

Sheetlines

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THE CHARLES CLOSE SOCIETY
for the Study of Ordnance Survey Maps

Number 115

August 2019



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This year's AGM in Alnwick offered the opportunity to view guillemots and puffins in the Farne Islands (*left*) as well as the more usual pleasures of meeting old friends, discussing the Society's affairs (*right*: Hon Sec Rob Wheeler and Chairman Gerry Zierler take questions) and browsing the map market. Next year's event is in Lincoln on 9 May 2020.

Other future events include meetings in Wall, Staffordshire on 11 September,¹ Redbourn, Hertfordshire on 12 October² and Notting Hill, London on 8 February 2020,³ with other possibilities still in planning. To keep informed, make sure you are registered to receive CCS News emails and check on the Latest News page of the website.⁴

Members may also be interested in the exhibition *Talking Maps*, running at the Bodleian Library, Oxford until March 2020 and the accompanying series of free lunchtime talks at 1pm every Monday, Wednesday and Friday. Cambridge University Library also offers a series of free talks in the *History of Cartography* seminar series at 5:30pm on occasional Tuesday evenings.⁵

The committee have been considering how to increase the effectiveness of our media presence in furthering our charitable aims of advancing public education and you can read about the current strategy on page 2.

We are proposing to introduce a new facility to enable members to make contact with each other, to replace the Almanack which was discontinued in compliance with Data Protection legislation. Please read the details on page 45 and get in touch if you are willing to participate.

¹ details from lez@watsonlv.net or contact the Visits coordinator (details opposite).

² details from david-watt@outlook.com or the Visits coordinator.

³ details from John@Jomidav.com or the Visits coordinator.

⁴ <https://www.charlesclosesociety.org/latest>

⁵ <http://www.lib.cam.ac.uk/collections/departments/maps/cartographic-events/camsem>

How CCS communicates

Gerry Zierler

With the recent launch of our Facebook group the Society has a variety of ways of spreading news and information to members and the public as well providing the opportunity for people to raise questions and comments and engage in discussions with the Society and each other.

Our various initiatives work to complement each other and each serves a particular purpose. We are continuing to develop them in ways which respond to changes in technology and people's wishes and expectations.

The website is relatively static and serves as a repository for information about the Society and Ordnance Survey. Here you will find a wealth of valuable resources, such as bibliographies, carto-bibliographies, the history of OS and other national mapping organisations of the British Isles, a digital archive of over 200 images of historic mapping, almost 2000 images in the map covers collection, back issues in the *Sheetlines* archive, the Sheetfinder map display, the virtual museum, and much, much more, including the online shop for renewing membership and buying publications.

Sheetlines is our print journal, published three times a year, containing articles of OS and related interest, mostly submitted by members.

CCS NEWS is the email news service, sent to subscribers at roughly monthly intervals, or whenever there is some new event to publicise or topic to be notified. Anyone not already a subscriber and wishing to receive these should contact the Membership secretary.

The newly-launched Facebook group allows conversations in which anyone, member or not, is free to join and lets us publicise our activities and expertise to the wider world. This will, we hope, attract a new younger generation of map-lovers and map-users to join the Society and take things forward in new directions.

Finally, not managed or controlled by the The Charles Close Society, but with overlapping membership and interests, is the io discussion group, where users post questions, answers and comments about OS maps.

Links

CCS website: <https://www.charlesclosesociety.org/>

CCS NEWS: to be on the mailing list write to memsec@charlesclosesociety.org

Facebook: <https://www.facebook.com/groups/charlesclosesociety/>

io group: <https://ordnancemaps.groups.io>

Brightling and the principal triangulation

Robert Fenner

On a recent visit to the National Trust property Batemans, Kipling's home in East Sussex, I passed by the village of Brightling. Here two things immediately drew my attention, an observatory dome and a few hundred metres north an obelisk. To someone who had spent over thirty years of his life in the geodetic branch of the OS as a field surveyor such objects have a particular relevance as likely intersected trig points. The name Brightling rang some distant bell within me and some days later at home in Worcester I did a little research.

Firstly to the OS trig archive and certainly the obelisk is a listed trig, fixed in 1949, but no mention of the observatory. Looking at old triangulation diagrams of the principal triangulation I realised where I had seen the name Brightling before. It is shown as a primary trig point. The internet shows the observatory to have been completed in 1818 but before that, in the late-18th century, a triangulation for the map of Sussex seemed to terminate at a station called Brightling Down. The main triangulation heading east reached there in 1822, four years after the observatory was built, continuing again in 1844 and the station, referred to as Brightling was presumably the observatory dome. The interval 1822 to 44 was the result of Colby and his surveyors being given a priority task with the triangulation of Ireland.

A further place of reference was Cassells Gazetteer of Great Britain and Ireland. A six volume 1893 edition has been passed down within my family for many years. The entry for Brightling I found most interesting (*figure 1, below*).¹

Brightling, pa. and vil., E. Sussex, $6\frac{1}{2}$ N.W. of Battle; ac. 4,812; soil light, overlying limestone. The church of St. Thomas à Becket is chiefly Perp. There is a pyramidal mausoleum, 24 ft. high, near the church. B. Down is 636 ft. high, and an obelisk called the "Needle," 650 ft. above sea-level, was of use in carrying out the Ordnance Survey. A feeder of the Rother flows past the pa., and B. is said to contain more woodland than any pa. of its size in England. Chicken are largely bred, and timber for hop-poles produced, in the neighbourhood. *B. Park* is a seat, and just outside of it, commanding a fine view of Pevensey Bay and three counties, is an observatory fitted up with astronomical instruments.

¹ Page from Cassells Gazetteer.

Whilst referring to the obelisk it says the Ordnance Survey found it most useful in carrying out their survey. Puzzling because being an intersected trig point there would be no surveyor activity at the site. More likely the reference was to the nearby observatory, which if it was a primary trig point, occupied or just intersected, would have involved some surveyor activity. This could have been heliostat or light keeping operations in order that the point would have been identified from the surrounding distant primary trig points. This may well have created local attention.

Following this I referred to the *Account of Principal Triangulation*² where the description of stations and the observations taken at them are shown. Interestingly, no description of a Brightling station or observations from it are shown. However, from six surrounding stations Ditchling, Crowborough, Wrotham, Frittenfield, Fairlight and Beachy Head observations are shown into Brightling observatory dome. One old diagram also shows a ray from the primary Butser, 100 kilometres to the west but it is not listed in the Butser observations. Presumably the observatory dome was an intersected primary point, hence no description or observations in Clarke.

Verifying the fact that it was a coordinated station, the 1908 edition of the 25-inch County series plan shows the appropriate symbol. It also shows a bench mark within the observatory, which until I saw the plan I hadn't realised had an opening within it (*figure 2, below*).



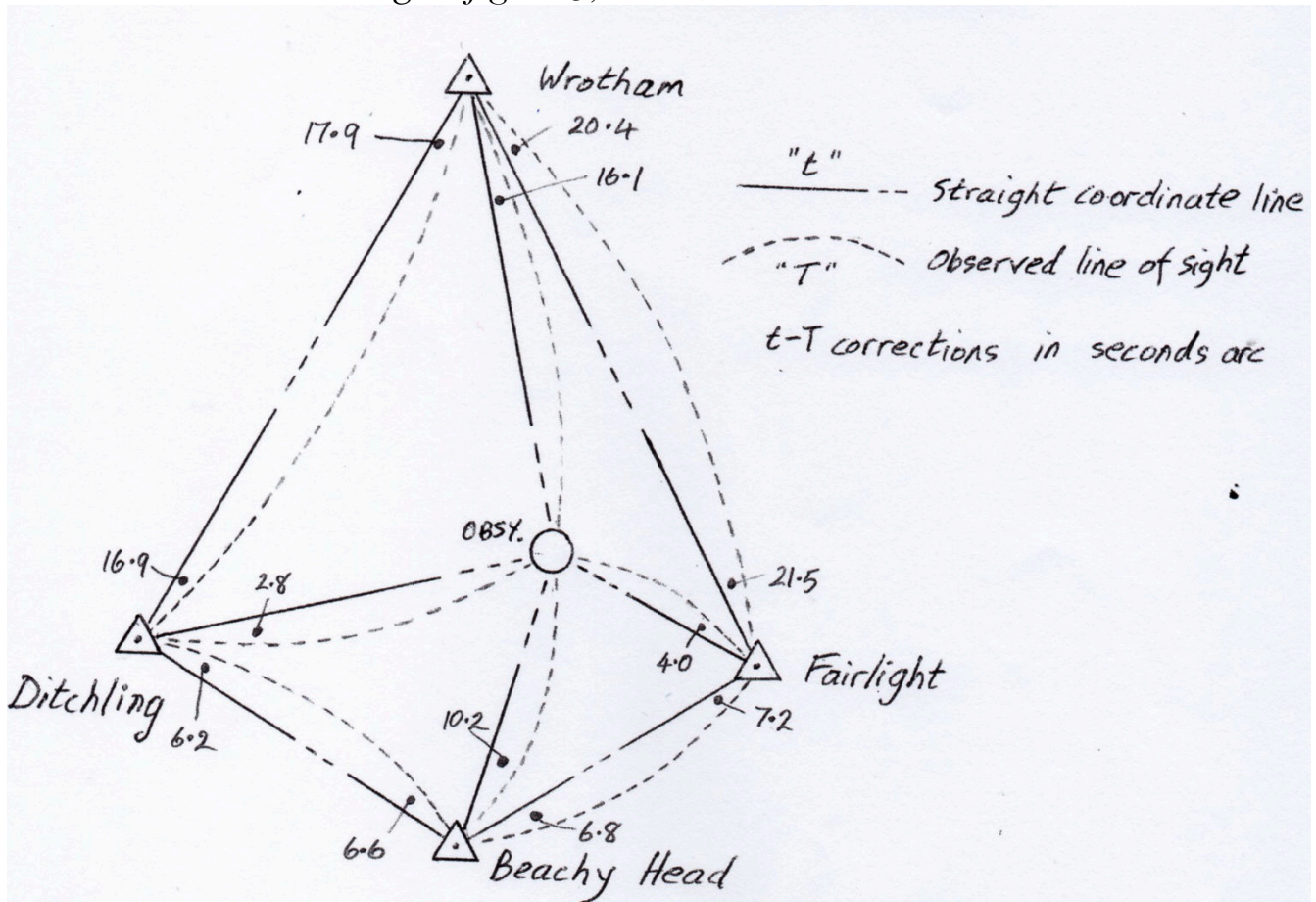
The principal triangulation has always been a fascination to me despite being employed on its replacement the retriangulation for much of my life. The Davidson committee with Hotine's recommendations no doubt justify the reason for the retriangulation, but I sometimes wonder whether a more

thorough resurrection of the old stations followed by a patching up where necessary would have been a possible alternative. As it was the retriangulation after adjustment was tied to eleven of the old principal triangulation primary trigs spread across the country, as so many precise astronomic observations for latitude had been made previously, and added to that its orientation was obtained from Greenwich. In subsequent years particularly the sixties, the retriangulation was greatly strengthened by many of its sides being measured by tellurometer or geodimeter; about a dozen precise azimuths were observed, at locations over the full extent of the triangulation and at some, precise astronomic latitude and longitude was also observed. All of this together with further observed and measured connections to the French and Irish triangulations, enabled scientific adjustments of the triangulation to be made.

² AR Clarke, H James, *Account of the Observations and Calculations of the Principal Triangulation*, London, 1858.

In the hundred years since the principal triangulation theodolite design had changed considerably, particularly in portability and convenience of use with the Geodetic Tavistock being able to be carried on a man's back, as opposed to the Ramsden theodolites being transported in their own well sprung horse drawn wagons. The accuracy had improved but not greatly; the retriangulation claimed an average triangle closure of 1.2" arc and was about double that previously.

Brightling got me thinking about my own very small check on the quality of the 1844 observations. Using observations from four of the previously mentioned stations that observed into Brightling observatory dome and combining them with the retriangulation NG coordinates I would attempt to derive NG coordinates for the observatory dome. This would enable me to assess the accuracy of the observations in three stages (figure 3, below).



Firstly, the closure of the quadrilateral surrounding Brightling should add up to 360° plus the spherical excess. This spherical excess is proportional to the area of the triangle or figure and can be considered as 1" arc per 197 square kms. The quadrilateral has an area of 1630 square kms.

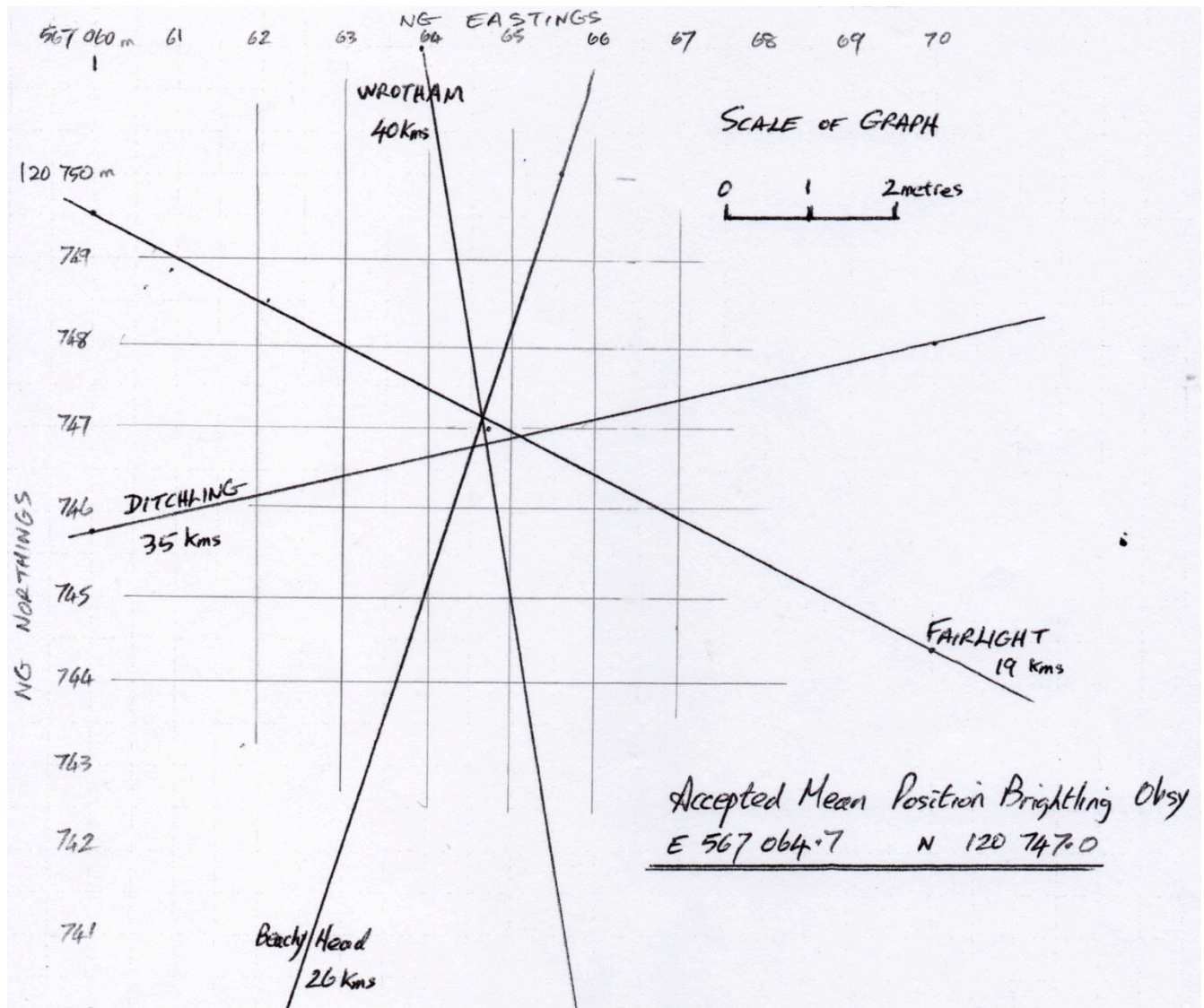
Wrotham	56°	37'	00.0"
Fairlight	95°	02'	27.5"
Beachy Head	113°	46'	42.3"
Ditchling	94°	33'	56.6"
Total	360	00	06.4

Spherical Excess 8.3"

Quadrilateral Misclosure – 1.9" arc

Having passed the first test satisfactorily, the second test is to see how well the derived directions into Brightling from the two stations either side for each of the intersecting rays compare. The average discrepancy was an acceptable 2.1" for the four directions.

Finally, by computing the intersections of the four rays and plotting the result graphically (*see figure 4, below*) the accuracy of the observations becomes readily apparent and would suggest a mean positional accuracy approaching a tenth of a metre.



Because of the distance of the intersecting rays, up to 40 kms, corrections need to be made to the straightforward bearing computed from the station coordinates – this being “t”. The line of sight observed or geodesic becomes a slight curve to the projection and is known as “T”. The difference $t - T$ varies with the length of the rays, their directions and their position on the projection. In this computation they are shown in the diagram and varied from 3" to 21" arc. For those interested details of this correction and formulae for its deduction, these are shown in an

excellent OS publication *Constants, formulae and methods used in Transverse Mercator Projection*.

All in all, I feel in its very small way the exercise was a fitting tribute to the quality of principal triangulation. I never cease to wonder at the effort that was put into this great feat. We mostly know about incidents like the instrument set up on St Paul's Cathedral, but that was one of several similar, such as Thaxted church spire in Essex, not to mention Norwich cathedral spire 300 feet above the ground (see figure 5, below). These precarious positions became necessary, as

NORTH RONA, 1850. This station is on the south-east and highest point of the island of this name, about 47 miles north-north-east of the Butt of Lewis. The hill is 355.2 feet above the level of the sea, and is very precipitous on the east side, but sloping gently towards the west. The zenith sector station of the same name is 24 feet north-north-west of the trigonometrical station, and both are marked by holes bored in the rock.

NORWICH SPIRE, 1844. This station is on the top of the spire of the cathedral church of the city of Norwich in the county of Norfolk. The vane and the upright stone were removed, and the instrument placed on the flat stone composing the leaves of the finial, the centre of the instrument coinciding with the centre of the vane. The observatory was supported by a scaffolding built round the spire, and connected at various heights with its inside frame-work to within 30 feet of the top, above which height the scaffolding supported itself quite independently. The height of the scaffolding was 81 feet, and the instrument was 299 feet above the ground.

THAXTED CHURCH SPIRE, 1844. This station is immediately over the centre of the coping-stone of Thaxted church spire. The instrument was supported by a scaffold erected from about the middle of the spire, and the observatory was supported by another scaffold erected from the top of the tower at the base of the spire.

unlike the retriangulation in flatter areas such as East Anglia, they did not have water towers or specially erected "Bilby" survey towers. When reading the description of Norwich Cathedral instrument set-up, I couldn't help but notice the adjacent reference to a station on North Rona. This to me in 1983 was perhaps the remotest and most difficult place to reach in the UK.

