvarra Bay, Baleen)*. This location is about one mile south of the town of Gort but it is not mentioned in the newsletter report. All of the named risings can be found on the 1:2500 sheets of the area.

*Figure 2. Galway sheets 128-4 and 129-1 OSI 1:2500, 1893*
2. One mile S of Carran, small cave 45’ pitch all mud & H₂O (wild horses stabled legend). Again, there is no mention in the newsletter but this seems to be at the southern end of the Castletown river and close to the prehistoric fort named on OSI sheets as Cahersavaun. However, the legend about wild horses actually refers to a cave system at Kilcorney, 8 miles NE of Corofin. The “Cave of the Wild Horses” is a complex cave, which contains some internal potholes, often fills up with water and floods out on to the valley floor above and said to make a loud noise like horses. It can be found on OSI 1:2500 sheet Clare 9-3 (1895).

3. Disappointing swallets but cave mouth 680’ plus, Poulwillin. Another location not mentioned in the newsletter report. The OSI 1:2500 sheet (but not the six-inch sheet) names Poulawillin a little to the S of the location marked by Railton and also marks nearby a Spa Well (Chalybeate). This cave was first described by Bartlett in 1936.

4. Caves alongside of small river by site of old castle, Ballynalackan. This small river is marked on the half-inch sheet and indeed also on the current 1:50,000 sheet 51, whilst the six-inch sheet marks ‘sink’ and ‘rises’ in several points along its route. The 1:2500 sheet marks a cave to the east of Ballynalackan Castle.

Figure 3. Clare sheet 8-2 OSI 1:2500, 1895

5. Caherbullog. Pot-hole near road 60’ deep 100’ diam 1830 yds long. Poulnaelva large pot SE ¾ mile from 5. This refers to the cave system now known as Poulnagollum, now recognised as Ireland’s largest and mentioned in the newsletter as such, being 4½ miles long. It was described as being “basically a stream passage needing no tackle … fast progress can be made in the stream because any potholes are filled up with shale pebbles.”

Figure 4. Clare sheets 4-12 and 5-9 OSI 1:2500, 1895

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6. *Fisher Street for boats to Moher Cliffs*. The club newsletter refers to the Fisher Street Pot and (another) Poulnagollum, with the entrance being a 40-foot shaft leading to a real river passage. This is named on OSI 1:2500 sheet Clare 8-9 (1895).

One of the most interesting features in the area, though not marked on Railton’s map, is in the cave known as Poll-an-Ionáin which the SWCC newsletter reported “has a very small entrance, 800ft of low crawl and a large chamber containing a 30ft stalactite”. This had been discovered just a few years previously and is now recognised as the longest free-hanging stalactite in Europe. After a lengthy legal battle, Doolin cave was opened to the public as a show cave in 2006.

The Geological Survey of Ireland has published a 1:50,000 sheet titled *Landscape and Rocks of the Burren* (2008). This includes general information about the formation of underground rivers, caves and turloughs but gives no specific information about the cave systems visited and surveyed by Railton and others.

For those with an interest in surveying techniques and the production of maps, Railton’s achievements with the survey of cave systems should be of interest. The depiction of features above ground by means of conventional symbols together with the use of hachuring, contours and layering is well known, but the challenges facing anyone setting out to survey a cave system are very different. In the SWCC Newsletter 47 (1964) he published a review of the existing surveys of caves in South Wales and reported that most of the drawings and notes gave “no useful information or even impression of the nature of the caves they intend to portray”. He then pointed out that survey of a cave is not like that of a footpath through fields in flat country and should be more akin to “an architect’s drawing of a house and of necessity has to give a true representation of the place, indicating the dimensions and particularly height of passages, relative position of chambers, slope of roof, nature of the floor and other details”. Caves are a complex system of channels and cavities, with limited line of sight, constantly changing levels and without the benefit of daylight, but he suggested that it wasn’t necessary to be a qualified surveyor to produce a good cave survey, which should include a plan drawn with lettered and numbered squares for reference purposes and with magnetic or true north clearly indicated. Transverse sections of passages should be drawn on the plan as frequently as necessary to show changes of form. A longitudinal section is essential to show the slope or drop of floors and roof.

As mentioned in the introduction, one of Railton’s major achievements with the SWCC was his completion of the survey of the Ogof Ffynnon Ddu system (which lies below the SWCC club hut), published by the CRG in 1953. In the 1964 newsletter he reported that the published plan and sections had become

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7 Published online at [www.swcc.org.uk/joomla-swcc/club/newsletter](http://www.swcc.org.uk/joomla-swcc/club/newsletter)
incomplete as new passages had been found and work was then in hand to bring the drawings and description up to date.

Further revisions were made up to 2004 and this simplified version of the survey clearly indicates the challenge of representing the intricacies of a complex cave system on a flat sheet of paper. More recent developments in survey techniques include the introduction of GPS-based software, in much the same way that above-ground mapping has developed since the early days of the Ordnance Survey.