After a chartered fishing boat from Stornoway failed because of adverse weather to get us there, we used the services of the Northern Lighthouse Board ship and helicopter. In 1850 the trip must have been at the mercy of the sailing craft of the day. But not content to take the massive theodolite there, they also took the cumbersome great zenith sector instrument to determine astronomical latitude.

When again referring to Clarke, I notice the observations and observers at two other stations; Crowborough, although not used by me in my four-ray intersection of Brightling despite having being observed into it. The named observers – Colby, the head of the Ordnance Survey at that time, coping with just one hand, having lost the other in a pistol accident; together with another great name, Captain Henry Kater who had served and suffered ill-health working under Lambton on the survey of India and went on to be an expert in gravity, having designed the famous Kater Pendulum. He also was one of the observers at Wrotham, the second station referred to.

In addition to the field effort of course we must consider the reduction and computation of those observations, a truly colossal task, necessarily using 11 figure logarithms, solving hundreds of equations.

In conclusion my little exercise did show the high quality of the 1844 observations but of course it also shows the retriangulation coordinates of the four surrounding stations to be of a very high order. But then we knew that, GPS soon proved this to be so.

Disputing the Roman map

Perhaps unsurprisingly, Alan Richardson's article in April Sheetlines ¹ *led to some critical responses from CCS members.*

Professor Leif Isaksen ² *writes:*

David Walker's review ³ addresses many of the issues raised by Alan Richardson's article very well. We should always keep an open mind as to the intellectual and practical ingenuity of ancient societies but in this case the evidence seems to be deployed in order to support a hypothesis, rather than to challenge it. It's hard to get away from the feeling that particular examples have been cherry-picked. The article leans quite heavily on claims already made in the author's 2003 BAR report (which I have not read) but if the central theory is that Roman towns and forts were established according to a 15-mile north-oriented grid system, then this could easily be determined by a regression analysis of their locations and the proposed grid. If most Roman sites are shown to sit on such a grid, or even close to it, then the pattern requires explanation and Roman surveying would seem a plausible one. If they are randomly distributed (as seems much more likely) then the rest of the argument is moot.

Without having conducted such an analysis, the contextual evidence speaks strongly against the theory. Tacitus's *Agricola* (Ch. 20) makes clear that as Roman governor he took personal responsibility for the siting of camps across most of northern Britain, a large proportion of which are known to be situated at river crossings or other strategic locations. Roman surveyors did plan some regional landscapes very precisely for the purpose of land distribution – including some in southern Britain – and sometimes mapped them (cf. the Orange Cadastre) but there is no evidence that I am aware of that this took place at a provincial scale, and it is unclear what the benefit of doing so would be. Ptolemy's *Geography*, written almost a century after the sites of most Romano-British cities had been fixed, states explicitly that the spatial relationships and coordinate locations of inland cities were poorly understood in his time. If the surveyors had been capable of conducting such a scheme in Britain, we would expect to see it reflected in the maps that have come down to us. The lack of any such material means that until systematic and comprehensive evidence is presented to the contrary, we must continue to assume that the siting of Roman settlements and fortifications was based on military and/or economic consideration of the local geography, rather than according to a universal scheme.

Helen and Frank Livingston write:

We are responding to the editor's invitation to comment on Alan Richardson's hypothesis that the Romans devised an orthogonal grid referred to degrees of latitude and longitude and that the location of both Roman sites and Roman roads was determined by it.

¹ 'Evidence of a Roman map of Britain', *Sheetlines* 114, 36-47.

² Leif Isaksen is Professor in Digital Humanities, University of Exeter.

³ *Sheetlines* 114, 48.

We have a long-standing interest in Roman roads and Roman surveying techniques (our book *In the footsteps of Caesar: Walking Roman roads in Britain* was published in 1995), and the title of Alan Richardson's article intrigued us. Sadly, though, we have to agree with your reviewer, David Walker. Richardson's argument is unconvincing. We too do not wish to pick holes in the fabric of the article but would like to add the following points:

- Richardson's thesis rests entirely on his interpretation of the meaning of the Roman place-name 'Mediolanum' (modern Whitchurch), since all his calculations spring from the assumption that this place was the origin of the putative grid, although his inexplicable relocation of the origin from a known Roman site to the tumulus at Warren Tump, 3.5 km to the west, might raise a few eyebrows. 'Mediolanum' is not an unusual name, though Whitchurch is the only one known in Britain. It is usually rendered 'middle of the plain' or 'middle of the farmland'. Richardson cites the scholarly work of Rivet and Smith (*The place-names of Roman Britain*, 1979), stating that they suggest 'Mediolanum' means 'the middle of the plain' although it lies close to low hills, and that the -lanum element means 'holy place' similar to the Welsh llan (church, sacred enclosure). Hoping to understand a little better, we turned to our trusty copy of Rivet and Smith and found a worrying discrepancy: Rivet and Smith state that the second element of the name is the British lano -plain, level ground. The Welsh llan is not mentioned at all but, in discussion of the work of others, the Breton lann (sacred place) is considered and rejected. In fact, Rivet and Smith provide a detailed rebuttal of the 'sacred place' interpretation. They conclude that 'the greatly preferable explanation of lano in this name is 'plain, level ground'. For one thing it is very straightforward; for another the word could well have been used to mean 'small extent of levelled ground' which would take account of those continental Mediolanum places situated in hilly country, with Medio- then meaning 'central (to the needs of the community)'. At the very least, then, Richardson has misrepresented the acknowledged authority on Roman place-names in Britain, Rivet and Smith. The other work that Richardson cites to discredit the 'middle of the plain' interpretation and lend support to the concept of 'Mediolanum' as a 'holy centre' is Graham Robb's *The Ancient Paths: Discovering the lost map of Celtic Europe* (2013). This is problematic. We have consulted it. It is not a serious book but a clever piece of pseudo-science claiming that the Druids mapped the whole of Europe on a grid organised by sight lines derived from the solstice position of the sunrise and that their settlements relate to the grid. If you Google the book – published as 'Finding Middle Earth' in America - you will find this exposed in the review by Prof Ian Morris ⁴. Richardson seems to have transferred ideas from Robb's book, including the interpretation of 'Mediolanum' as a sacred centre associated with survey lines. This time a 'grid' is credited to the Romans, whom at least we know to have been competent surveyors.

⁴ *New York Times*, 22 November 2013.

- We would like to emphasise the Romans' consummate knowledge of Britain's geography. This is demonstrated time and time again by the skilful way they employed it to such advantage in their road routes: altering their alignments to use a ridge of high land or cross a river at the most convenient site before turning back to the road's survey line. Richardson's orthogonal grid would seem to be an impediment rather than an aid to setting out the Roman road system and no mention of any imposed grid has come down to us in the surviving literature. If the grid existed, one would expect the 'nodes' to have been marked on the ground, by cairns or standing stones, perhaps. Surely some would still survive in open country for archaeologists to record and question their purpose. Moreover, since Britain's topography is so varied, being neither like a prairie nor the 'unbounded plain' beloved of spatial theorists, the actual setting out of 'nodes' fifteen miles apart to create a template for development would be beset with problems. Why would such expert surveyors and engineers as the Romans try to shoe-horn their infrastructure into something so eminently impractical? Finally, although our knowledge of Roman Britain is incomplete, there are many more known Roman sites than those named in the article. We are forced to wonder if the putative grid is testament not to the skill of the Romans but to Alan Richardson's wizardry with computer spreadsheets and carefully selected data.

To conclude, before we even get to consider the geodesy and mathematics or question the accuracy of the groma over long distances, it seems a pity that the author has constructed his entire edifice on a foundation unsupported by scholarly evidence: the Roman place-name 'Mediolanum' seems not refer to a survey point, sacred or otherwise, but to location in the middle of a community (farmland?). Once you discover the foundation is unsafe you look at the building to ask: 'will it stand?' Unfortunately, the answer here is 'probably not'.

Michael Spencer writes:

This is an interesting hypothesis, on a subject about which I know nothing; but some of the statements in it need a little thought. In general, it may indeed be true that the stages in the programme of road building were planning-auguries-construction; but the idea that the roads were laid down on a mathematical system from nowhere to nowhere,⁵ and the settlements later appeared at the nowhere-points as if by magic, is very hard to take. It also denies the fundamental reasons for a road: to provide easy and quick communications between sites of military significance, and to allow the development of trade between existing settlements. The road is an enabler, but it is the settlements that are the drivers. I think it's more likely that the auguries were along the lines of "Should we do it today?" rather than "Should we do it here?"

The construction of the road was a multi-layered job, designed to leave a permanent road surface that could carry more than trivial loads. The builders proceeded by excavating the line of the road, building a firm foundation, refilling and compressing the soil, forming a central embankment by adding more soil

⁵ "not Axminster-to-Lincoln", p.43.

from digging lateral ditches (or fosses) on one or both sides of the road, then surfacing the embankment with graded layers of stone and cobbles. The surface was cambered to allow rainwater to run off; the lateral ditches became the storm drain. It is unrealistic to pretend that this considerable engineering was ever done on a “Build-it-and-they-will-come” principle. It would not be undertaken simply to satisfy the witch-doctors.

As a general criticism, the Romans clearly did not have the OS kilometre grid of Britain available to them, and the various calculations in the article might be more convincing if the actual geographical co-ordinates were used as primary data. This would of course lead to the question of how accurate Roman surveys, and the fixing of the north point, were able to be.

Just to pick a nit, the word Prom. is short for Promontorium which means what it looks like it means. I would argue that Cantium Promontorium (Kent Head) was more likely to have been the North Foreland, which is more promontory-shaped than the rather obtuse outline of the South Foreland and is closer to where Caesar landed his invasion. This might upset the calculations in the article, though, so I won't press it.

The Fosse Way

In his description of the Fosse Way, Alan Richardson states that the “mean course between Axminster and Lincoln is a straight line.” This doesn't say much: the mean course between any two points is necessarily a straight line. It's the detailed deviations that are important, and the Fosse Way has plenty of those. I think what Alan is getting at is that the Fosse Way never deviates as much as ten miles away from the mean line. It is, of course, remarkable that the four main stations along the route — Aquae Sulis (Bath), Corinium (Cirencester), Ratae (Leicester) and Lindum Colonia (Lincoln) — are almost collinear; but this is just the ley-lines argument all over again, and I have addressed that already. The important point here is that these stations are not intervisible; it is not clear how the Roman engineers, grubbing about in the estuary of the Axe on the south coast, knew in which direction to build their new road to reach Lindum Colonia. I think this has to remain an open question. (Of course, I could just say that they let the trigonometry guide them, and turned out lucky, but you know how I feel about that.)

But as to the route and its deviations. First of all, it's not clear what happened in Bath. Working northward from Axminster along the well-established line of the road, we see that it starts off at Grid-35°E, running almost to Chard, then at 50°E to Ilchester, at 30°E to Street-on-the-Fosse (wonder how long it's had that name?) and then runs with slight deviations either into or past Bath — the line is not clear beyond Combe Down.⁶ If you produce the 30° line past Street-o-t-F as far as you can, it runs slap through the centre of Bath and continues on minor roads almost to Cirencester. Many of these roads are annotated “Fosse Way” on the one-inch map. This route, however, ignores the mapped “Fosse Way” which joins the

⁶ It's all right for me to use the National Grid to give directions: I'm not trying to prove anything, just showing relative bearings.

30° line at Wraxall, having come from the Avon at Bathford, which I find perhaps suggestive.

The 25-inch of 1888 shows “Fosse Way” approaching the Avon on a bearing of 65°E, fording the river just above the Old Bridge in the centre of Bath, and leaving on a bearing of 15°W. It’s by no means clear how these sections fit into the overall plan of the road.

Cirencester may not have been an important military site but was certainly the administrative capital of Britannia Prima, one of the five sub-provinces that formed Britannia. Roman remains at all their capitals are well-known; Roman cathedrals are perhaps something more than a hypothesis at four of them. It has not, as far as I know, been suggested before that Cirencester may have been a cathedral city; but in 1965 a Saxon church was excavated on the site of the abbey, which proved to be the longest Saxon building in England: this may at the very least be taken as circumstantial evidence of the religious importance of the site. It may also be significant in this context that the Abbot of Cirencester in the Middle Ages was entitled to wear the mitre.

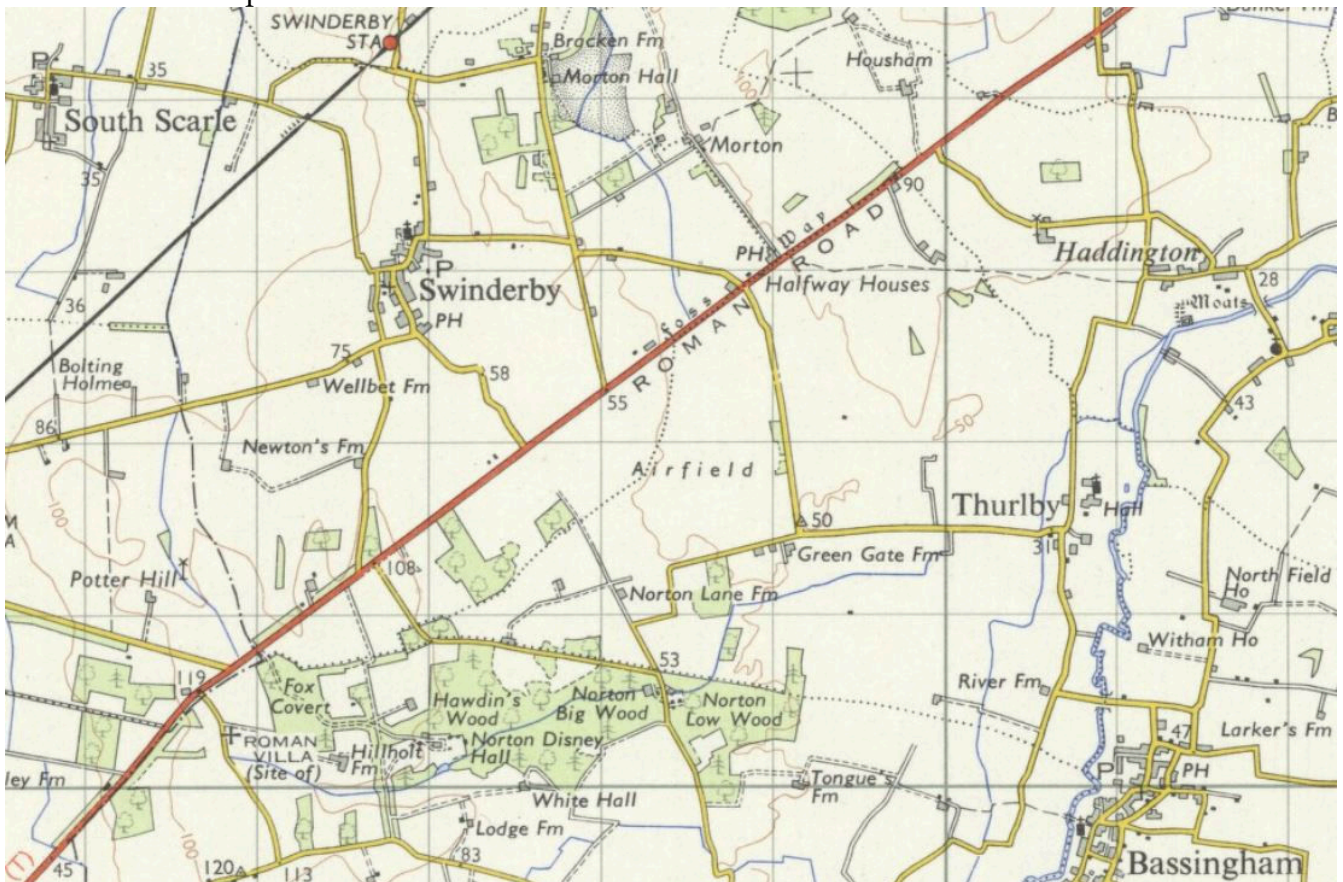
Only a couple of miles before reaching Cirencester, the line of the Fosse Way adopts a 45°E bearing to approach the site of the abbey directly, and shortly thereafter runs due north a few miles before taking a 40°E line, through villages called Foss Cross and Fossebridge, to Stow-in-the-Wold. Through Stow the route adopts a northerly bearing again, and then reasserts the 30°E line all the way to Leicester. This long section, so distinctive on the map, marked now by the A429 and the B4455, astonishingly enough is a projection of the 30° line south-west of Cirencester. (It certainly looks as though the deviation through Cirencester was built only after the place became administratively important; but one wonders why the 30° line was not rejoined much earlier.) The B4455 shows a clear deviation to the intersection with Watling Street, but returns to the line, which runs through the centre of Leicester and leaves the city on what is now the A607. At Syston there is an alteration of course to 10°E, followed today by the A46.

At the top of a marked elevation on the Cropwell Wolds, but for no obvious reason, the Fosse Way and the A46 now return to the 30°E line, but at Newark the line changes to 40°E, and after only a few miles changes again to 50°E, which is followed to Lincoln. On this line, the route leads directly into the gap in the limestone escarpment penetrated by the River Witham, which is navigable for small craft from here to the sea. Two thousand years ago Lindum Colonia, corrupted now into Lincoln, was a seaport. There is no indication that the road was ever built further to the north-east; but my money’s on the line of the B1200, pointing directly to the centre of Lincoln and meeting the sea at Saltfleet Haven. This name is suggestive in itself.

Throughout the length of the Fosse Way, Grid North varies from True North by only about a degree: so these frequent alterations of course can not have been due to the surveyors’ mathematics. On the other hand, it’s quite possible that, at least from the ridge at the Cropwell Wolds, they could actually see their target, and these changes were expressions of relief.

The maritime connections at the Lincoln end lead us naturally to consider the route at the Axminster end. Alan Richardson is right: the road did not end at Axminster, nor even at the place where Axminster grew up. Modern thinking is that it turned through a considerable angle, and ran through Honiton to Exeter; but while a connection to the fortress at Exeter was obviously vital, this dog-leg is not at all in keeping with the very slight deviations from the straight line exhibited along all the rest of the route. Projecting the line as it runs down the valley of the Axe through Axminster leads very naturally to the estuary of that river at Axmouth. Two thousand years of silting has changed the depths of the upper estuary to the point where it is now merely picturesque; but in Roman times it was capable of harbouring the largest contemporary merchant ships. The Roman equivalent of the 300,000-ton ore carrier was a wooden boat about 150 feet long, capable of carrying up to a thousand tons. Such a vessel could certainly be used to carry on trade across the English Channel and even down the western coast of Europe to enter the Mediterranean.

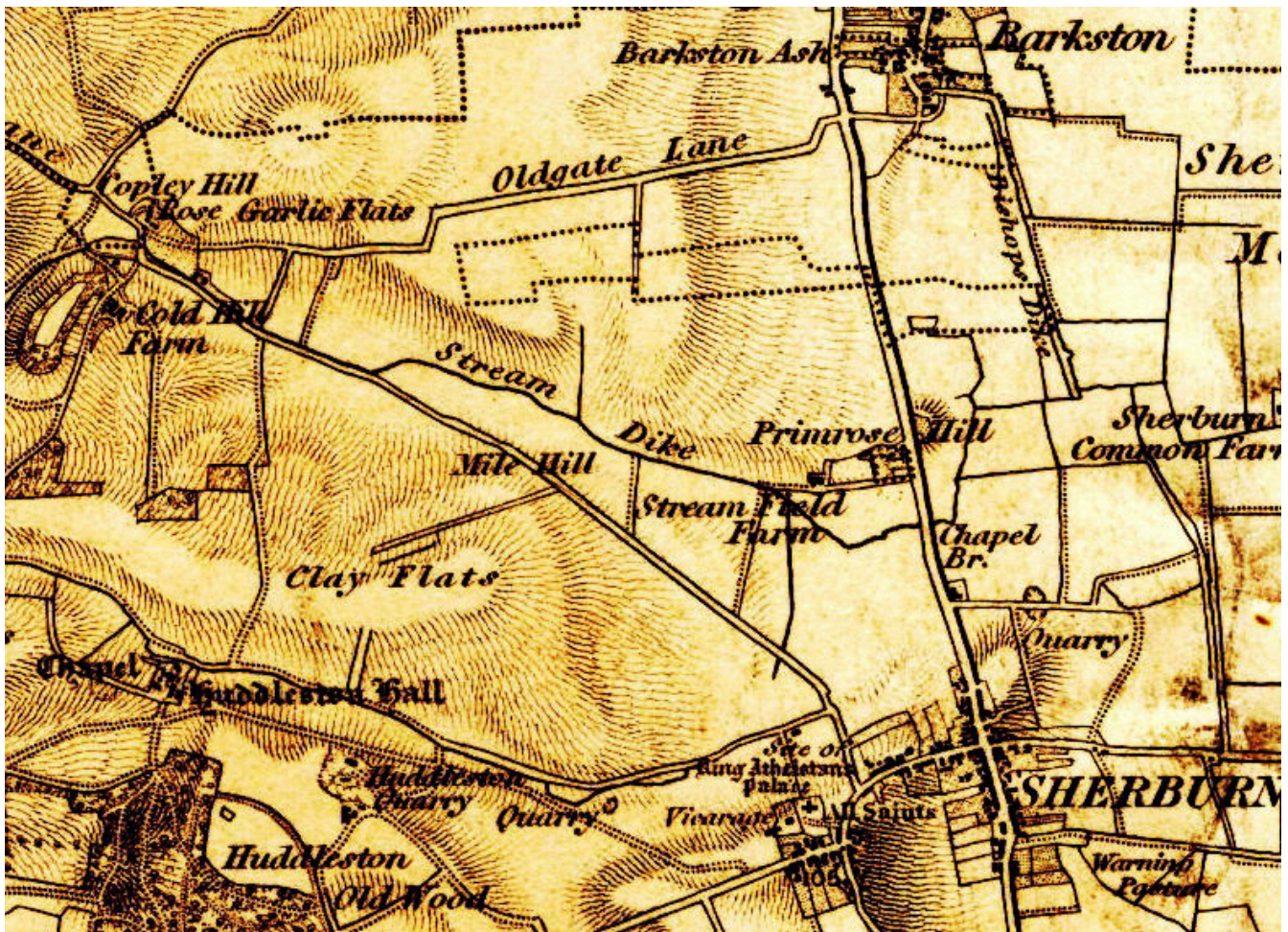
This gives real meaning to the existence of the Fosse Way. It brought in supplies from the Continent which were not available in Britannia, and distributed them quickly to the military and civilian establishments in the west and central districts of the province.



The Fosse (or Foss) Way, Lincolnshire. OS 1-inch sheet 113 Lincoln & Grantham, 1959

Brown hills

Rob Wheeler



This map extract might make a good quiz question: what is it? It looks like Old Series sheet 93SW with brown hills but, of course, separate hills plates only appear much later. And although that sheet turned into New Series sheet 70, the *Engraved Maps* cartobibliography tells us that brown hills only appear for Sheet 70 on the Revised New Series.

Is it a hoax then? But this isn't the April issue. How could it have been done? Look how sharp the distinction is between brown hachures and the dots of parish boundaries, or the drive from Huddleston Hall. You can't apply colour-separation when the original is printed wholly in black, at least not without a huge amount of work.

The answer is that maps printed from a copper plate are not 'wholly in black'. I remarked in *Sheetlines* 110¹ that the Bavarian survey managed to print their maps in such a manner that the finer hachures come out a greenish-brownish grey. I have come to realise that the same phenomenon may be observed with Ordnance Survey engraved maps, especially mid-century, though the effect is neither so carefully controlled nor is the change in hue so noticeable. I found it

¹ RC Wheeler, 'A Bavarian Comparison', *Sheetlines* 110, 41.

difficult enough to persuade others that the Bavarian grey was of a distinct hue. Doing the same for the Ordnance Survey grey seemed well-nigh impossible.

At this point, modern technology came to my aid. Any difference in hue can be picked up by image-processing software, enhanced, and indeed changed to some other colour-difference. In particular, I found I could transform the OS grey to brown while leaving black and white unchanged. (The only problem was that grubby marks on the map also had enough colour in them to come out brown, eg NE of Sherburn.)

There was a serious purpose behind this. Colour-transformation makes it easier to see how the more pronounced slopes are marked with deeper (black) hachures that transition gradually into the lighter sort, unlike the Bavarian hachures which are either one or the other. It also brings out the in-between nature of the tree ornament: most comes out brown, but some is black.

It is instructive to compare this image against the two published reprints of the sheet. The Margary reprint, being from an early printing, has slightly clearer hachures but of course prints all of them in black. The David & Charles reprint is taken from a late printing and loses many of the fainter hachures. It certainly does not convey the nature of the relief as well as this image does.

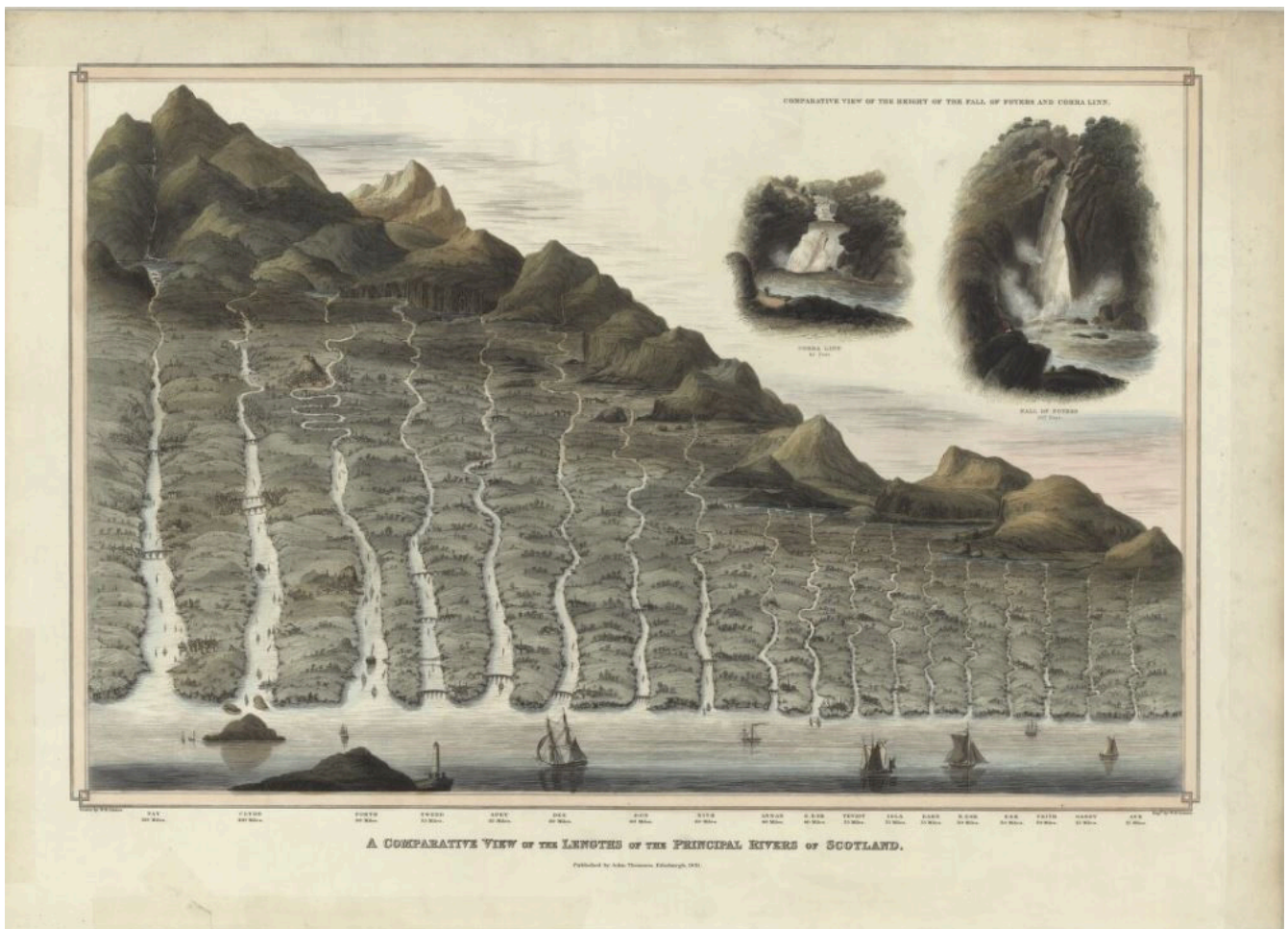
The printing of hachures may seem a technicality but it had a major impact on the legibility of the maps. At their best, grey (or bluish-grey) hachures depict the relief without competing against the roads and other detail. It is when the terrain becomes dramatic, and the hachures are correspondingly dense and black, that the detail becomes illegible. The aficionados of hachures may admire the depiction of the Lake District or Snowdonia, but they would not want to use such maps for hill-walking. Fortunately for the Survey, most of the contemporary purchasers were interested in more gentle terrain.

The ability to engrave a line that would print in grey rather than black was exploited more systematically on the engraved six-inch of Lancashire & Yorkshire. There is a requirement to distinguish a water-course from a fence, but both are liable to be absolutely straight at this scale. The solution was to engrave a stream as a double line, but (in the case the smaller ones) the lines are so fine that they print in grey, and they are so close together that the eye tends to read them as a single, but thicker, grey line. This is, I fear, something that even the best digital images fail to capture, because any line that is finer than the pixel spacing will come out grey on the image. For some purposes, only a paper map will serve.

Scotland's rivers and mountains

Paul Bishop

Recent *Sheetlines* have featured river basins¹ and mountains.² Representations of the relative lengths of Scotland's rivers and the relative heights of Scotland's mountains, from John Thomson's *Atlas of Scotland* (1832), are available digitally on the NLS maps website. They are presented here to highlight a different but attractive and diagrammatic way of representing these physical features.



Here, 'A Comparative View of the lengths of Scotland's Principal Rivers' is presented from the longest (Tay, 110 miles) on the left to the shortest (Ayr, 25 miles). Strikingly, the Clyde is Scotland's second longest river and has received major treatment by John Moore in Birlinn's recent book on its mapping through time.³ The major towns along each river are indicated diagrammatically, together with the bridges in existence in the early 1830s. These bridges might not be accurate, however, as Glasgow is shown as having two bridges, whereas John

¹ *Sheetlines* 112, 42; 113, 37, 39; 114, 18.

² *Sheetlines* 113, 37; 114, 59.

³ John Moore, *The Clyde. Mapping the River*, Edinburgh, Birlinn (2017); see also my review of Moore's *The Clyde*, in *Scottish Local History*, 103 (2019), 55-56.

Ainslie's *Map of the Country of Renfrew* (1800)⁴ and William Forrest's *County of Lanark* (1814)⁵ both show the Clyde at Glasgow already crossed by three bridges. David Smith's 1828 *Plan of the City of Glasgow and its Environs with all the Latest Improvements* confirms these three bridges;⁶ the next and only bridge across the Clyde upstream of Glasgow is that at Rutherglen, which is shown. The many bridges crossing the Tweed presumably reflect the need for border crossings between Scotland and England.



Elements of the form and function of rivers are represented diagrammatically. Thus, the Forth's sweeping meanders downstream of Stirling are obvious and the Clyde's navigation beacons downstream of Glasgow point to the river's important role in maritime trade by this time. Small annotations indicate that it was drawn and engraved by WH Lizars. William Home Lizars (1788-1859) was one of the leading Edinburgh engravers of the early nineteenth century.⁷

Sheetlines 114 carried Peter Haigh's review of The Munro Society's new book, *Scaling the Heights*.⁸ Peter's review opens: "During the latter part of the nineteenth century there was much discussion amongst Scottish mountaineers as to how many 'Mountains' there were in Scotland." Thomson's pictorial representation of the comparative heights of these mountains can be thought of as part of that discussion giving, as it does, the heights of Scotland's main peaks.

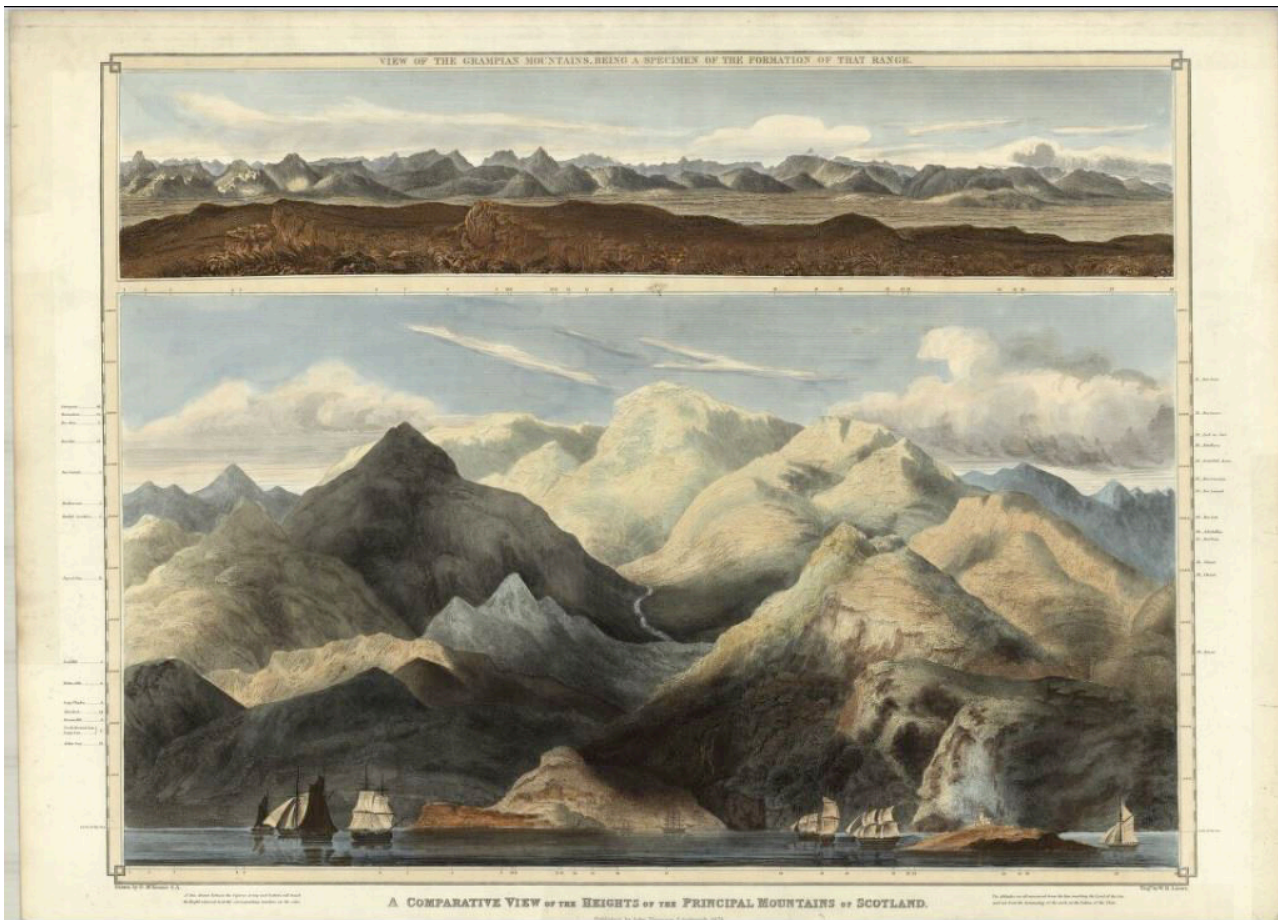
⁴ Moore, *op. cit.* p34.

⁵ Moore, *op. cit.* p36.

⁶ John Moore, *Glasgow. Mapping the City*, Edinburgh, Birlinn (2015), p97.

⁷ Moore, *op. cit.* p41.

⁸ Peter Haigh, *Sheetlines* 114, 59-60.