Despite ill-health in later life, Railton retained an active interest in caving and he was elected President of the South Wales Caving Club in 1970; it was during his Presidency that Lewis Railton died on 25 August 1971 and the following brief extracts from his obituary published in the club newsletter give some idea of his huge contribution to the development of caving in the UK, Ireland and further afield – “his many caving interests included photography, survey and development of caving equipment” and “during his career Lewis travelled extensively, visiting caves in many countries, including Yugoslavia, France, Belgium, Austria, Norway and the USA.” His widow died two years later, in September 1973, aged just 54.

Had he not bothered to write his full name on one of the two maps which I acquired, most of this information would have remained unknown outside the caving world.

Figure 5. Survey of Ogof Fynnon Ddu, by permission of South Wales Caving Club

Figure 6. Lewis Railton in Ogof Fynnon Ddu, by permission of South Wales Caving Club
Agas to OS: Oxford’s changing townscape in old maps and new
Nick Millea

Imagine a new map showing the historical layout of a familiar town on a modern cartographic background. Better still, imagine a series of maps showing the urban development of that town on the same modern cartographic background at various different stages over the past thousand years. If you are interested in British towns, then this work may well have been completed for somewhere which is very well known to you.


The British Atlas of Historic Towns project was established in 1963, administered by the Historic Towns Trust (HTT) as part of this pan-European project. The atlases are intended to provide maps and text to fill gaps in knowledge and to assist in urban studies. Each atlas aims to produce maps which help in understanding the critical stages of the town’s development; they all include a summary map which shows the town just before industrialisation began.

The HTT is a Charitable Incorporated Organisation (CIO) under the chairmanship of CCS member Professor Keith Lilley (Queen’s University Belfast), and is governed by a board of trustees which sets the strategic direction of its operations. The day-to-day running of the charity is undertaken by an executive sub-committee of the main board which oversees the HTT’s current projects. Its outputs include historic town atlases; printed historical maps; and scholarly activities, including study days.

Development of Historic Towns Atlases in Britain
The HTT’s current Cartographic Editor, Giles Darkes, joined the project in 2008, and has since provided the Trust with much needed and valued advice and expertise on the compilation and production of HTA maps and mapping. This influence has shaped the recent series of atlases starting with volume IV, Windsor and Eton.

There was a 26-year hiatus between volumes III (published in 1989) and IV (2015). The Trust took advantage of this accumulated experience by gathering sample atlases from the other participating countries and drawing on examples of best practice across the continent, settling for a slipcase model pioneered by the Swiss atlases.

Existing HTT Atlases
Volume I Banbury / Caernarvon / Glasgow / Gloucester / Hereford / Nottingham / Reading / Salisbury – published 1969
Volume II Bristol / Cambridge / Coventry / Norwich - 1975
Volume III The City of London from prehistoric times to c.1520 – 1989
Volume IV Windsor and Eton - 2015
Volume V York - 2015
Volume VI Winchester - 2017
Volume VII Oxford – in preparation

The content of Historic Town Atlases in Britain
The maps in each British volume always include a ‘Main Map’, based on a redigitising of a mid-nineteenth century large-scale map summarising the growth of the town, and showing the site of its principal medieval and post-medieval buildings and structures.
Usually the Main Map is derived from a 25-inch OS map or a comparable survey. The use of OS maps in this way means that the urban features shown share a common cartographic origin, even if the actual surveys used in the summary maps differ in date.

The Windsor and Eton atlas used OS base maps of 1869-75, York one of 1850, while Oxford will use an OS map base of 1876. The atlas of Winchester used a derived base map of around 1800, created from a synthesis of later OS maps and detailed town surveys by Godson of 1750 and Gale of 1836.

In addition to the Main Map the atlases also contain a series of maps showing the extent of the town at critical periods in its development; maps of parishes and civil wards; maps showing the town in its regional and local context; and a reproduction of an OS one-inch map showing the town’s location at the start of the railway age. All maps are printed in full colour. Because the maps are not bound into a volume, they are easy to set side-by-side for viewing purposes. So, the history and development of a town can be seen by comparing maps of the town at different dates.

Cartographic material is always accompanied by a text, the purpose of which is to provide a well-researched but readable summary of the history of the town, incorporating the latest scholarship. The text is designed to be read by the non-specialist but is supported with full references. It includes an introduction and summary of the history of the town from its inception to the mid-nineteenth century. As was the case with the recently-published volumes, the atlases in preparation will be published as high-quality board folders containing around 25 maps, eighty to a hundred illustrations, the text, and a gazetteer of the places named on the maps, along with aerial photographs of the town, reproductions of old maps and topographical views.

**Oxford – Volume VII**

The Oxford atlas project currently in progress consists of a team of six: Alan Crossley – Editor, ex-Victoria County History; Anne Dodd – Oxford Archaeology; Malcolm Graham – ex-Oxfordshire Local Studies Librarian; Julian Munby – Oxford Archaeology; supported by HTT Cartographic Editor Giles Darkes, and Nick Millea, representing the trustees who acts as an overall Co-ordinator of the project.

The atlas is focused on the 1:2500 Main Map – a digitised version of the 1876-published 25-inch 1st edition county series maps covering central Oxford.