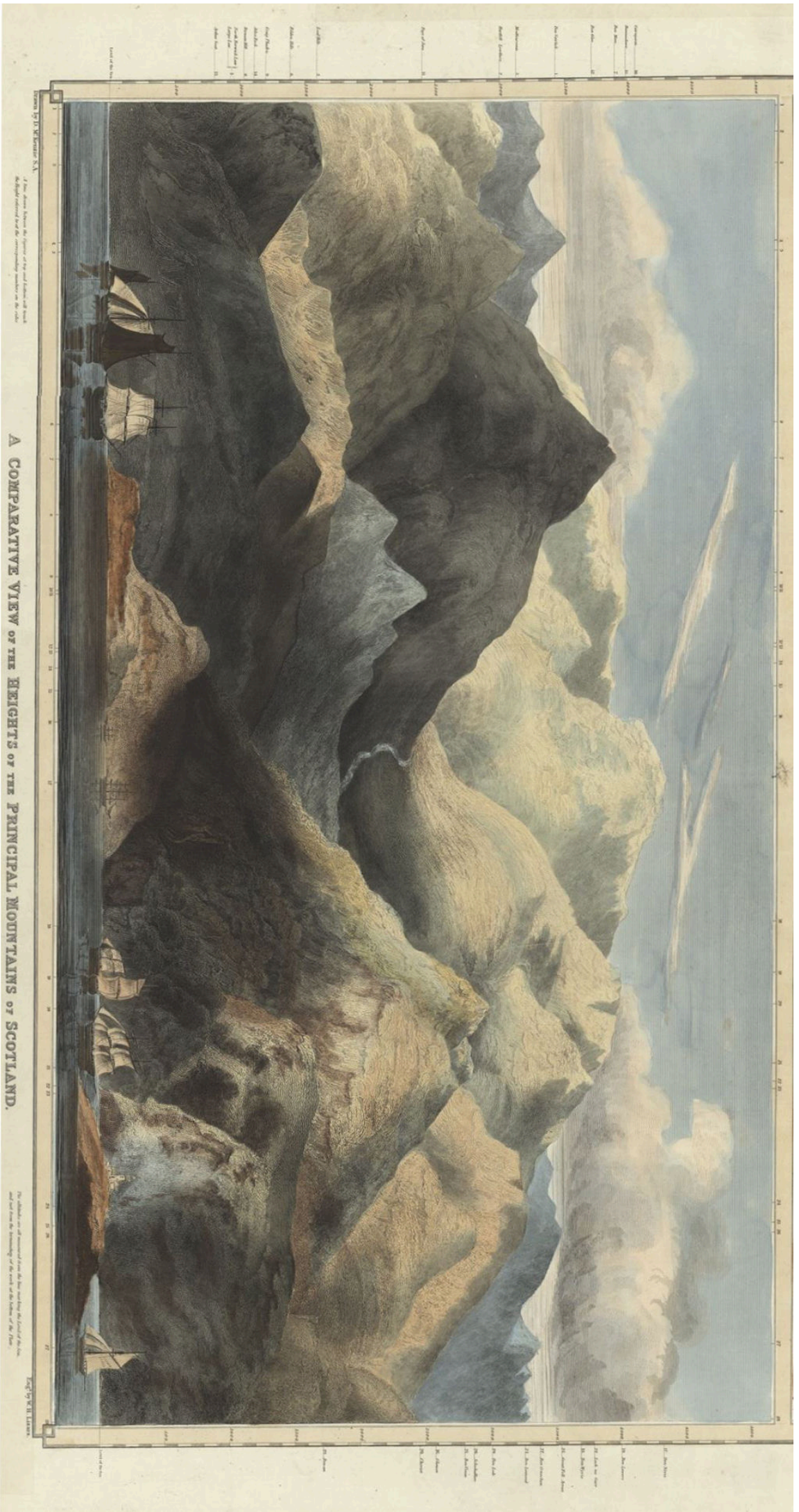


The heights as then known are noted down each side of the image with a number that corresponds to a number along the upper and lower borders. When the same two numbers are connected by a straight line, the line passes through the peak in question. The altitude is measured from the level of the sea, and not the bottom border of the image. This image was also engraved by WH Lizars.

Along the top of the comparative view is 'View of The Grampian Mountains, Being a Specimen of the Formation of that Range'. As David Walker has described, this view was created by James Gardner, with Captain Thomas Colby's permission, during the initial triangulation of Scotland.⁹ Gardner subsequently had the work engraved in London and published as an aquatint six feet wide. Walker also notes that it was published (as here) in Thomson's *Atlas of Scotland*, commenting that the hill shading of this version is not as effective as in the original. David's paper can be consulted for more detail but, in any event, both the rivers and mountains engravings deserve to be better known.

The images are published here by courtesy of the National Library of Scotland and I thank Chris Fleet for reminding me about David Walker's piece in Sheetlines 100 on the Grampians panorama.

⁹ David L Walker, 'A view of the Grampians observed in 1818 and published in 1820', *Sheetlines* 100, 23-26.



A COMPARATIVE VIEW OF THE HEIGHTS OF THE PRINCIPAL MOUNTAINS OF SCOTLAND.

The heights are all measured from the sea and being the level of the sea, and not from the summits of the peaks or the tops of the hills.

Engraved by W. H. Lister, Esq.

Additions to the NLS online resource

Christopher Fleet¹

Many hundreds of OS maps, mostly from the twentieth century, have been added to the NLS online resource in the past twelve months. These maps, which as CCS members will know are freely available to anyone with access to the internet, include 10,469 National Grid 1:10,560 (six-inch) sheets published between the 1940s and 1960s, covering most of mainland Britain. Other new additions include more than 800 sheets of the 1:25,000 series of Scotland produced by the War Office between 1940 and 1943. In brief, our new offerings are:

1:10,560 National Grid maps of England, Scotland and Wales, 1940s-60s²

All of our out-of-copyright maps at this scale, published more than 50 years ago, are now online. We have also created a georeferenced layer of 8,657 sheets. For this georeferenced layer, we have used Regular edition sheets where possible, based on larger-scale surveys or real landscape revision, rather than the Provisional sheets, which were largely based on the pre-war County series maps.

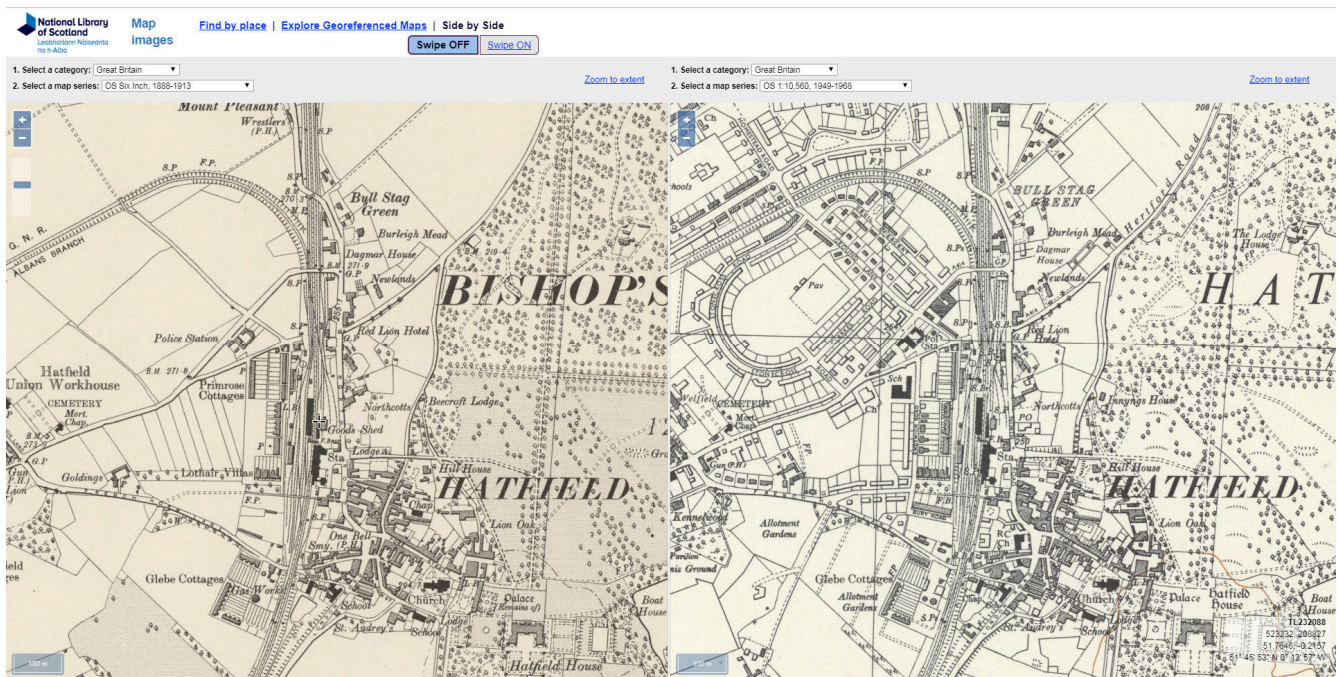


Figure 1 Side-by-side: six-inch mapping of Hatfield, Hertfordshire, 1890s (left), 1950s (right)

War Office 1:25,000 Scotland, GSGS 3906, 1940-43³

This military map series at 1:25,000 was rapidly completed in the early years of the Second World War. The underlying topographic detail was photographically reduced from the latest available OS six-inch to the mile maps, including the

¹ The author is Map Curator at the National Library of Scotland (NLS).

² OS National Grid maps home page: <https://maps.nls.uk/os/national-grid/index.html>

Graphic index: <https://maps.nls.uk/openlayers/?id=61>

Georeferenced layer: <https://maps.nls.uk/openlayers/?m=1&id=193>

Side-by-side: <https://maps.nls.uk/geo/explore/side-by-side>

³ <https://maps.nls.uk/os/25k-gb-1940-43>

Special Emergency Edition (1938-9) maps made for Air Raid Precaution purposes. GSGS 3906 can therefore provide a useful surrogate to these elusive Special Emergency Edition sheets for Scotland (the NLS holds no copy of these sheets), and a real update of selected landscape features for the historian. This topographic base was usually overprinted with thick brown contour lines, enlarged from OS One-Inch to the mile maps. This is all our holdings of this series, consisting of 829 sheets. Coverage of Scotland is complete, with additionally a small number of sheets covering the Isle of Man and south-east England. We are very grateful to Chris Higley for providing the sheetlines/graphic index for this series.



Figure 2 Detail of part of Dundee from Sheet 38/74, printed 1941

Geological Survey of Scotland 1850s to 1940s ⁴

We have now scanned all our out-of-copyright holdings of geological maps of Scotland. These have OS base topography and a geological overprint. They include a detailed set of six-inch-to-the-mile maps, with a focus on areas with economically-valuable geology, as well as less detailed one-inch maps covering most of Scotland.

One-Inch Popular edition Scotland (derivative series) 1930s to 1940s

The Popular edition of the 1920s had a long after-life, re-used by the War Office, captured and reprinted by the German Army in the Second World War, and also issued in various outline or partly-coloured forms. Although some of these later

⁴ Six-inch home page: <https://maps.nls.uk/geological/six-inch>
One-inch home page: <https://maps.nls.uk/geological/one-inch>

series were essentially reprints of Popular edition sheets and may have less to offer for the landscape historian, the ‘War Revision 1940’ and later sheets often included air raid precaution revisions from 1938-9. GSGS 3908 is also useful for giving an overprint of the War Office Cassini Grid. As part of our current plan to put online all of our out-of-copyright sheet maps of Scotland by 2020, we have recently made available a number of these OS one-inch series of Scotland, based on the Popular edition of the 1920s.⁵



*Figure 3 Edinburgh, Popular Outline edition 1923;
Lochinver und Loch Assynt, German Army Karte von Schottland, 1941*

⁵ OS One-Inch Popular Outline edition, 1921-20: <https://maps.nls.uk/os/one-inch-popular-outline>
 OS Water and Contour “pulls”, ca. 1930s: <https://maps.nls.uk/os/one-inch-popular-pulls>
 War Office GSGS 3908, One-Inch Scotland, 1933-43:
<https://maps.nls.uk/os/one-inch-popular-3908>
 German Army, Karte von Schottland 1:50,000, 1941: <https://maps.nls.uk/os/german-army>
 OS One-Inch Popular Outline edition, Water in Blue, 1941-2:
<https://maps.nls.uk/os/one-inch-popular-blue>
 OS One-Inch Popular with National Grid, Outline edition, 1945-7:
<https://maps.nls.uk/os/one-inch-popular-nat-grid-outline>
 War Office, GSGS 4639, One-Inch Scotland, 1947-50:
<https://maps.nls.uk/os/one-inch-popular-4639>

Cardiff: Revision for defence – and attack!

Chris Higley

Government cutbacks are nothing new. Enforced manpower reductions in the years after the First World War led to OS large-scale mapping becoming seriously out of date. Considerable development had taken place in Cardiff but as *figure 1* shows, with World War II approaching, Glamorgan six-inch Sheet 47NE was still based on a 1915 revision.

In 1938 a Special Emergency Edition of the six-inch map was produced for built-up areas. Intended for Air Raid Precaution planning, copies were not put on public sale and are now hard to find.¹ Whatever revision was available was used, and the quality of the printing was sacrificed to achieve speed of production. *Figure 2* is actually taken from a later 'A' printing of the post-war six-inch Provisional Edition, published c.1947. This uses the same revision detail as the SEE but the peace-time print quality does allow clear reproduction here.

The new building in Grangetown, to the west of the River Taff, looks to have been sketched in from enlarged one-inch revision material with the short terraces and tight-packed semi-detached houses all reduced to a vague continuous outline. However, we do get some road names, presumably from another source, and the end result, while not pretty, would have been perfectly adequate to plan air raid precautions and dispatch fire appliances and ambulances as necessary.

Cardiff was heavily blitzed and the outdatedness of OS mapping must also have been something of a nuisance to the Germans. They had acquired copies of pre-war six-inch OS mapping by entirely legitimate means and Glamorgan Sheet 47NE was used to provide one of the 1:10,000 maps included in a Cardiff area folder of maps and photographs of sites of military interest.² When several raids had already taken place, a second edition of the sheet appeared, updated from air-photo interpretation of January 1941. This is shown in *figure 3* and it is interesting to compare the German air-photo revision with the British SEE revision.

Cloud and hostile fire would not have made for ideal conditions for *Luftwaffe* aerial reconnaissance and this probably accounts for the Germans missing the new industrial building immediately to the east of the River Taff. However, Grangetown is represented far more accurately and would be easily recognized from the air – no street names of course, but then you don't need to know the name of a street in order to drop a bomb on it!

Some conventional OS large-scale revision did continue during the War.³ *Figure 4* shows the 1949 'B' printing of the six-inch Provisional Edition, revised 1941-42 (with additions in 1947). This is as close as we shall now get to the true detail of wartime Grangetown.

¹ WA Seymour, *A History of the Ordnance Survey*, Folkestone: Wm Dawson and Sons Ltd, 1980, p281; Richard Oliver, *Ordnance Survey Maps: a concise guide for historians*, third edition, Charles Close Society, 2013, p44. Locations of known sheets of the Special Emergency Edition are provided by Roger Hellyer at <https://www.charlesclosesociety.org/SEE> (I am grateful to the Royal Geographical Society for access to Glamorgan Sheet 47NE). The series also formed the basis of the wartime GSGS 3906 1:25,000 mapping, Scottish sheets of which have recently been put online by The National Library of Scotland.

² *Militärgeographische Objektkarten und Objectbildern* folders are described in RC Wheeler, 'German maps of England of World War II and associated publications', *Sheetlines* 68, 26.

³ Seymour, p283.

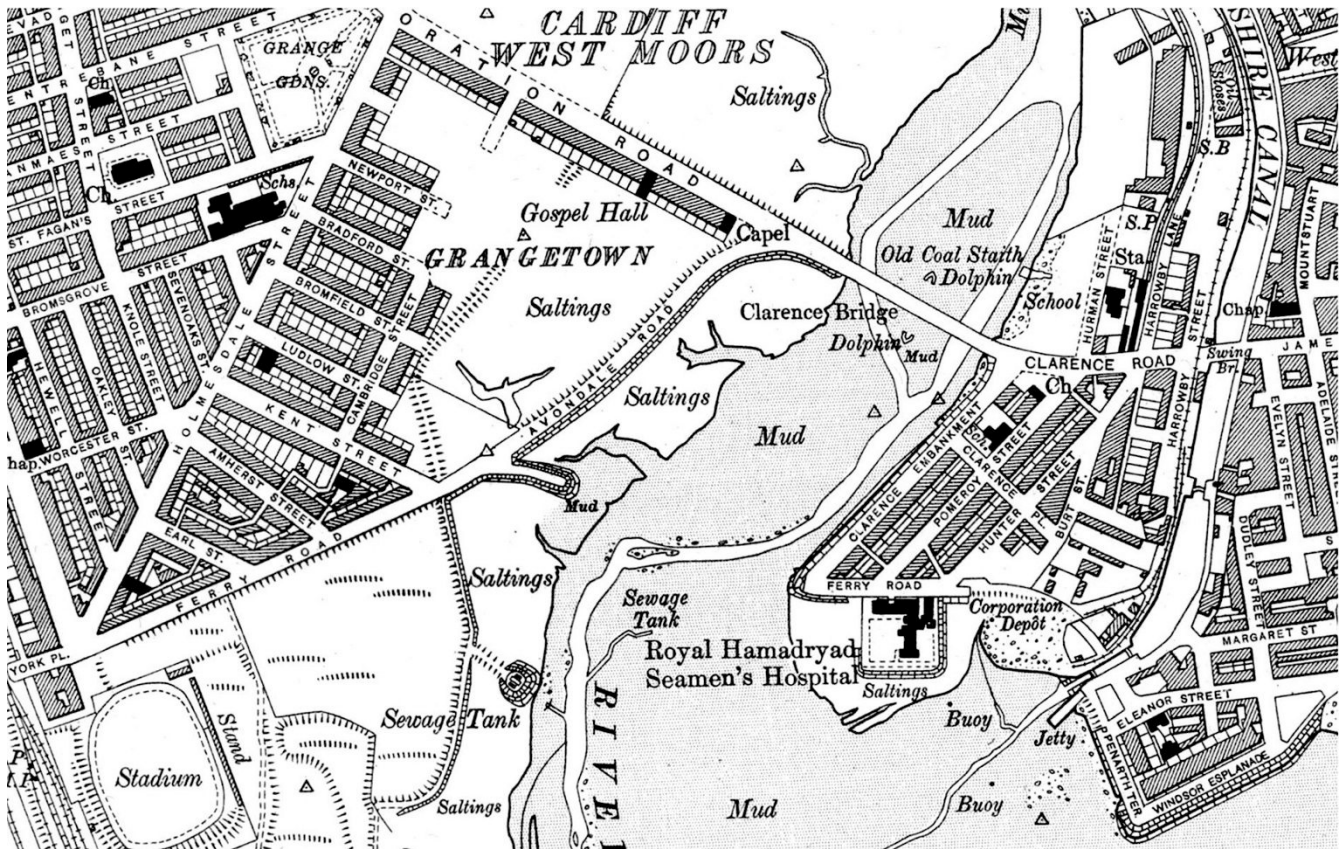
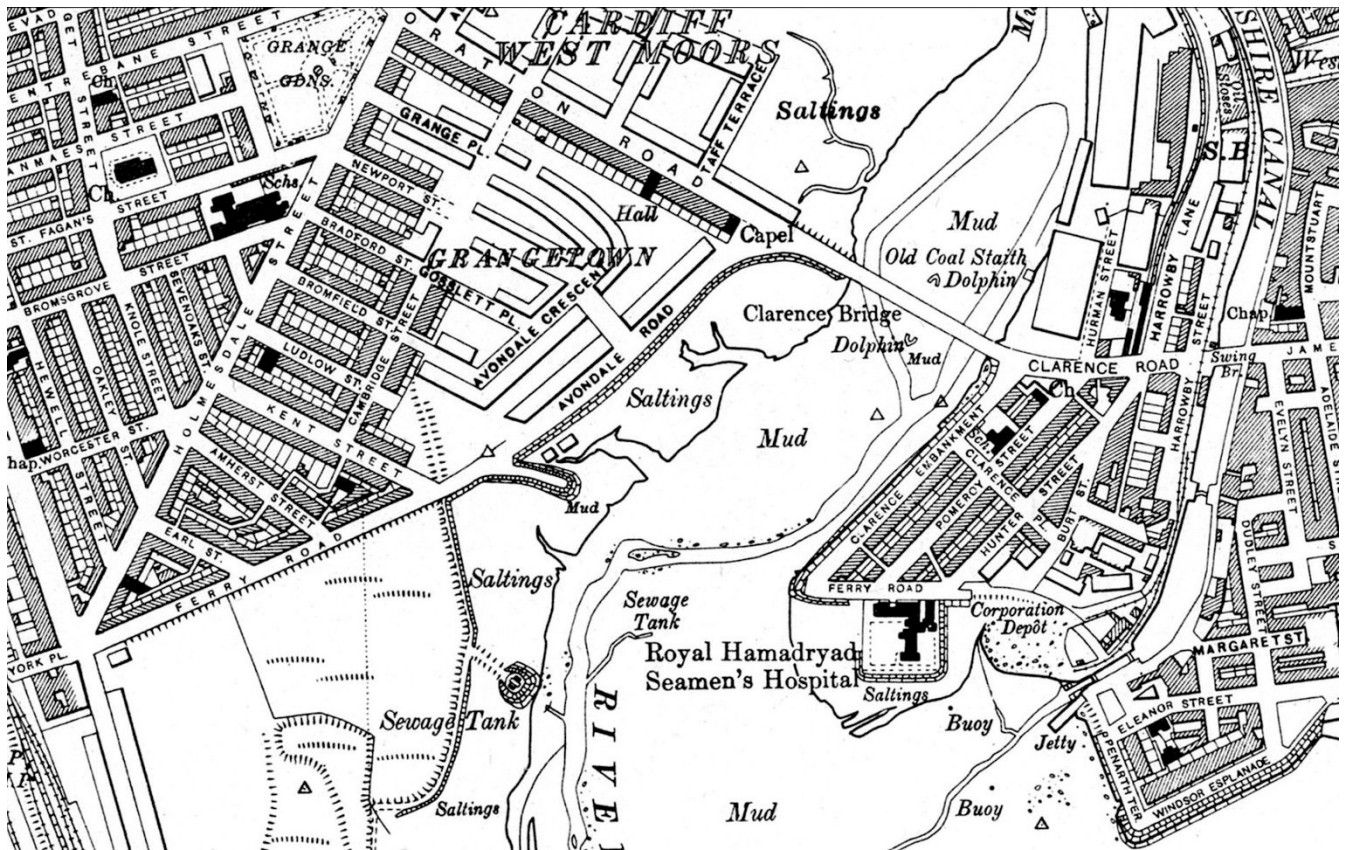


Figure 1 (above) Glamorgan six-inch sheet 47 NE., revised 1915.

Figure 2 (below) Revision of 1915 with additions in 1938.



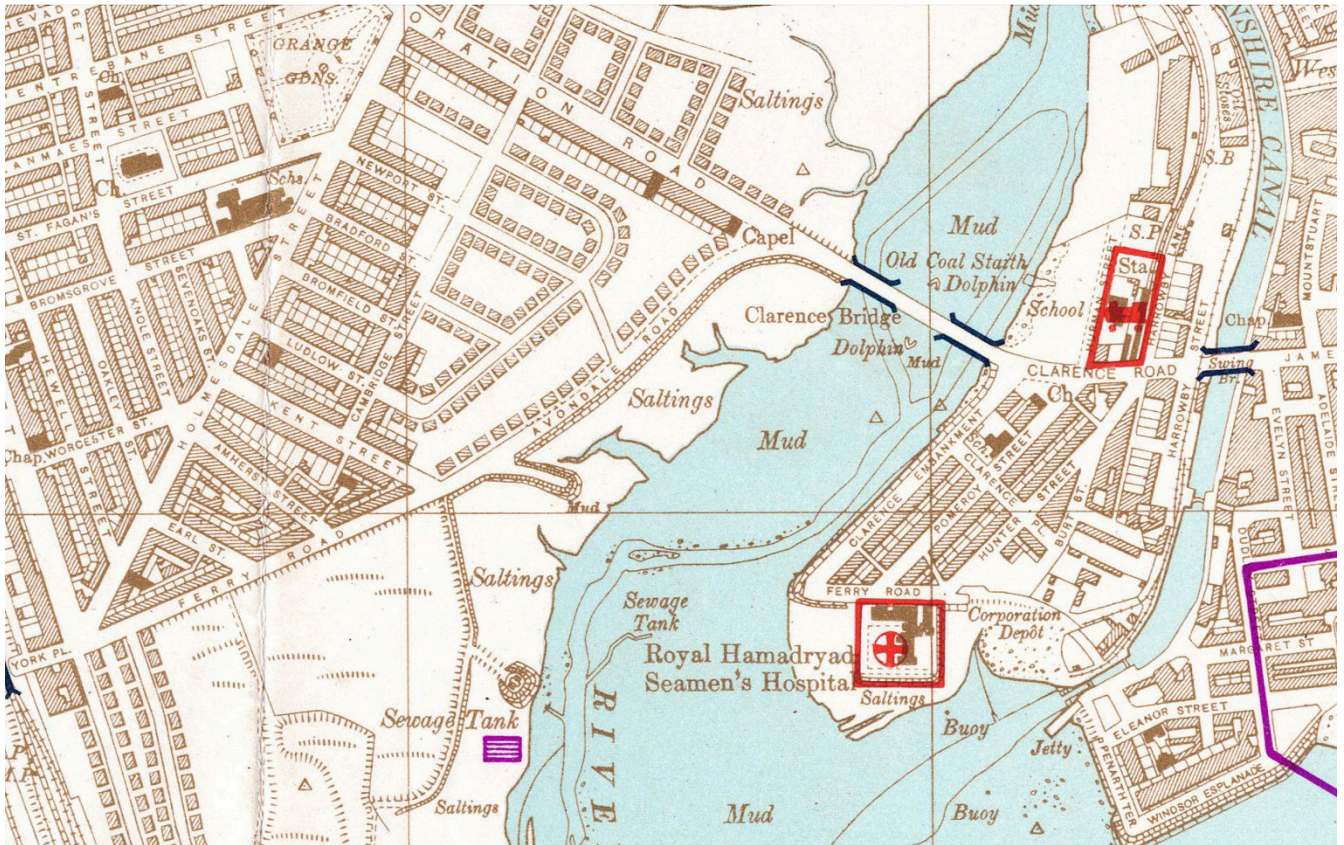
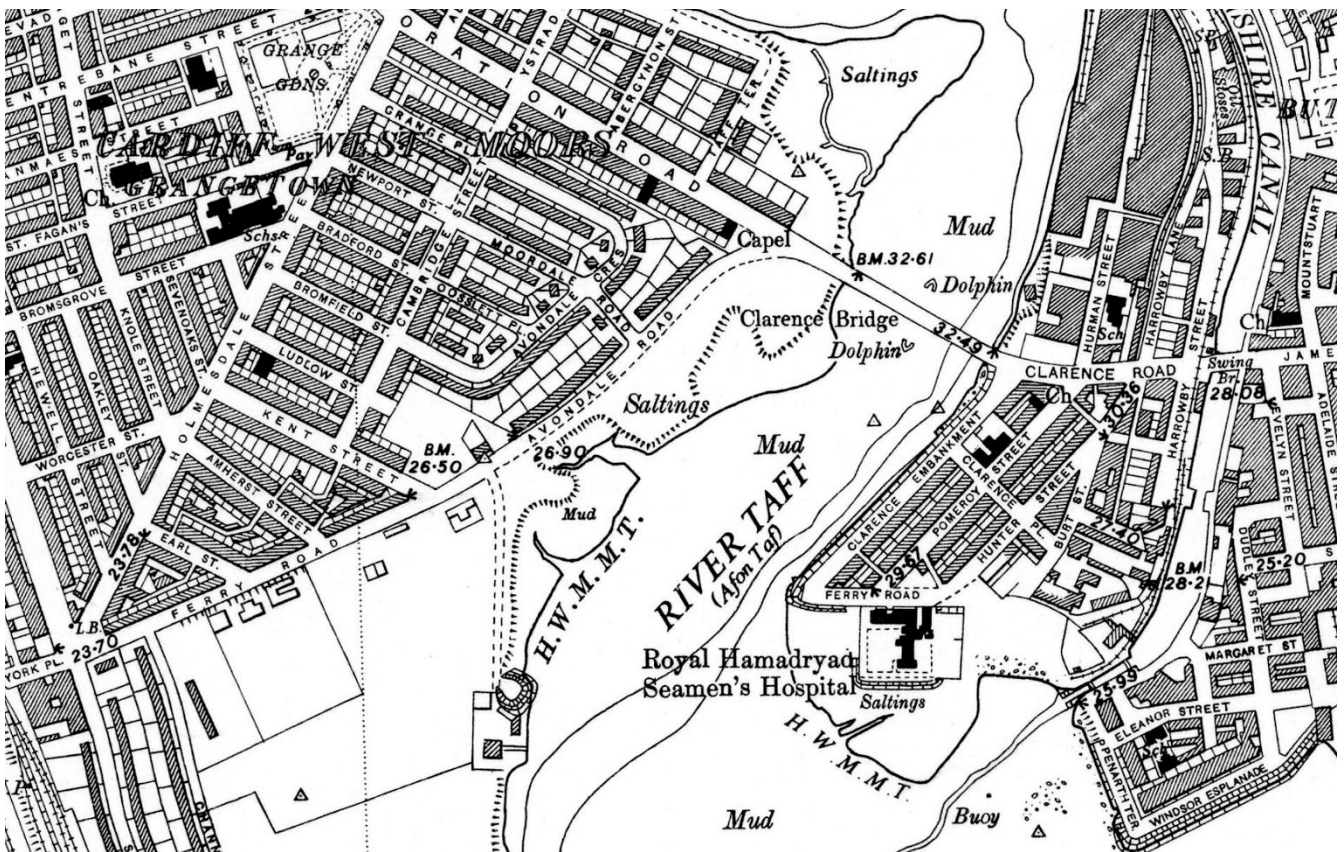


Figure 3 (above) German 1:10,000 'Stadtplan von Cardiff', BB 32c, 1941.

Figure 4 (below) Glamorgan six-inch sheet 47 NE., revised 1941-42 with additions in 1947.



Figures 1, 2 and 4 are reproduced by kind permission of the National Library of Scotland.

The West Highland Way – sculptures and maps

Paul Bishop

The West Highland Way is Scotland's first long-distance walking route, stretching from Milngavie, a commuter town on the northern edge of Glasgow, to Fort William, about 90 or so miles (150 km) to the north. It is generally considered the most popular of Scotland's long-distance walking routes and it is common to see groups of walkers assembling in the centre of the town to set off northwards. The first 20 or 30 yards of the walk are marked by attractive wall 'sculptures' with a numbered vertical timber beam for each mile of the route and prominent way points highlighted in more detail.

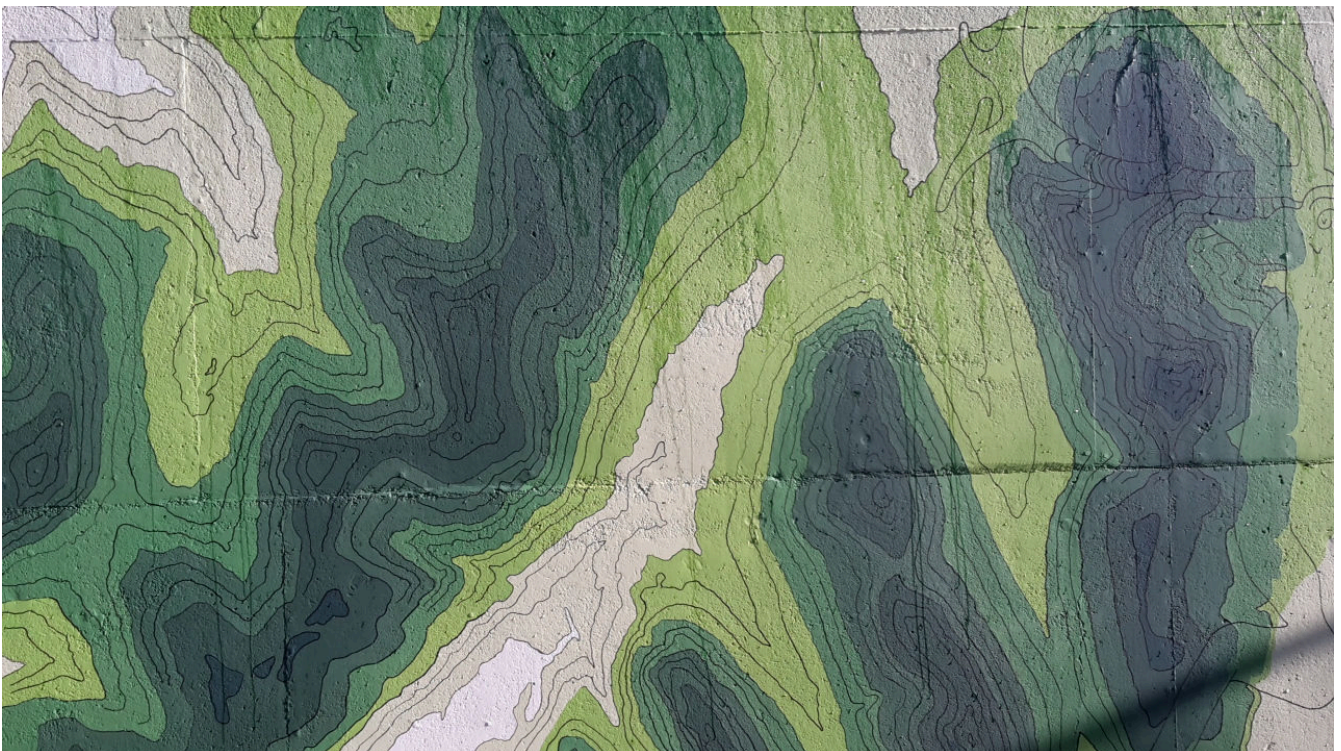


Milngavie: the way begins with 'mileposts' and (inset) sculptures

At one end of Milngavie's main street, a passageway under a by-pass connects the town centre to a supermarket and the Milngavie water mill.¹ The line of the underpass follows a long-standing route to the mill. The walls of the concrete underpass are being decorated with "an energising new mural capturing Milngavie's position between city and country" (to quote from a small publicity brochure adjacent to the half-completed mural). The publicity continues (with slightly uneven sentence construction): "we really wanted to put Milngavie on the map ... The side [of the underpass] currently underway is a scale topographic map of the full West Highland Way, and when completed we believe could be

¹ The Milngavie mill featured in my *Sheetlines* 108 piece on the thickness of walls in OS mapping.

the biggest painted map in Scotland, and possibly the UK. 95 miles crammed into a 15 second walk!”. The project has had to pause because of problems related to old paint on the underpass walls and to water dripping down the walls, and I will report on it again when it is finished. There is no indication as to the source of the contour maps of the West Highland Way but perhaps that acknowledgement will be made in in due course.



“95 miles crammed into a 15 second walk.”

Whether the map will “be the biggest painted map in Scotland” is a moot point, depending on your definition of a map. The Polish Relief Map of Scotland, shown on the front cover of this issue, is a 50m by 40m three-dimensional concrete relief map of Scotland in the grounds of the Barony Hotel at Eddleston near Peebles in the Scottish Borders. It was constructed between 1974 and 1979 in a collaboration between Jan Tomasik, a member of the 1st Polish Corps of the Polish Army in Exile, who decided to remain in Scotland after the Second World War, and Professor Klimaszewski, the Head of Geography at the University of Krakow at that time.²

Butley ferry

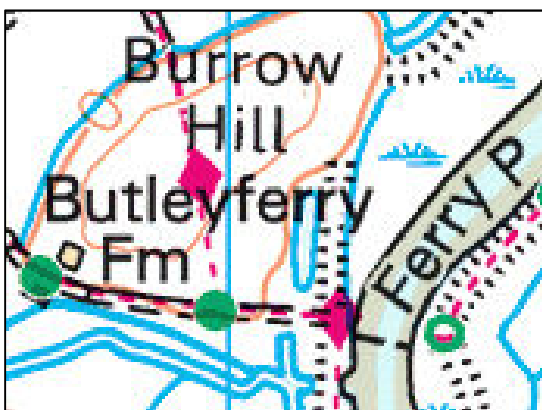
One of the ferries appearing in the recent *Sheetlines* lists,³ Butley ferry in Suffolk (TM 392481) is worthy of special mention. According to its timetable leaflet, this is the smallest licensed ferry in Europe, being capable of carrying four passengers or two passengers and two cycles. It is also one of only two in Britain working under the power of oars alone. At first sight, this is surprising, considering how fast the river flows, but the reason is that there are large expanses of mudflats just below the surface. A propeller would foul on the bottom, while the oars need very little depth to work efficiently.



The ferry dates back to the 16th century, but went out of service before the Second World War. It was revived in the 1980s and is popular with walkers on the Suffolk coast path and with cyclists touring Orford and this lovely stretch of coast.

The service operates at weekends and bank holidays from Easter to October and the *Explorer* map helpfully indicates ‘limited service’, prompting the traveller to check. The ferry is also shown on the *Landranger*, but without that annotation.

No prizes, but which is Britain’s other rowing boat ferry service?



² For more detail on the map, see Edward Z Smith, ‘The Polish Relief map of Scotland, Eddleston’, *Scottish Local History* 100, 39-40.

³ *Sheetlines* 113, 67.

Visits and meetings

Recent months have seen a variety of activities taking place in venues around the country. As well as examining maps old and new, members have learned much about the history of our road and canal networks, tactile computer models, military campaigns and the nesting habits of puffins and guillemots.

At a show and tell session in Redbourn (Hertfordshire) in March the exhibits included maps of highways through the ages, ranging from a reproduction of the strip maps in Ogilby's *Britannia* of 1675, through Cary's 1832 half-inch 'improved map' showing parish roads and enclosure roads, the OS MoT road maps of the 1920s and a mid-1950s planning map for the construction of the M1, to the 1964 AA handbook.

Canal maps ranged from a 1770 plan for the proposed Stockton and Winton canal and a 1790 plan for a proposed St Albans canal, through the 1830 Bradshaw's half-inch map of canals and navigable waterways and a 1918 map of 'controlled canals', to plans of the Manchester Ship canal dated 1921 and 1956.

The next Redbourn show and tell meeting will be on 12 October, when the topic is military maps post-WW2.