The project has used cartographic guideposts throughout, with key historical maps of the city including those produced by Ralph Agas in 1578, (alongside the Robert Whittlesey re-engraving of 1728), David Loggan’s 1675 masterful depiction of the city, Isaac Taylor’s map of 1751, and Richard Davis’ 1794 inset on his map of the county of Oxfordshire.

Historical data is being used to create nine ‘Supplementary maps’ at a scale of 1:4000, all using a common base map, but with historical information inserted above. These maps will show the spatial arrangement of the city in 1050, 1150, 1279, ca.1400, ca.1500, 1578, the Civil War, 1675 and 1800. Additional new smaller scale maps are to be added within the text of the atlas, these being: River channels, Prehistoric remains, Roman times, Burhs, Medieval halls, Property boundaries, Street markets, Radcliffe Square, Oriel tenements,
and College property. More new maps, already created for the atlas are Turnpikes, Medieval parishes, and Suburban expansion.

Other maps to be included as loose pull-outs, and common to all the atlases from Volume IV onwards are a Regional map at 1:500,000, a Situation map at 1:40,000, a 2017 map at 1:25,000, an OS 1st edition 1-inch map, Bedrock and Superficial geology. There will also be facsimile maps of the city, for example those by Whittlesey, Loggan, Taylor, Davis, Hoggar, and Whessell.

A spin-off from the atlas project was the first in a series of folding Town & Historical Maps published by the Trust themselves and printed by Dennis Maps. The Oxford map was launched in January 2016, and has been followed by maps of Winchester, Hull, and Tudor London in 1520; with a new York map scheduled for July 2018.

**Where next for the British Historical Towns atlases?**
The HTT would like to fill geographical gaps (especially Wales and Scotland), and include a wider range of town types and urban forms. Key to progress is always the availability of local enthusiasm and finance.

**Using atlas material**
The HTT is always pleased when researchers use maps from the volumes for research and illustrative purposes.

**Supporting the HTA**
As a charity, the HTT relies on donations, legacies and income generated from investments to carry out its work. We receive no government funding but have to generate our own income.

We have ambitious plans for future work and hopes for educational outreach and other activities. We also need funds for specific aspects of projects - for example, to complete a particular map in an atlas. We plan to increase our fundraising efforts sharply in the next few years and to give our work a higher profile.

Study days designed to promote individual atlases have already been run. Firstly a one-day event held in conjunction with the University of Oxford's Department for Continuing Education, took place in March 2015 and focused on the Oxford atlas. A similar event occurred in April 2016 at the University of York in support of the York project. Each day involved a series of papers presented by authors of various sections of the atlas, as well as contributions on the HTA project in general. Plenty of supporting material outlining how the atlases are produced was also on hand so attenders could immerse themselves in the editorial processes involved in creating modern maps compiled from historical research.

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**Special offer for CCS members**
10% discount is offered to CCS members by Oxbow Books on the Historic Towns Trust atlases (Windsor and Eton, York, and Winchester).

Go to www.oxbowbooks.com/oxbow and use code CCS18 at the checkout. Valid until 31 December 2018.

**Irish Historic Towns Atlas project**

Based on a series of annual seminars run by the IHTA project from 2012 to 2014. Its predecessor Maps and texts: exploring the Irish Historic Towns Atlas was published by the Royal Irish Academy in 2013.

Further information can be found at www.ibta.ie or www.ria.ie
New online Ordnance Survey maps
and related resources at National Library of Scotland

Chris Fleet

1. Initial GB1900 gazetteer for searching OS six-inch, 1888-1913 names

As reported in Sheetlines 111, this new gazetteer allows basic searching of 2.52 million names and related textual content on Ordnance Survey six-inch to the mile, 1888-1913 maps of England, Scotland, and Wales, dating from a century ago. The names have been gathered through the GB1900 project, which ran from September 2016 to January 2018, transcribing text content from these maps. Please note that this is a crowdsourced data project, and ongoing cleaning, editing and enhancement of this gazetteer will result in more accurate releases of the data in future. Parish and county names have been added to the transcribed names to make the names easier to tell apart and to provide locational context.

- Search the names in our Explore Georeferenced Maps viewer (http://maps.nls.uk/geo/explore), under Search OS six-inch 1888-1913 names:
- Query specific names and their distributions at: http://geo.nls.uk/maps/gb1900
- Access raw gazetteer data at: http://www.visionofbritain.org.uk/data

Below: How the GB1900 gazetteer can be searched in the Explore Georeferenced Maps viewer. It also illustrates the farm of Lubheasgarnich, now under Loch Lyon in Perthshire, one of many thousands of places that are shown on these maps, which have disappeared from later maps and gazetteers.
2. Ordnance Survey Books of Reference for Scotland, 1859-1882

The Ordnance Survey Books of Reference (or Area Books), *(such as Forres below)*, record acreages of each land parcel on the OS 25 inch to the mile County Series maps, and often land use (except in settlements and for counties surveyed after 1879). From 1859, Books of Reference were published for specific parishes, which the National Library of Scotland bound together into 22 volumes, ordered alphabetically by parish.