Later the same month CCS were guests of University of Nottingham School of Geography map library, where the manager Elaine Watts had not only laid out a selection of interesting or unusual Ordnance Survey maps, but invited members to rummage around in the collection and look at anything that drew their attention. Particular attractions included the prototype New Popular sheet 126, sent out to selected academic geographers, six-inch MS originals for the 1st Land Utilisation Survey, many of which have information not included on the printed maps, two sheets of the secret German geological map of Northern France of 1918, aerial photos of the Normandy beaches and an ingenious computer model which responded by displaying revised contours and water levels when one moved the surface of the underlying sandbox.

Prof Mike Heffernan spoke on the activities of Sir Charles Close after his retirement from the OS, using information from papers at RGS, whilst Garry Priestnall described Mayson's Ordnance Model of the Lake District of 1875.

CCS were guests of the National Army Museum, Chelsea in April. The Templar Study Centre manager, Robert Fleming, provided a display of selected items from their map and book collections. The library contains over 55,000 books representing regimental and campaign histories, with nearly 4000 maps and charts and 10,000 photographs. The archive of documents contains a wealth of material about military history, campaigns and battles, personal stories, political and social history, fashion, science, technology and engineering.

Of particular interest to our party were London Air Defences maps, similar in style to that described in various issues of *Sheetlines*,¹ but dating from 1860.

¹ *Sheetlines* 102, 36; *Sheetlines* 112, 21, see also page 54 of this issue.

The Templar Centre is open to the public, free of charge and members wishing to pursue studies are invited to visit. Full details are on the NAM website.²

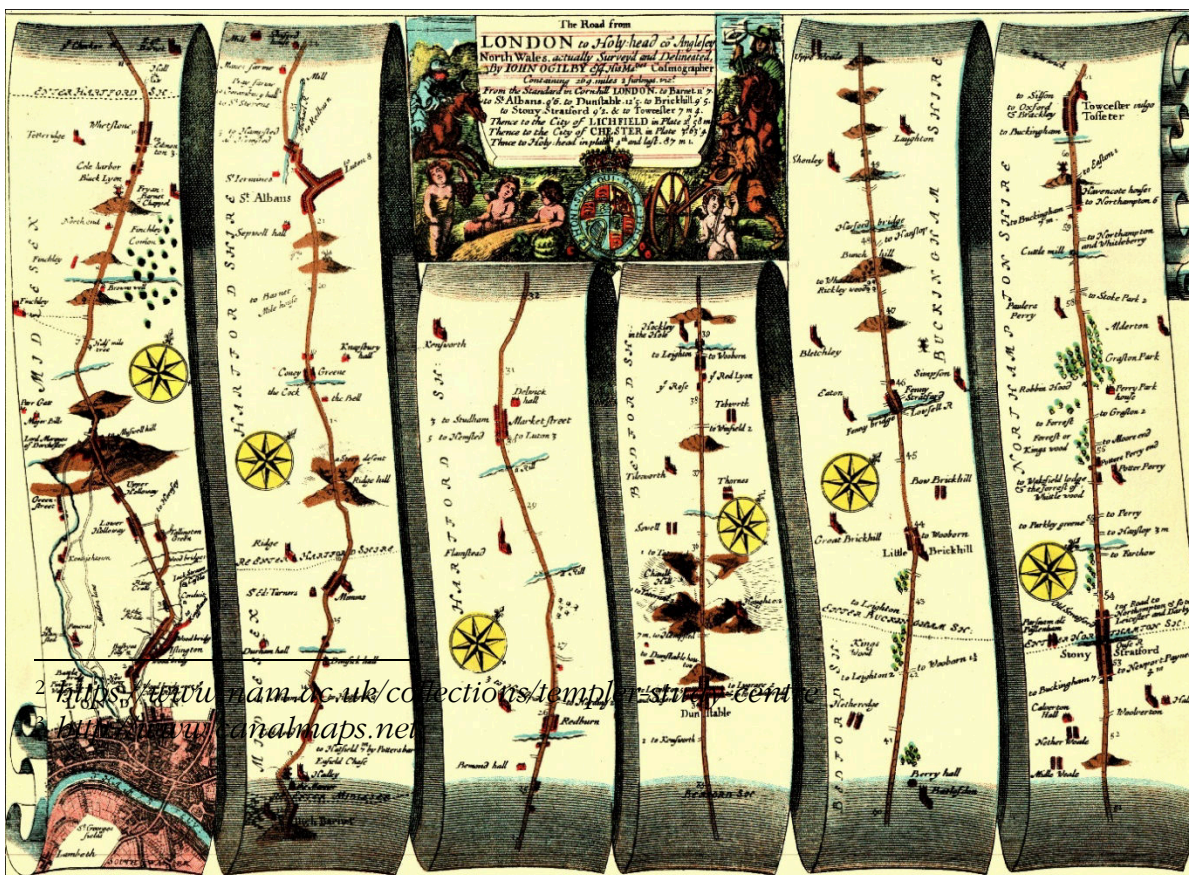
There was another show and tell session in May, this time at Wall, Staffordshire, where canals were again the topic. Here Richard Dean, who runs the canal maps archive³ gave an informal introduction to his collection, bringing with him a wide variety of OS-based and other mapping related to the canal era.

The next Wall meeting will be on 11 September, at which John Davies will speak on Soviet mapping of the Midlands.

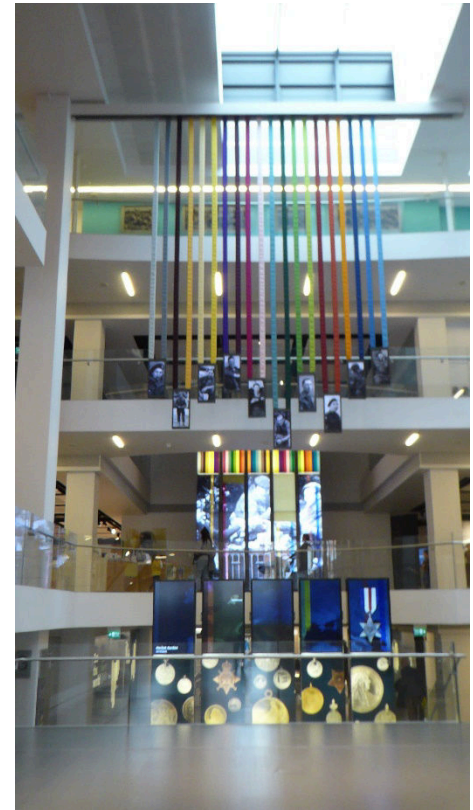
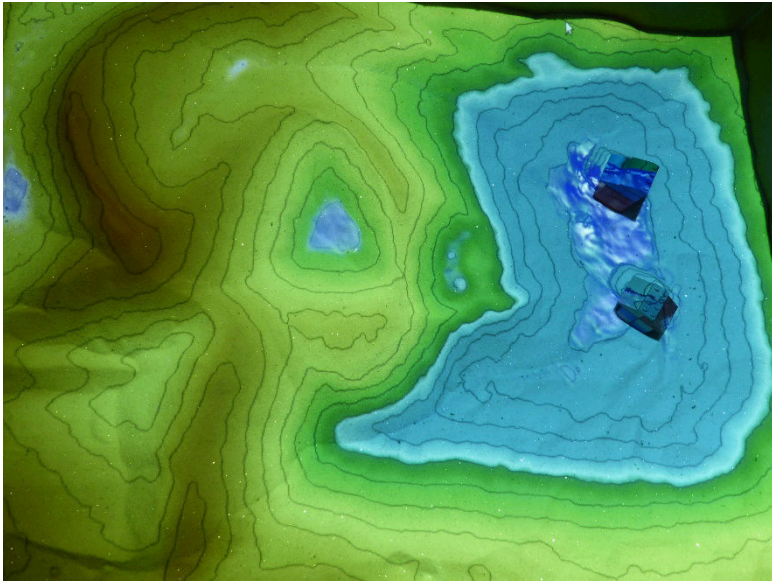
The May CCS AGM was held this year in Alnwick, Northumberland. To make the most of what was, for many members a long journey to unfamiliar territory, Peter Ennor arranged two extra-mural attractions; a boat trip from Seahouses to the National Trust Farne Islands bird reserve and a walking tour of historic Alnwick town centre.

At the AGM itself, the scheduled speaker, Karen Rann, was unfortunately indisposed and at the last-minute three substitute speakers were recruited from the members present. David Watt showed the plaque in Schiehallion commemorating the 1772 experiment by the Astronomer Royal, Nevil Maskelyne, to determine the density of the Earth. John Davies gave an illustrated talk about secret Soviet Cold War maps of Britain and Graham Cornell explained why the OS MoT road maps, which had been discontinued in the 1920s, made a repeat appearance in 1934.

The formal report of the AGM business meeting will appear in the Index supplement published with December *Sheetlines*, whilst the journal itself will carry reports of the June visits to Royal Scottish Geographical Society in Perth, Glasgow University map library, the Scottish Canal archive and the July visit to Dennis Maps.



The road from London to Holyhead, passing through Redbourn, from the reproduction of Ogilby's *Britannia*, shown at the Redbourn meeting in March.



Photos John Davies and Lez Watson

*Clockwise from top left:
Tactile computer relief
model at Nottingham;
Prof Mike Hefferman,
Karen Rann and Rob
Wheeler; National Army
Museum entrance hall;
examining canal maps at
Wall; CCS at sea,
voyaging to the Farne
Islands.*

How to treat a cult

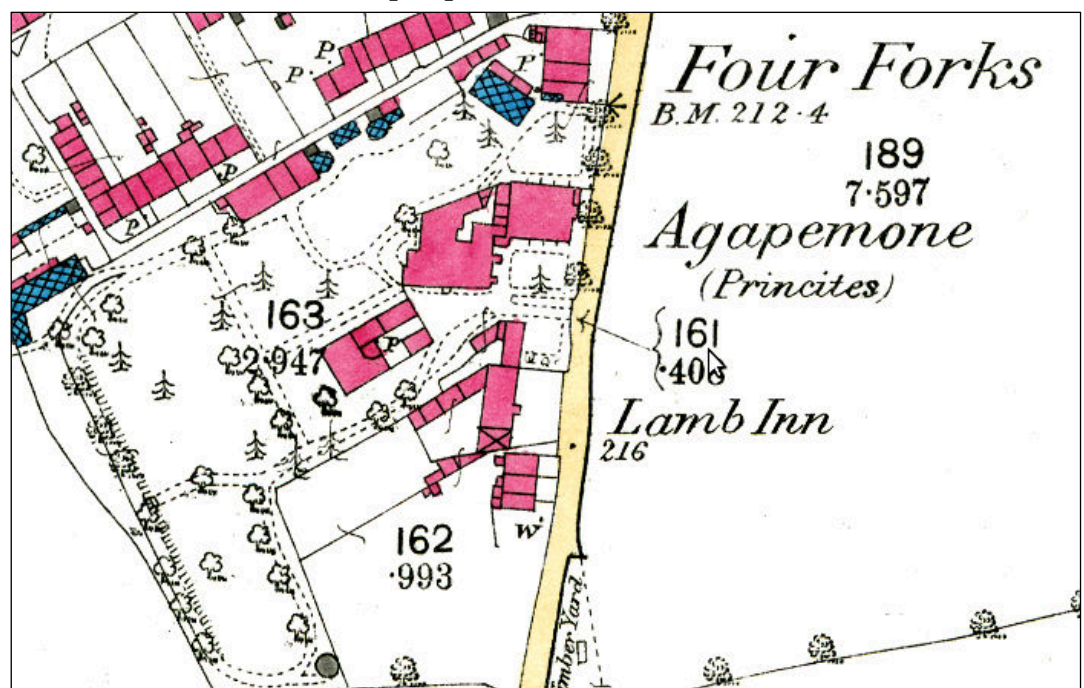
Rob Wheeler

How should the premises of a cult be mapped? Richard Oliver's *Concise Guide* offers no guidance, presumably because the Survey itself never saw fit to lay down rules.

The Rev Henry James Prince, on graduating from Lampeter theological college in 1839, had been one of the founders of a mission called the Agapemone which preached at fashionable seaside resorts. He served a couple of curacies but in both cases the licences were withdrawn by the respective bishops on account of his unorthodox views. He established the Trinity Free Church at Four Forks, near Spaxton, Somerset (ST 232369) and persuaded a number of followers to come and live in what became a closed community there. It had many of the characteristics of more modern cults: its members regarded Prince with reverence bordering on adulation; Prince himself lived in great luxury and sexual immorality. Unlike most modern cults it survived Prince's death in 1899 and kept going until money ran out in the 1960s.¹ The premises extended to a couple of acres with numerous buildings and ornamental gardens. How, I wondered, should a surveyor describe it?

In the event, the question seems only to have arisen in 1887, during the large-scale survey. *Agapemone (Princites)* was the description adopted, as though the Princites were an established sect rather than the sole surviving establishment of the now elderly founder. The 2nd edition of the 25-inch (Soms 49.12) left the description unchanged in 1903. And that was the last edition of the County Series. The premises were surrounded by the rest of the hamlet of Four Forks, so there was no space to name it on the one-inch or the 1:25,000. The chapel went through periods when it was used for other purposes. I do not know its status in 1887 but the surveyor chose not to label it as a chapel; hence the question of whether a chapel symbol was required at smaller scales seems not to have arisen either.

*Extract by kind
permission of
National Library of
Scotland.*



¹ Sarah Wise, *Inconvenient People*, 2012, 94-129.

Annotations – irritants or enhancements?

Andrew Darling

There can be few things more likely to cause exasperation and annoyance to a dedicated book or map collector than the scribbblings of a former owner on page or sheet. But as Michael Richardson wrote in his fascinating article on the caves of Co Clare,¹ this natural and understandable reaction may be mitigated by knowledge of the identity of the author of the annotations, or the circumstances in which they were written. In some cases, indeed, the inherent value of the publication is increased rather than decreased by an inscription (although here one recalls the old joke about Sir Edward Heath's *Sailing*, the scarce unsigned copies being considered so much more desirable). While I have yet to learn to love the defacement of a book, I sometimes find myself taking pleasure, and deriving knowledge, from inscriptions on a map.

I have in my collection of Seventh series One inch maps, ten sheets stamped on the front covers with either the name JM Hancock, or 'Department of Geology, King's College, University of London'. The maps themselves have numerous handwritten notes, principally in the margins. I bought them as a job lot in an auction on eBay; the seller failed to mention the inscriptions and annotations in his description, and my initial reaction upon receiving them was one of dismay. But further consideration and a little research has led me to regard these 'flaws' as great enhancements.

John Michael ('Jake') Hancock (1928 - 2004) was an eminent geologist with an international reputation. His obituary in *The Independent* ² describes his rise from Assistant Lecturer in Geology at King's College in 1955, through the various stages of Lecturer, Senior Lecturer, to finally, from 1977, Reader, in that department. In 1986 he was appointed Professor of Geology at Imperial College, London. 'Jake Hancock was a colourful, kind, and much-loved geologist and oenologist whose reputation extended from Japan to Georgia, Norway to North America, and Tunisia to the North Sea, in all of which he worked as a professional scientist,' wrote his obituarist. His greatest geological interest was the Cretaceous epoch, from 65 to 145 million years ago; 'a world much warmer than today, without icecaps, and with sea levels at times hundreds of metres higher than at present', when vast areas of chalk accumulated beneath the oceans. Hancock became an acknowledged expert on chalk, particularly that of the North Sea. He was a consultant to the oil industry, and the earliest oil discoveries in the North Sea in 1966 came from chalk reservoirs which, in the decades that followed, yielded most of Norway's, and all of Denmark's, oil production. Equipped with this knowledge, my enjoyment of Professor Hancock's old maps has increased enormously.

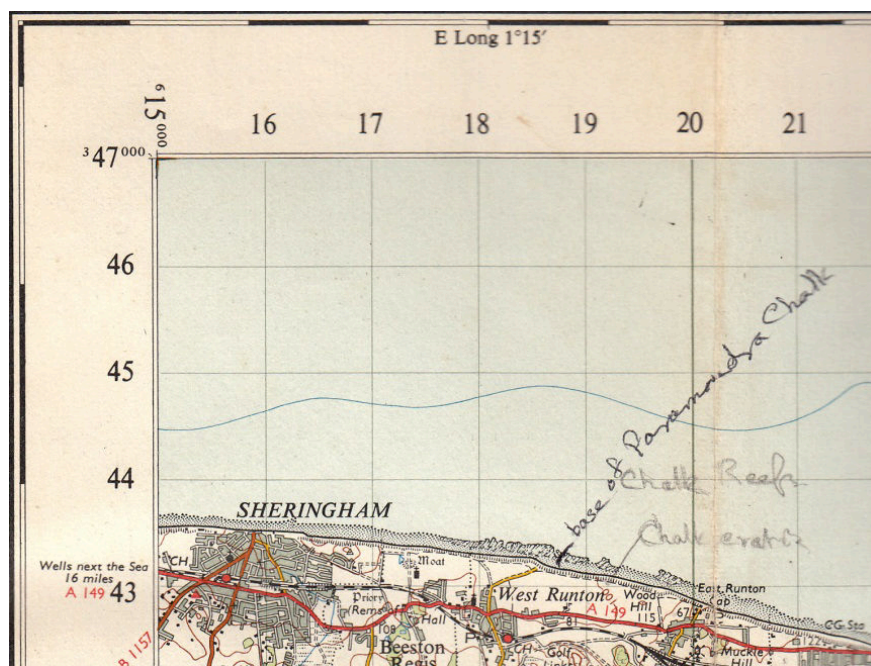
The annotations are not dated (obviously), and their purpose is not stated (equally obviously). Were the maps research documents, occupying a permanent

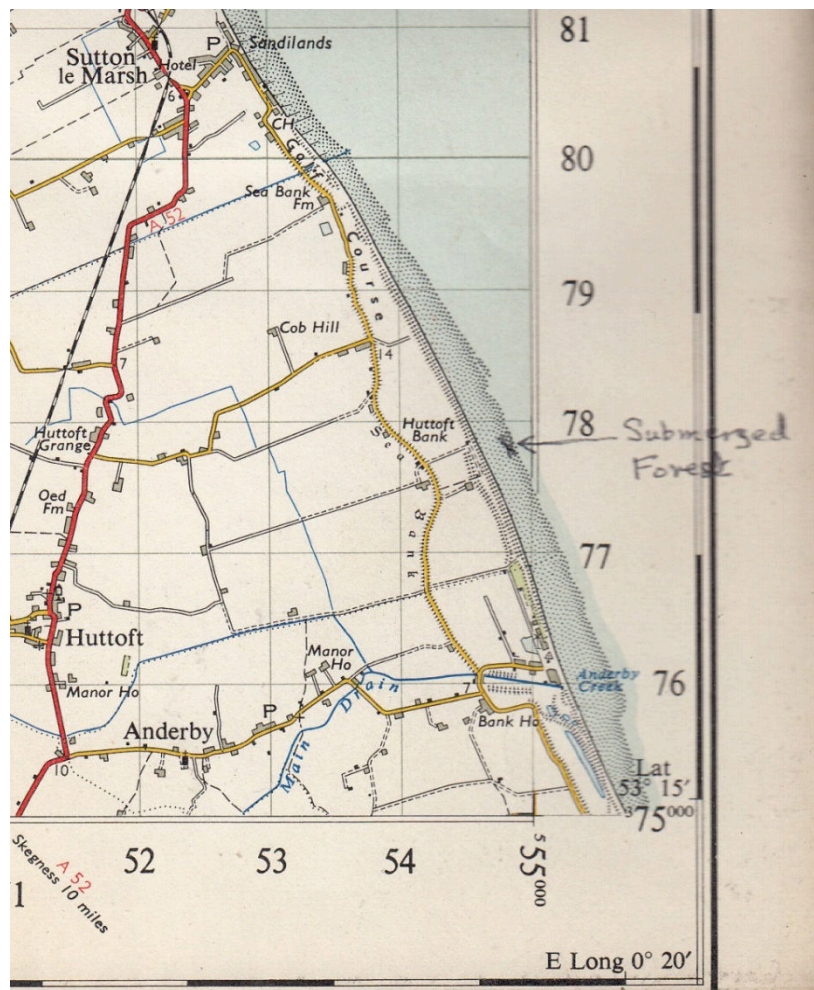
¹ *Sheetlines* 112, 46-50.

² Wednesday 17 March 2004; retrieved online 12 June 2019.



place on a shelf in Professor Hancock's study? Or were they field documents, to be packed into a rucksack next to the geologist's hammer? In the case of at least one of the maps, I think the answer is clear. His notes on Sheet 124 (King's Lynn) include guidance which was evidently intended as an accompaniment to his field trips. At Thornham, he reminds himself, 'creeks not crossable >2 hrs after low tide'; a 'path to beach' is arrowed at Hunstanton. Adjacent sheets, while not containing such detail, might very well have been annotated during a field trip;





Professor Hancock identifies a feature overlooked by the OS

on Sheet 105 (Grimsby), he has marked the location of a submerged forest on the shoreline just south of Sutton le Marsh, while Sheet 126 (Norwich) identifies three chalk features on the shoreline to the east of Sheringham. All three of these maps are on cloth, suggesting perhaps that increased ruggedness and durability were important.

These scholarly additions do nothing in my view to detract from the value of the maps. Similarly, I relish the notes written on a large number of 1:25,000 maps in my collection by Leslie Owen Tyson, during his many years researching and writing the history of mining in the northern Pennines.³ As well as being near-neighbours, Les and I both toiled in the depths of the North Yorkshire County Record Office, and on his death at the beginning of 2019 his maps passed down to me.

Jake Hancock was a professional scientist, Les Tyson an amateur historian; their maps, some of which have quite fortuitously ended up in my collection, are a happy demonstration of the uses to which scholars of all kinds put the products of Ordnance Survey.

³ The Arkengarthdale Mines; Mashamshire Collieries; A History of the Manor and Lead Mines of Marrick, Swaledale; &c. All published by the Northern Mine Research Society



Extract of 1:25,000 First Series sheet NY90 (Whaw), annotated by Les Tyson during his researches for 'The Arkengarthdale Mines'

Setting Colby in context – and the software that does it

Rob Wheeler

If one looks at European official mapping in the nineteenth century, countries fall into two camps, led by France and by Prussia. The former group saw geodesy as a grand scientific enterprise. They also established cadastral surveys, not least because prosecuting revolutionary wars was extremely expensive, and an up-to-date cadaster was necessary as a means of effective taxation. Relations between the topographic and cadastral surveys could be fraught, but generally the former ended up drawing on the data of the latter with the aim of producing maps – often at 1:50,000 – that would be militarily useful. Having initiated this process (and pushed the front line out into neighbouring states), France itself was slow to apply what it preached. The plans of its *ancien cadastre* were not updated until the 20th century. The topographic maps – at 1:80,000 rather than 1:50,000 – did not use cadastral data and were not completed until the 1870s.

Prussia and Austria had extensive lands in the east that needed mapping and limited resources to map them. There was also a reluctance to produce printed maps for fear that they would aid the enemy. So the mapping tended to consist of plane-table sheets at 1:25,000 hung on a trigonometric framework that was at best merely adequate. Fair copies of these were maintained in national capitals, and – presumably – tracings of the relevant areas were rushed out to generals who might need them. Later on, printed maps at a smaller scale were produced; and sometimes, later still, at the scale of survey.

Britain was in a peculiar position from the start. It conducted its triangulation as a great scientific enterprise, but the projection of its maps can only be described as fudged. Nor was there any cadastral survey. Then came the move to Ireland to survey townlands, which might have become a unique example of a topographical survey taking on cadastral work. Colby, however, refused to touch the legal side: he would provide the maps but it was the job of a separate organisation to establish the extent of individual townlands. From about 1835, maps included field boundaries: the Ordnance was now producing a map that looked much like a cadastral survey, but was insisting that its surveyors would only record what was on the ground and would not take cognisance of property boundaries. This freed the survey to take a detailed interest in constructed features: for example, lime kilns, about which several articles have appeared. In contrast, continental cadastral surveys normally used a solid line to indicate the boundaries of a holding (ie land with the same owner and occupier). In open-field agriculture most such boundaries did not correspond to a fence, and to show fences as well as holding-boundaries was usually thought to complicate the map unacceptably. Such differences proved long-lasting: even today, the Ordnance Survey 1:25,000 aims to show every fence; the French and German 1:25,000 maps have a fence symbol but show relatively few.

This extremely simplified account is intended to explain why CCS members might wish to take an interest in other nations' official surveys. An astonishingly large number of the older surveys are freely available on-line, and I have placed

on our website a guide to sites where one can see 19th-century official surveys of various European countries.¹

Equally astonishing is the lack of any common software for displaying these maps. Official surveys are characterised by large numbers of sheets on regular sheet lines. The user traditionally had recourse to a printed index diagram to ascertain the sheet numbers he needed and would order sheets by specifying sheet-numbers. This is sometimes reflected by an interactive index diagram: click on the square desired and the sheet in question loads. Sometimes the user is presented with a choice of sheets of different dates covering that square. The National Library of Scotland goes one further and drapes the index over a modern map, with more detail presented as one zooms in.

The alternative approach which some sites follow is to stitch the maps together and overlay them on a modern base. That provides a short-cut which many users find convenient, but it denies the user any metadata he or she might have found in the margins, notably the dates of survey and revision. It would, in principle, be possible to provide that data in a read-out line, just as the lat/long of the cursor is usually shown, but I have not encountered any sites that do this. The best approach will depend on the maps. For example, the *mapire* site shows the second and third Austrian Military Surveys in stitched-together form. But in this case not very much is lost: another site shows the same maps as single sheets, from which it emerges that the margins were largely filled with data on the accommodation available for men and horses.² NLS, as most readers will know, avoids the problem by offering a stitched-together product as an alternative to the index-diagram-based one.

The Dutch and the Swiss surveys take stitching one stage further by offering a date-slider. One can select the area of interest and then move the slider to any specific date, or slide it back and forth to see how the area changed with time. This is great fun; it is also dangerously beguiling. Seeing that a fish dock (say) was not there in 1907 but appears in 1908, it is all too easy to jump to the conclusion that it was built in 1907-8. Actually, all we know is that it was not shown on the version of the map current in 1907. If we had that map in front of us, we would look at the revision date and, seeing a revision date of (say) 1870, we would pronounce the fish dock to have been built sometime between 1870 and 1908. The slider style of presentation insinuates that maps were updated every year. With considerable work one can establish the date when the older sheet last changed; that may (possibly) approximate to its revision date; but not one user in a hundred will go to such trouble. All too many archaeologists and historians are naive users of maps; I fear that the Netherlands and Switzerland will suffer an epidemic of spurious building-dates resulting from these sliders.

Western Europe will be relatively familiar territory to most CCS members. We know where Naples is; a place like Graz, most of us have heard of. Go further

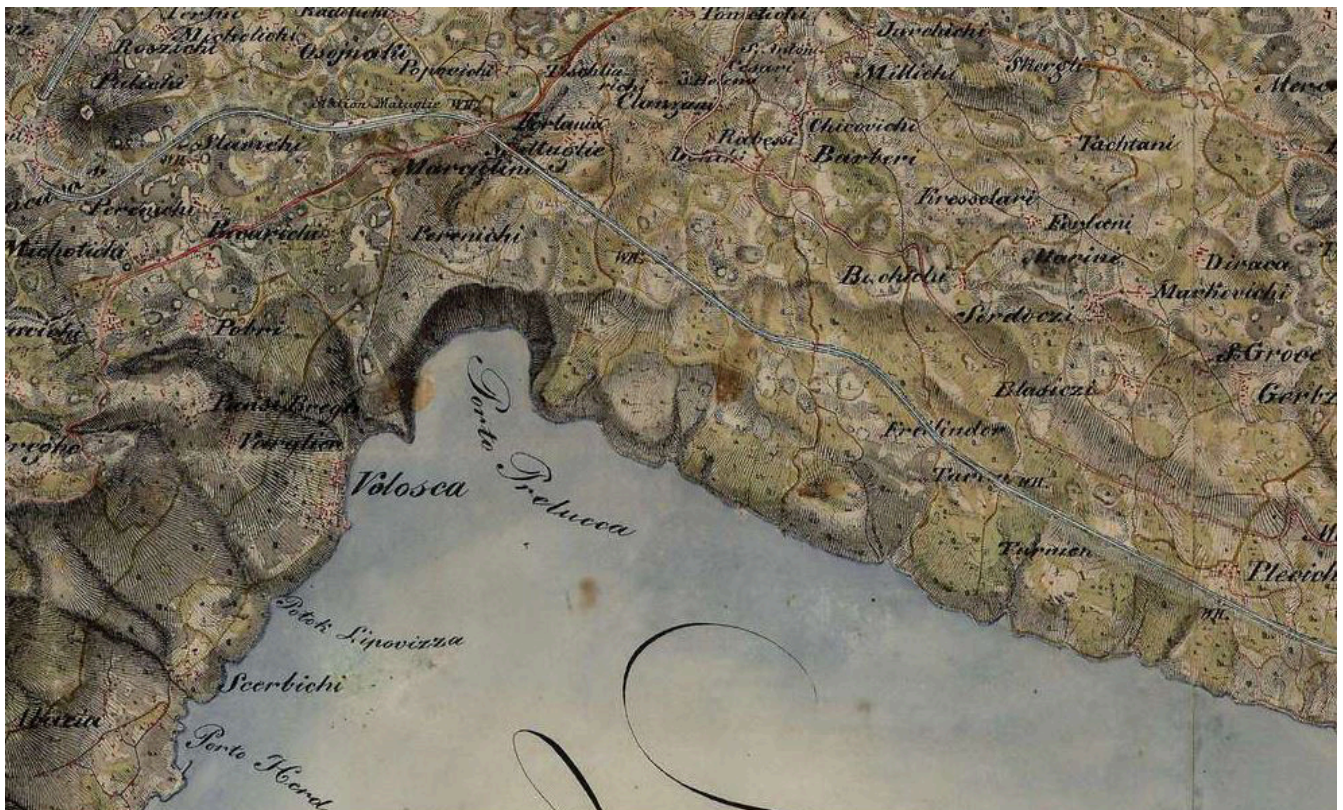
¹ <https://www.charlesclosesociety.org/files/EuroSurveys.pdf>

² Dates when the survey was reduced from the cadaster are given bottom-right. Later notes, not easily read, sometimes mention railway revision, but without a date.

east and things become difficult, especially when the same place can have different names in different languages. Throw in maps with Cyrillic lettering and life becomes really difficult. I was therefore grateful to find that the Latvian National Digital Library presents all its maps, with margins, but georeferenced on top of a modern base. There is a slider to make the map transparent, although the coarseness of the base map reduces the utility of this feature. The real value lies in being able to zoom out to see where the map selected actually sits in the country as a whole.

The other development which is greatly to be welcomed is the extent of collaborative ventures. Where national boundaries have remained unchanged for centuries, it is easy for the national library of a country to take the view that it is really only interested in putting on-line such of its holdings as relate to its own country. Where boundaries have changed many times in the last 200 years, such a position starts to look absurd. The Vienna archives, for example, hold surveys covering the whole of the Austro-Hungarian Empire and beyond. The consortium making this fascinating material available is run from Hungary.

Finally, an expression of gratitude is called for to all those institutions that have put collections on-line, and more particularly to a couple of private individuals who have assembled sites which are up of a comparable standard. One wishes all of them every success.



*Coastal Zone (1821-1824) – Second Military Survey of the Hapsburg Empire
www.mapire.eu*

No bridge at Hullbridge

As a postscript to the recent interest in the depiction of river crossings on OS maps by ferries (*Sheetlines* 112) and bridges (*Sheetlines* 113), there is a strange anomaly on the map of the River Crouch at Hullbridge, Essex (TQ 809956).



Explorer 175 (left) shows a 'byway open to all traffic' crossing the river, but no indication of the means of doing so. The view (below) taken recently at about half-tide confirms that no crossing now exists, but the extract from the 1958 edition of TQ 89 shows that both ford and ferry once did.

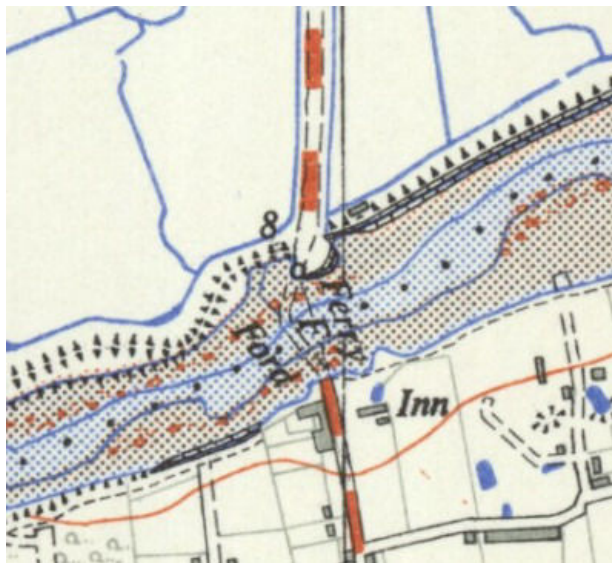
According to the visitor information board, 'Pilgrims crossed the river at the slipway on their way to Canterbury. Signs of the old causeway can still be seen at low tide, but there are no remains left of the bridge that spanned the river from before 1240 to Cromwell's time. For years a ferry-man would row children across the river from South Woodham Ferrers [on the north bank] to the Old School House'.

Local people told me that they thought it possible to wade across at low tide, but none had actually done so (nor seen anyone do so).

Presumably, the route still has legal status as a byway, but to show it picked out in green is, I suggest, every bit as unhelpful as failing to show working ferries on current footpaths.

Or is there another explanation?

John Davies



The extract from TQ 89 is by kind permission of the National Library of Scotland.

The photograph is by the author.



The Ordnance Survey tidal observatories at Felixstowe and Dunbar

Michael Spencer

In *Sheetlines* 114, Richard Oliver reviewed a new book about the Newlyn Tidal Observatory, whose observations from 1915 to 1921 were used to fix the datum level for altitudes throughout Great Britain. The book refers to the two other such establishments, on the east coast of Great Britain, which did not last long; and at the end of the review Richard wonders what became of them.

All three sites were established because it had become apparent that the First Geodetic Levelling of 1840 to 1860, using bench-marks mounted mainly on buildings, did not meet the twentieth-century standards of accuracy. A Second Levelling, using Fundamental Bench-Marks mounted in solid rock, was undertaken from 1912 to 1921, and new measurements of tidal levels were required at the same time, because the old datum based on ten days of readings at Liverpool was strongly affected by the flow of the Mersey at the port. The sites of the three new tide gauges were chosen to be well away from any major estuary.

Dunbar



The observatory building, erected in 1913, is now the harbourmaster's office. It is a small stone building on the edge of the very narrow entrance to the harbour, tucked closely under the steep cliff topped by the ruined Dunbar Castle. Although the site is not shown explicitly on the map, *figure 1* is an extract from Haddingtonshire Sheet 7.NW, annotated to show the position. The interior comprises a single room about ten feet square, with a linoleum floor tacked and screwed down to near immovability. Under it is the shaft in which the measuring device floats on the water surface, connected to the water in the harbour by a narrow pipe always below water level. This

arrangement is designed to permit the water level in the shaft (the ‘stilling well’) to respond to the diurnal tidal variations in the harbour entrance, but to be much less affected by very short-term fluctuations such as are produced by strong waves. Unfortunately, the actual readings obtained are to some extent affected by the domestic habits of various eels and crabs.