- Search Books of Reference by county and parish: https://maps.nls.uk/os/25inch/books-of-reference
- Search Books of Reference by volume (with parishes ordered alphabetically): https://digital.nls.uk/97363649

These volumes do not cover all counties in Scotland:

- No Books of Reference were published for those counties surveyed at the six-inch to the mile scale prior to 1855 (Edinburgh, Fife, Haddington, Kinross, Kirkcudbright, Wigtown, and the Isle of Lewis).
- From 1855-1859, the Books of Reference information was usually published as A0-sized lithographed sheets, which could be cut and bound into books. We are planning to scan these sheets during 2019. These sheets cover parishes in the following counties: Ayr, Berwick, Dumfries, Forfar (selected parishes), Lanark (selected parishes), Linlithgow, Peebles (selected parishes), Renfrew (selected parishes), Roxburgh (selected parishes).
3. OS National Grid 1:1,250-1:2,500 1940s-1960s maps of Scotland

We have now put all our out-of-copyright OS National Grid 1:1,250-1:2,500 maps of Scotland online. Initial scanning work last year focused on 1:1,250 scale maps covering larger urban areas, whilst more recent work has supplemented coverage with 1:2,500 scale maps covering smaller settlements and cultivated rural areas. We are now scanning National Grid 1:10,560 scale maps which will provide comprehensive coverage of all areas.

- Search OS National Grid maps of Scotland: https://maps.nls.uk/os/national-grid/index.html

Detail from OS 1:2,500 sheet HU4641-HU4741, revised 1965, published 1966, showing central Lerwick

Special offer for CCS members

20% discount is offered to CCS members on reprints of Cold War era large-scale Soviet military maps of British and American cities (such as Edinburgh, as this extract showing the Castle and Princes Street) and smaller-scale topographic maps of many parts of UK and USA. Details at http://redatlasbook.com Follow the link to View and Buy and enter code CCS-20 at the checkout.
Kerry musings

David Archer

With a postal business selling used Ordnance Survey maps, I always tried to describe items as accurately as possible, first by post and in more recent years by email. A clear description of what was in front of me was usually sufficient. But thinking about it now, I can see that certain terms I used quite freely could be argued to have been misleading. But nobody ever complained that something was wrongly described.

Most of our customers were not map collectors, so one had to explain things clearly. At the most basic level, maps were described as either flat or folded in covers. If in covers, one could go on to describe the cover or if necessary, refer to an image in *Map cover art*, which would usually suffice. Flat maps were described as such, or sometimes as ‘paper flat’, ‘paper folded without covers’, ‘previously folded but now kept flat’ or ‘flat map previously folded’, ‘flat with a single vertical fold’ and so on. The description ‘rolled maps’ or ‘paper rolled’ never came into it, yet everyone was still happy. If a map was wanted and I knew a copy was in a roll, I would take it out, and probably describe it as a flat sheet in good condition, despite looking at it on the surface all curled up from having been in a roll for several years. If a sale was agreed, it would be popped into a tube and posted, only to immediately curl up when taken out at the other end. Nobody complained. Ever. Even if I sent a flat map which had never been folded, it would still come out of the tube after a couple of days with a slight curl. Flat? Not really if one were in a court of law. But who is going to offer a flat sheet and tell the customer that it will acquire a slight curl during delivery? It never occurred to me to do so, and probably describe it as a flat sheet in good condition, despite looking at it on the surface all curled up from having been in a roll for several years. If a sale was agreed, it would be popped into a tube and posted, only to immediately curl up when taken out at the other end. Nobody complained. Ever. Even if I sent a flat map which had never been folded, it would still come out of the tube after a couple of days with a slight curl. Flat? Not really if one were in a court of law. But who is going to offer a flat sheet and tell the customer that it will acquire a slight curl during delivery? It never occurred to me to do so, and every customer seems to have accepted that flat sheets would be rolled sheets on receipt and any curl would quickly relax back into shape. Only twice was I asked to send flat sheets flat and not in a tube, and luckily, both orders were for six-inch quarter sheets. Had it been for a flat Seventh Series or 1:50,000 map, I would have said forget it.

A rolled flat map, whether on its own or rolled with others is usually bad news. Why? Because people seldom look at maps kept in a roll, the most hostile form of map storage. A map folded in covers can be opened at once; a flat map in a plan chest can be located and slid out, but a single rolled map is difficult to find, as only the end is showing, and it might be squashed by adjacent rolls, if not crushed. Once taken out, it needs weights at each corner to keep it open, and even placing the weights can be tricky as the tendency is for constant curling. No, a map rolled is a map lost in many respects, even more so, if like me, one just pops another rolled map into the open end of a roll. Being positive, this does mean that maps in rolls might be re-discovered, giving pleasure a second time. But it is a very big might.

Major problems arise if one wants a map from the centre of a long-time-stored

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1 Not to be confused with fake news, such as advertising Bartholomew’s maps as Ordnance Survey maps.
roll as just to open the roll one needs heavy weights, always heavier than one thinks, on all four corners to keep the contents anywhere near flat. Increasingly heavier weights are needed the fatter the roll and the longer stored. Then, having peeped at the corners of the weighted pile and found the required sheet, always towards the middle, it cannot be pulled out as from a plan chest drawer, since it is weighted down. So you lift the weight in the top left corner, and replace it on the wanted sheet, leaving the released corner to curl towards the centre, and repeat for the lower left corner. The released left half of the pile then shoots off to the right, curling over the other two weights, if you are unlucky. If lucky, the top half of the pile moves with such force that it and the right-hand weights land on the floor, relieving pressure on the bottom right side of the pile which now shoots off to the left and curls around the recently moved weights before falling on the floor on the left of your working surface. So far, so good. At least the wanted map is now on the floor, on top of a now smaller roll which you pick up and place on the surface in order to repeat the whole exercise by first placing the two right hand weights on top of the pile, but putting the two weights on the left under the wanted top map, which, being very light, will roll itself around the two weights on the right and be free from the others. Easy peasy.

All right, let us assume, wrongly, that I am not very good at handling rolled maps. What other problems might be encountered? Well, if one has a list of what is in the roll, one might peep at the weighted sheet corners looking for the ninth sheet down, Sheet 124, and it is not there. So one checks the map corners against the list and all are there except the wanted sheet. How can this be? The list was only complied a year ago and you are positive nothing has been taken out. An hour later, you find the fugitive. Between the eighth and tenth map. Right in the centre of the pile and a far smaller sheet than all the others; invisible to anyone peeping in at the edge of the pile. Even if a careful handler places such small sheets at the corners of a pile, they always wriggle into the middle.

Which leads on to the question of maps of different sizes. If a pile of maps is to be kept rolled, is it better to build the pile as a pyramid, with the smaller maps forming the tip, so that they will be within the roll, or inverted, with the tip underneath, so that the smaller maps are on the outside of the roll? Advantages and disadvantages. Either way, instinct says that the smaller maps need the protection of the wider maps, which will take any knock and will buckle at the edges, thus protecting smaller sheets. But why do we feel small sheets need protecting, and are quite happy that larger sheets get damaged, regardless of importance? Are we able to say that yes, broadly speaking, considering the whole output of the Ordnance Survey since 1791 or 1805, that smaller maps are the most valuable, or most interesting or the more uncommon sheets, and thus need protecting? Old Series quarter sheets, New Series, Revised New Series, Third Edition small sheet series, six-inch quarter sheets, all versus the larger New Populars, Seventh Series and 1:50,000 maps? I suppose that it is not really a case of looking to protect smaller sheets if rolled with larger sheets, they cannot help but be protected, whether they are on the outside, inside or inter-filed.

I still have not found a satisfactory way of searching a tight roll for a specific
map. The quickest way is indeed to open it out by using weights and then search, with searching being easier if the smaller maps are on the inside and thus on top when open. And if anyone complains that this will mean maps being out of order within a roll, well, in my experience most rolls are of maps in random order, even if they were in order originally. Rolls have a will of their own and given half a chance will curl up in an instant with the formerly top map buried deep within the pile, leaving only the edges along one side showing. And if you slide your fingers beneath the lowest sheet edge, if you can decide on one, and again unroll the maps, I guarantee that no longer will the original top map be uppermost. Which is why I try, when rolling maps, to put a piece of newspaper just sticking out from the edge of the top map, so that I know where the top sheet is.

In the early days of our business, if I had to send 1:2500 County Series maps by post, I would visit the local carpet shop and get some very thick cardboard tubes that the carpets came wrapped around and saw them to length. As I have mentioned elsewhere, the weight did not really come into it, as one could send more than I was happy to lift for a pittance. And if an order had more than would fit in one tube, I just taped several together as one parcel. No objections from Royal Mail in those days, but things have changed dramatically. As I write, March 2018, a tube under 900mm/35” in length, weighing under 2 kg will cost £5.00 Second Class, but 2.01 kg will jump to £13.75, compared to £6.49 with a carrier. Be careful when using Royal Mail.²

I was never happy with sending a large order in multiple tubes, and eventually realised that over a certain number, rolled flat sheets were self-supporting and did not need a tube. A heavy tight roll could be padded at both ends with crumpled newspaper, and then the whole wrapped in bin bags secured by rings of brown tape, and again, sent cheaply.

I cannot remember ever sending anything other than 1:2500 sheets as a self-supporting roll, so if other series were found to be too many to go into a tube, it was easier to roll them around the tube. I have always been aware that whatever I put into a tube, someone will have to get out at the other end, which means that although one can roll maps into an exceedingly tight roll and pop them into a tube, it will be almost impossible to get them out. Thus, I always try to see that whatever is in a tube allows an index finger to be inserted and pushed against the innermost map in the direction of its edge to relieve the pressure and allow the roll to be eased out. But what if one cannot reach the maps in a tube? From either end? Saw one end off? No. I once saw Dave Watt with such a tube and he simply held it vertically, repeatedly patted the open top end with the palm of one hand to make a popping sound, and the maps smoothly rose to the tube end. Really neat. I have used this technique ever since.

² If the customer insists on Royal Mail and I split the order, it would be £10 postage, but the volume in the mail will be double, two large tubes, rather than what Royal Mail might be hoping for: two smaller packets which are easier to handle.
Rowley award 2018

Having considered all eligible contributions to the last six issues of *Sheetlines*, the judges decided that Michael Spencer should receive the 2018 Rowley award for his contributions to *Sheetlines* 110.

It was felt that his contributions were fresh and original, questioning the Ordnance Survey world around him. So often we see things which we are not sure of, or feel are not what they should be, and only if such thoughts are shared with others will answers and explanations be forthcoming. *Sheetlines* is rightly the place for recording the results of academic research on Ordnance Survey matters, but equally, it needs members to raise questions they cannot find answers to, and to note perceived failings in the production, use and research into OS maps. Michael has asked such questions, and all members will have benefited from the replies received.

Rowley would like to thank Mike Cottrell and John King for being judges; and it is hoped hope that there will be an equally excellent pool of articles from which to make the 2020 Rowley award.

The Great Lines Project: Charles Hutton’s contribution to the invention of contours

Karen Rann’s talk at Cambridge University Library on 13 October will focus on mathematician Charles Hutton who – whilst working for the Greenwich Royal Observatory – was tasked with computing the data collected by surveyors working on the mountain Schiehallion during an experiment to “weigh the world”. Hutton’s description of his subsequent map, and its calculations, were published by the Royal Society in 1778.

Although this manuscript map is missing, from his calculations Karen – working with a present-day mathematician – has been able to recreate a version of the missing map as well as ‘compare and contrast’ models of Hutton’s contours compared with modern OS altitudes.

The talk will also touch on some of the earliest manuscript maps to include isobaths, and cartographic depictions of the mountain Schiehallion (pre and post contours), in a bid to understand how ‘elevation’ has been depicted on maps through history.

Booking essential: contact Bernard Anderson (details inside front cover).

Karen Rann is a freelance visual artist with a particular interest in space and place. Most of her work is research-based and a result of artist residencies. Usually the outcomes are in the form of installation, sculpture or performance, though now map-making is added to the list.
**Book review**


While the members of the Charles Close Society are defined by their interest in OS maps – and it is this that makes them distinct from other groupings of map-lovers, I suspect that many, like myself, cannot resist taking interest and delight any great collection of maps. And among map collections there are few so fascinating and beautiful as those very large atlases produced in Germany in the period between, roughly, 1850 and 1950 which are designated on their covers with the term ‘Handatlas’. Over the years I have added half-a-dozen to my shelves and they continually fascinate me not only as a series of witnesses to the shifting boundaries of ‘nation-states’ – in the heyday of that notion – but by their virtuosity as works of cartography and book-production. Moreover, they are far more common than the German title suggests. This is because these atlases often took on the externals of a work produced in Britain with titles such as *The Harmsworth Universal Atlas and Gazetteer* (London c.1906-7) whose initial pages make it appear as an atlas whose primary focus is the British Empire. There were also many special adaptations for the British market such as *Stieler’s Atlas of Modern Geography* (Gotha and London 1909). In both cases, the actual maps remained the same as in the German atlases, but the reverse side of each double-page spread, the map’s title, and the forematter for the collection was printed in English. But in whatever form they come, every one of these atlases is a monument to cartography, yet they are little studied – until now.

What Espenhorst has done is to examine how this form arose within German map production – starting at the very beginning in every way. Over the years I have often chuckled to myself at the misnomer: ‘Handatlas’ means something like ‘a handy atlas’ or a ‘manual atlas’ but one would need to be a giant to describe most of these as convenient to use (my 1910 Andree atlas weighs in at just over 5kg). So the origins of the name, and the concept, is his first topic (pp. 16-23); and he then proceeds to follow every aspect of their production from how the plates were inscribed to methods used for binding. One meets not only the maps but the people behind them. In this first volume he follows the fortunes of the six main firms of atlas producers (Weimar, Stieler, Meyer, Sohr-Berghaus, Andree, and Debes) giving an account of how not only their products developed over the years, but how in the process the modern atlas we all know – even in its simplest school format – emerged from these great houses.

This book, translated into English by George R Crossman, is a rare combination of historical analysis and very precise cartobibliography, so that it will appeal to historians of cartography as well as anyone wishing to locate a specific atlas. With excellent colour illustrations of every detail mentioned in the text, along with many pictures of those who produced these books, *Petermann’s Planet* is one of those books I am locating on the ‘reference shelf’ of my study!

*Thomas O'Loughlin*
I was interested in Thomas O’Loughlin’s article about romers.1 In the 1980s and 90s I served in the Army Reserve (then known as the TAVR).

For map-reading/field navigation, the RA Protractor (above) was used, in conjunction with the British Military Marching Compass (left). Note the military bearing system is mils rather than degrees. Silva compasses (also in mils) were also issued on occasion and were a lot simpler to use.

I cannot recollect using the term ‘romer’ at all. For a six-figure grid reference I tended to estimate the tenths and for an eight-figure grid reference the protractor would be used and the hundredths estimated.

Paul Swindell

1 Sheetlines 111, 50-54.
I was visited recently by an OS officer who was clarifying some mapping issues in my area. This is the first time I have ever interacted with the OS ‘on the ground’ and I was impressed by his professionalism and care with his work. In a later email he clarified for me that: “I suppose I refer to myself as a Cartographic Surveyor. Mostly my job involves updating and maintaining changing topographic features on our basic scales mapping.” In our case, he was asking about the names of the various buildings in the small cluster of three dwellings that we are part of. I checked with the other owners, annotated and corrected an extract of the six-inch mapping of our group of buildings, and sent it off to the surveyor who duly updated the large-scale OS mapping.

Given the recent run of Sheetlines interest in merelying I also asked him about this and he noted: “When a feature with a merely boundary has changed we won’t alter the boundary in the field but we are required to refer to the missing section as defaced. The OS has a dedicated boundaries section at our Southampton headquarters who are responsible for updating the various boundaries when required.”

When the surveyor was in our kitchen checking on property names, I mentioned that I was interested in the history of OS mapping and was a member of the Charles Close Society. He had never heard of the CCS. There is probably some proselytising to be done there.

Paul Bishop

Further to Derek Deadman’s article on page 40 of this issue, the cancellation statement over the red text appears to withdraw the offer of a replacement map on ordinary paper and to withdraw the request for comments. Quite clearly the entire stock of 18,673 maps was not scrapped. It makes me wonder whether Tim Nicholson saw a statement to the effect that all 18,673 maps had been cancelled – meaning the application of a stamp such as on this specimen – and jumped to the conclusion that this was the sort of cancellation applied to German stock being reused in 1944: the defacing of the printed map so that another map could be printed on the reverse. But, of course, the OS wasn’t doing that sort of thing in 1936.

Has anyone compared Place’s Waterproof Paper with the 1936 OS product? I am not suggesting any form of destructive test, but one can test the texture (David Archer’s ability to distinguish papers by touch is legendary) and opacity (hold both up to a uniform light source and view the reverse).

Rob Wheeler

Let’s be honest, dad’s love OS Maps. They just can’t resist!

This was spotted by Rob Wheeler on Ordnance Survey publicity release. Rob asks: Is this the first ever greengrocer’s apostrophe to appear in an OS communication? One wonders what size of explosion would have occurred had this gone out in, say, Sir Henry James’s time.
Do you write on your maps? Probably not, because this would obscure detail and spoil its appearance. Maybe some notes in the margins, or in the sea, could be permitted?

A possible exception would be to use a map for a specific purpose, such as planning the locations of new wind turbines, or maybe a camping and walking holiday.

An example of a heavily annotated map for this purpose was found at the recent AGM map market. (One-Inch Seventh Series sheet 12, published in 1959)

A trek of about 140 miles was to start and finish at Stornoway, over a period of about 14 days. Possible camp sites are identified along with the distances between them. The annotations are fluent, without any corrections, using a fountain pen.

Several constellation diagrams are added in the sea beyond West Loch Tarbet (left) suggesting that some star gazing, or maybe night navigation, was anticipated. Much harder to explain is the beautifully drawn map of the shipping forecast sea areas! (right). Maybe they planned to listen to “The Home Service” on that recent innovation, a small transistor radio, in order to work out the weather forecast for the area?

*John Winterbottom*
I wonder whether anyone else spotted the map of “Exminster” on the wall of DI William Beech’s office that could be seen in episode two of ITV’s drama Innocent, broadcast in May.

The production makes much of its coastal locations and it was filmed in a variety of places including Southsea, Bosham and Hayling Island. The map appeared to show an enlarged section of OS 1:250,000 mapping covering the coast from Southampton to Bognor Regis. It was almost a case of “blink and you’ll miss it”, but things certainly didn’t look right. All came clear when I freeze-framed the video recording, which revealed that the built-up area of Portsmouth had completely gone and the M275 led to an apparently empty space. A new, fictitious urban area about the size of Southampton lay a few miles to the north. Hayling was very much an island since it had lost its road bridge to the mainland. Perhaps the most obvious change that first caught my eye was that maybe half a kilometre of the West Wittering coast had been swept away and Chichester Harbour had doubled in size.

It intrigued me that they had gone to so much trouble to customise their map to make it less obviously the Portsmouth region. Has anyone come across other examples of OS maps being modified for TV or film?

David Sherren
In ‘Christmas teasers’¹ I asked whether there were instances of the same six-figure numeric National Grid Reference occurring with all of H, N and S prefixes. In the subsequent Sheetlines² I gave my solution as Foula (HT 960400) and locations in Northumberland and Salisbury Plain, 500 km and 1000 km respectively south of there. Now here’s an associated anomaly.

The Grid Ref for Sula Sgeir is HW 618300. What you find 500 km to the south depends on which map you look at.

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¹ Sheetlines 110, 60.
² Sheetlines 111, 64.

First, (top left) the OS Map Index for 1992 shows NW 618300 to be in the sea in the North Channel.

Second, (top right) the OS 1973 route planning map, by imposing the ‘British’ National grid upon Northern Ireland, shows NW 618300 to be just south of Belfast Loch.

Third, other OS Map Indexes show a more appropriate depiction of this area. This is from the Index to 1:10,000 and 1:10,560 Scale Maps, undated in the title but dated 1994 on the print.

Peter Haigh
**Query: Other route with public access (ORPA)**

<table>
<thead>
<tr>
<th>Other routes with public access (not normally shown in urban areas)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The exact nature of the rights on these routes and the existence of any restrictions may be checked with the local highway authority. Alignments are based on the best information available.</td>
</tr>
</tbody>
</table>

**Martin Sullivan:** I am trying to establish the criteria used by Ordnance Survey to mark roads as ORPAs. OS tell me it is supplied by the relevant highway authority. However, when I ask highway authorities they say they don’t. The ORPAs are typically those roads (often called green lanes or green roads) that are unsurfaced but appear on the List of Streets (LoS – roads maintained at public expense from the Highways Act 1980). The anomaly is that although many on the LoS are shown on OS, it is clear that not all are.

**David EM Andrews:** An “other route with public access” is a form of public Right of Way. As such Ordnance Survey is not the legal authority to determine whether a road/lane is an ORPA. The local authority, usually the County Council or the National Park Authority is the body which has the statutory duty to record public Rights of Way. Ordnance Survey is responsible for surveying physical features as they exist on the ground at the time of the surveyor’s visit, regardless of ownership or access rights.

Some small-scale Ordnance Survey maps show the routes of public Rights of Way, but this information is provided by the relevant local authority and Ordnance Survey accepts their information without question and publishes it on the maps. This can lead to some anomalous results, and there are instances of public footpaths and bridleways being shown on Ordnance Survey maps crossing reservoirs and lakes!

**Alan Bowring:** I’d suggest that an ORPA is not so much a form of public Right of Way (my italics for emphasis) which might be taken like the terms ‘restricted byway’ or ‘public footpath’ to signify certain rights on the part of the public to use a route labelled thus (rights set out under statute law and clarified by case law over an extended period of time), but a label created by Ordnance Survey to describe a data set provided by highway authorities which refers to routes, generally recorded on the ‘list of streets maintainable at public expense’ kept by each highway authority, over which there is at the least, a right of public passage on foot but where we may have an expectation – but no guarantee by their being labelled ORPA – that public enjoyment will amount to full vehicular rights.

I’d agree with David in that the sometimes poor state of highway authorities’ records puts OS in a difficult position on occasion!

*Above: OPRA symbol for 1:25,000 maps, as described in the legend file available at [www.ordnancesurvey.co.uk/docs/legends/25k-raster-legend.pdf](http://www.ordnancesurvey.co.uk/docs/legends/25k-raster-legend.pdf). The symbol used on 1:50,000 maps is similar but red.*
**Toponyms, homonyms and synonyms – solution and solvers**

For the last puzzle, we asked you to travel from north to south and identify place-names appearing on *Landranger* maps. This proved more of a challenge that intended, as your hasty setter had guessed, rather than checked, the relative latitudes of Preston and Leeds. Solvers were undeterred, however, and for clue 9 most offered Skipton as an alternative, which fitted the clue just as well, and the geography better, than the intended answer.

1. Shout **Yell**
2. Believe in better **Skye**
3. Scots unable **Canna**
4. Consider **Mull**
5. Greenback **Dollar**
6. Carefree **Blyth**
7. Remove skin **Peel**
8. Stop moving **Settle**
9. Continued **Preston**
10.Is ahead **Leeds**
11. Fred’s stone **Flint**
12. Shape or growth **Mold**
13. Browner **Towcester**
14. Bring under control **Thame**
15. Sell drugs **Deal**
16. HG **Wells**
17. Browned **Chard**
18. Milkers **Cowes**
19. Share resources **Poole**
20. WC **Looe**

Congratulations to Chris Harvey, Bill Henwood, Bill Hines, Paul and Christine Horbury, Phil Pearson, David Purchase, Michael Spencer, Malcolm Stacey and Tony Walduck.

**Prize challenge – do you believe in ferries?**

Like Peter Pan and Wendy, we do believe in ferries, but there are far fewer now than there used to be; Ballachulish, Erskine, Newcastle-Bergen, Harwich-Esbjerg and many other old favourites all gone. To celebrate the survivors (which include Fleetwood to Knott-End-on-Sea, *left*), can you name:

1. car ferries crossing estuaries, straits, etc around the coasts of the British Isles (UK and the island of Ireland), including short crossings to inshore islands, such as Isle of Wight, Inner Hebrides, etc? Which of these forms part of a regular bus service?
2. car ferries providing services to more distant islands of the British Isles and to continental Europe, including those plying the North Sea, English Channel, Irish Sea, the Minch, Pentland Firth etc.
3. any other British car ferry (I can think of only one not fitting the above categories, but you may know of others).
4. passenger-only ferries (all-year or seasonal), including those on the non-tidal reaches of rivers and lakes?

Compile your lists in clockwise order round the coasts of UK and Ireland from the far north, ignoring purely ‘round-the-harbour’ and tourist pleasure cruises etc.

Don’t worry if your list is incomplete; we’ll try to publish a single comprehensive list in a future *Sheetlines*. Submissions to the editor by 30 September. The prize for the best answer (as judged by the editor) is your choice of any pre-2010 CCS publication.