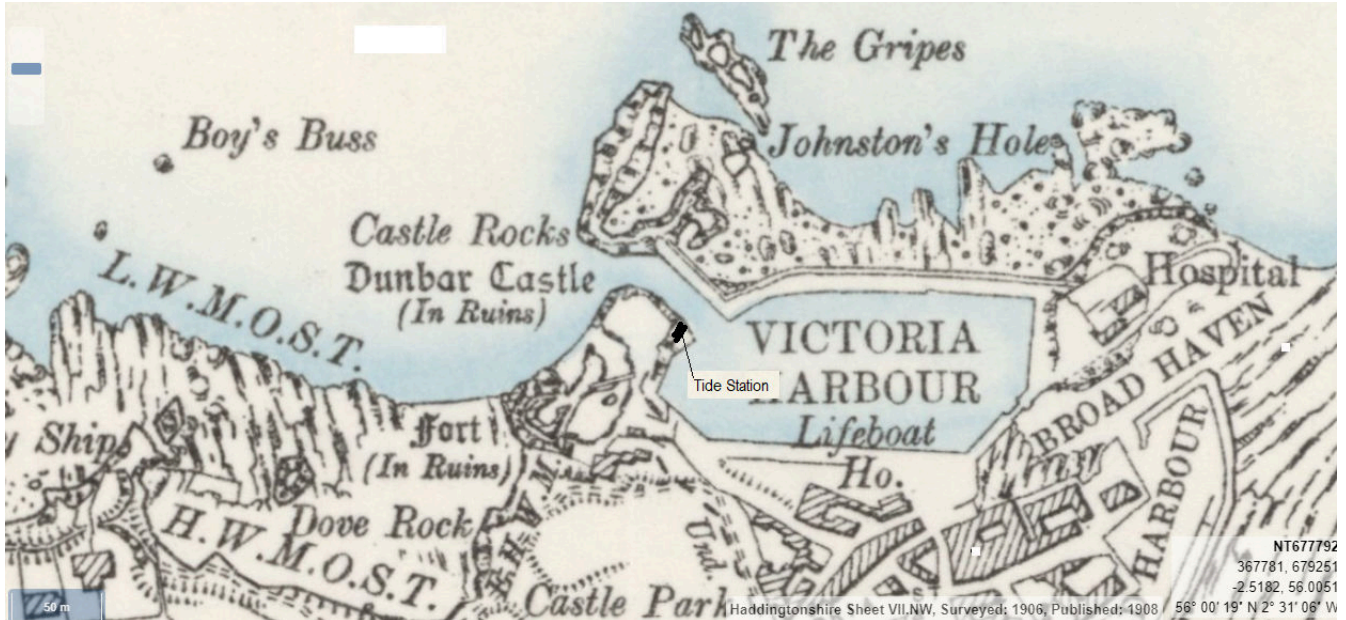


Figure 1

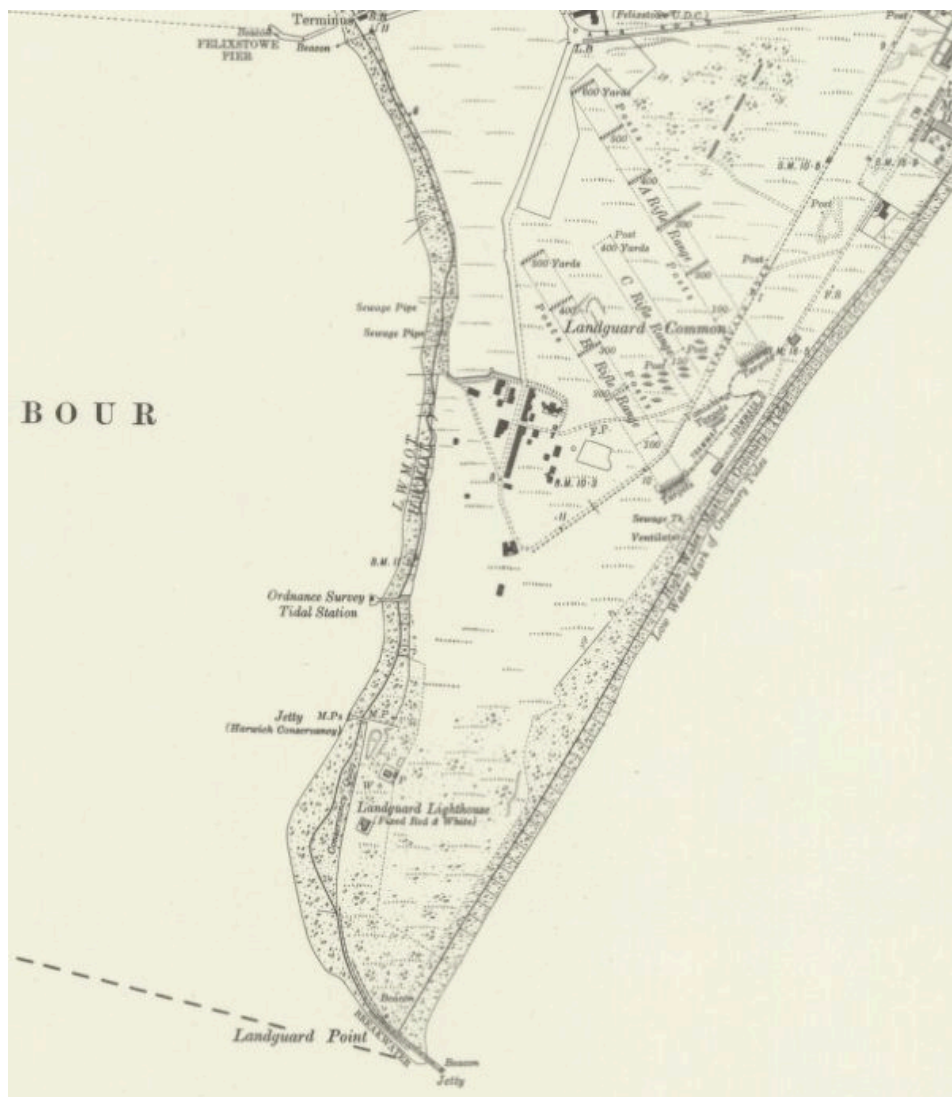
Although there is what appears to be a data logger sitting on the windowsill of the office, it is not part of the National Tide Gauge Network, a series of 43 stations throughout the UK controlled and monitored by the National Oceanography Centre for the Environment Agency. I have not been able to discover where, if anywhere, the readings at Dunbar are now sent, and it seems fair to discount it entirely for anything more than historical interest. The situation at Felixstowe is even worse.

Felixstowe

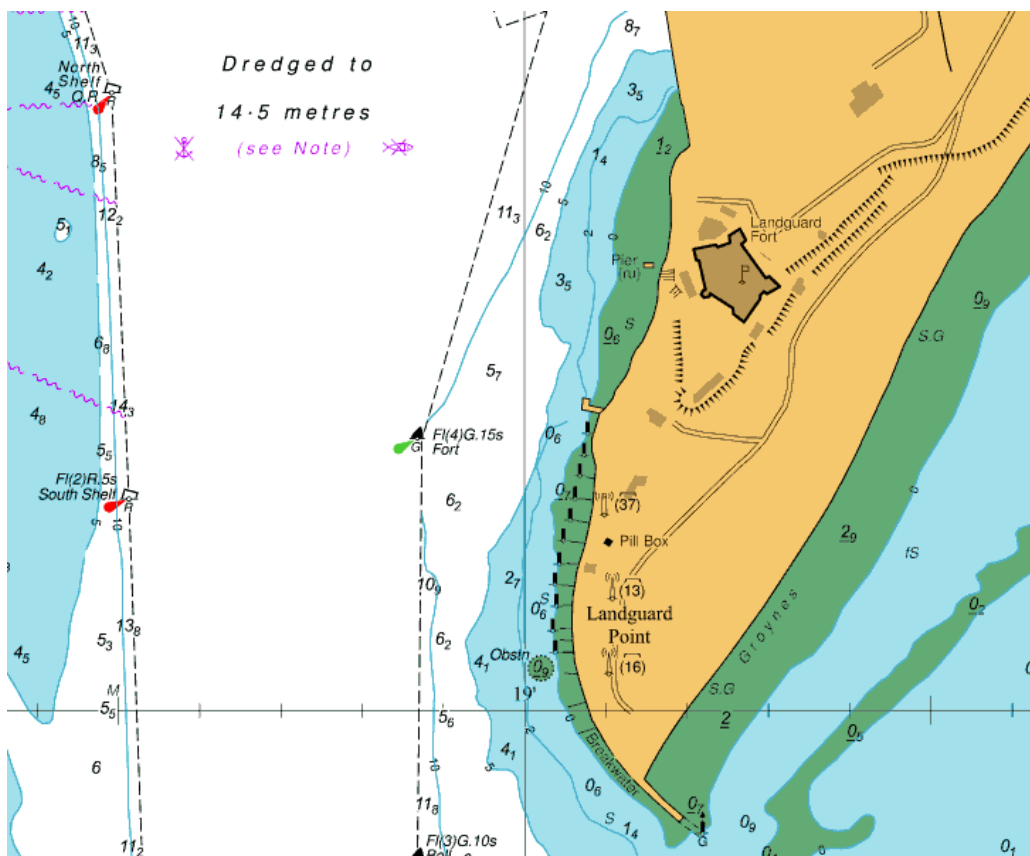
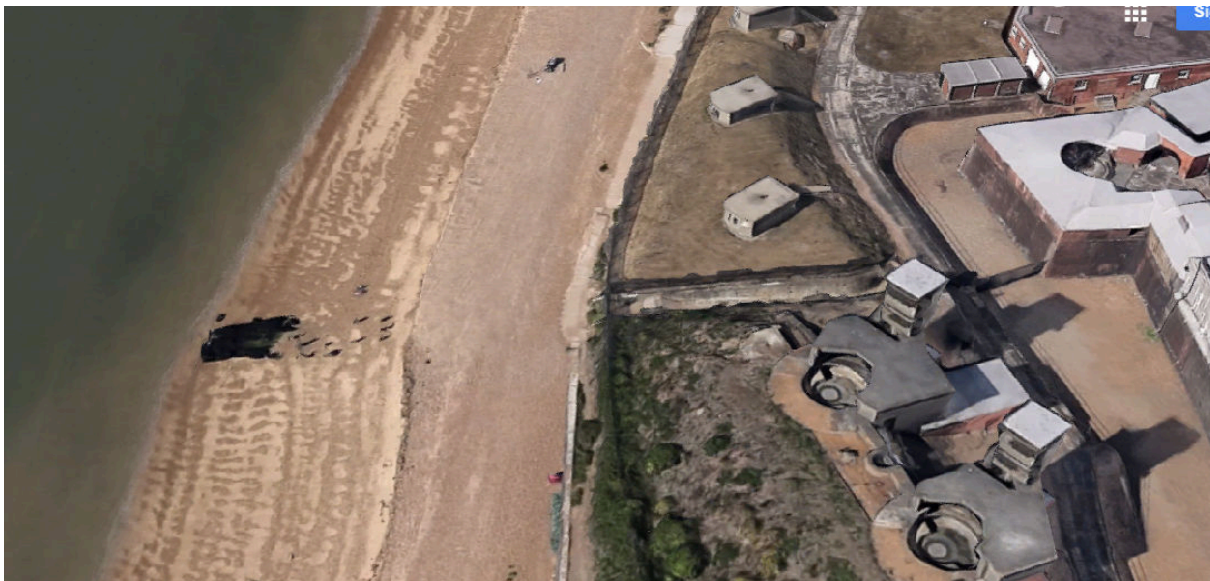
The site of the ‘Ordnance Survey Tidal Station’ is clearly marked on the six-inch Sheet 89SE of Suffolk (*figure 2*). Although not published until 1928, this map was revised in 1925 and “Adjusted to the New Geodetic Levelling and Newlyn Datum in 1925 and 1927” – this was the Second Geodetic Levelling already referred to. The Station was established in 1917 on a jetty extending into Harwich Harbour, and readings were taken for a short time only. It may have been already out of use by the time the map was published.

Figure 3, kindly provided by our member Michiel Rademakers, shows an extract from the 25-inch ESRI World Imagery layer ¹ used by the National Library of Scotland, overlaid with the transparent 25-inch Sheet Suffolk 89.12 of 1902. This sheet already shows the jetty with its distinctive shape, but of course without the Tidal Observatory. Notice in particular the walled walkway leading from the fort towards the jetty, which Michiel points out is an indicator of the location of the jetty.

¹ ESRI is the American company Environmental Systems Research Institute, a supplier of geographic information systems software.



Comparisons between the readings taken at the three sites showed that Newlyn and Felixstowe were very closely in agreement, to about half an inch; but Dunbar was well away from this result, differing from Newlyn by about 10 inches, about five times the estimated likely difference due to the probable errors in the levelling. It was therefore concluded that there was some kind of north-south ‘slope’ to the average sea surface around England, and the readings at Dunbar were discounted as being irrelevant to any kind of ‘standard’. Newlyn was then fixed as the basis for the OS Datum. The station at Felixstowe, giving results so close to those from Newlyn, was declared surplus to requirements, and was taken over by Harwich Harbour, who had a similar jetty nearby. It would appear that it was soon allowed to go to rack’n’rooney, and the present-day Google satellite view (*figure 4*) shows almost no trace of it at all. The walled walkway from the fort is still noticeable.



Above:
Figure 4

Left:
Figure 5

A further confirmation of the position is given by *figure 5*, which is an extract from Admiralty Chart 1491 dated Dec 2017, on the six-inch scale (well, all right, 1:10,000). This is not coy about showing the Landguard Fort, and also marks a “ruined pier” in what I would like to think is exactly the right position relative to it.

The idea of the ‘slope’ has been disproved by modern research, and it is now considered to be an artifact of errors in the Second Geodetic Levelling. This in turn may have been the wellspring of the Third Geodetic Levelling of 1951 to 1959. Nevertheless, there will be no further such levelling exercises, since it is now possible to determine the heights of MSL above the reference ellipsoid at tide gauges using GPS measurements of their benchmarks. (This should provide an answer to the question I raised ² about establishing the difference between Newlyn and other local datums, such as Stornoway.)

Facilitating contact between members

We recently discontinued publishing the Almanack, which listed members’ names and addresses, because of the restrictions imposed by the recently-introduced GDPR data protection legislation. Subsequently we have been asked to find a way to help members locate each other and make contact. The simplest way to achieve this would be to maintain a separate list of members who are willing for their addresses to be made public.

We are proposing that the first such list will be issued with December *Sheetlines*. If you would like your name and address to appear, please email info@charlesclosesociety.org or write to John Davies, 16 Charteris Rd, Woodford Green, IG8 0AL. Don’t forget to include your membership number, which appears on your *Sheetlines* wrapper.



Andrew Darling (*far left*) has joined the *Sheetlines* editorial team. Andrew, who lives in Wensleydale, was Senior Press Officer at North Yorkshire County Council and previously News Editor at Channel 4 News. Andrew is a keen photographer and local historian.

John Davies recently celebrated ten years as editor and much longer as a contributor, although his early submissions, such as this 1946 map of the LMS line from Lancaster to Manchester (*left*) were rejected as being in the wrong format.

² *Sheetlines* 114, 10.

Asked ... and answered

Leslie Ann Phillips, Rochester NY, asks: I'm looking at 1:50,000 Second Series sheet 90, copyright 1988, revised 1980, selected revision 1987. At the very bottom corner there is this: 12/89/891674 S. I have

1:50 000 Second Series Sheet 90



Series M 726
Sheet 90
Edition 4-GSGS
12/89/891674 S

another copy of the same sheet that only differs in that number. The second copy has 21500/6/88/880831 S. What this is code and what does it mean?

Richard Oliver answers: These are Ministry of Defence/Directorate of Military Survey/Defence Geographic Centre ('MOD') print codes. Around 1979-80 it was decided to produce the 1:50,000 as a joint civil-military series: hitherto this (like the predecessor 1:63,360 7th Series) had been produced in separate civil and military versions, but the latter only differed from the former in having the grid numbers on the map face, and enlarged magnetic variation diagrams and scale bars. As the OS and MoD were under the usual pressure to contain costs it was decided to make one printing serve two purposes. Apart from adding the grid figs, magnetic variation and scales bottom centre, it entailed adding 'refer to' boxes containing series, sheet and MOD edition (numerical, quite different from OS edition) and MOD print codes.

These are in two forms, one including the quantity allocated to MOD, the other not. The earlier code: '21500/6/88/880831 S' indicates that 21,500 copies were printed, nominally in June 1988, under MOD order/job number 0831 of 1988 by Ordnance Survey ('S'). The later code '12/89/891674 S' indicates a printing of December 1989, under order/job number 1674 of 1989, again by Ordnance Survey. It is quite common for 1:50,000 maps to be given a straight, unamended, 'facsimile' reprint, to which the only obvious clue is a change in the MOD code.

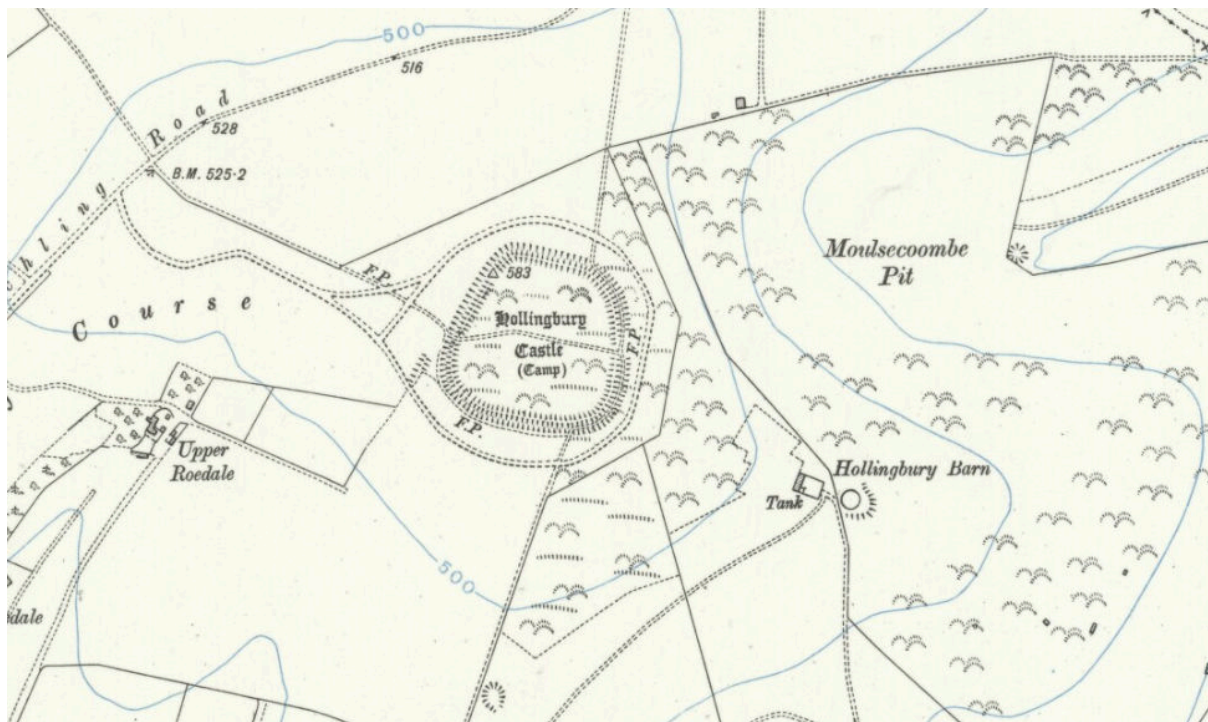
Mike Shaw asks: I spent yesterday running through a lot of maps for annotations, thinking afterwards I am sure that I saw one or two, probably Six-inch of mountain areas, with blue contours, did I overdo it or do such exist?

Richard Oliver answers: Be reassured: you have not been 'seeing things'. A separate contour plate was introduced for land-contours on redrawn and republished OS Six-inch maps in 1909. From that date until c.1912-14 they were printed in blue; thereafter they were printed in red. HSL Winterbotham in *The National Plans* (1934) gives 1912 as the date for introducing red contours, but blue contours were certainly still being used in 1914 in those counties that had been started 'blue' before 1912. This was so that there was consistency within counties. Sometime after 1914, when 'blue contour' sheets came up for reprint, they were printed with red contours. 'Blue contour' sheets are therefore not very

common: they would have tended to last longer in mountain and other areas where the Six-inch sheets would tend to sell less well than in more developed areas. I don't have any figures for how many sheets were printed with blue contours, or with red contours.

Blue contours are of course unusual for land-mapping, and they seem additionally anomalous when the OS had used various red or reddish, orange, 'burnt sienna' and browns of various sorts for contours on its small-scale maps from the mid-1890s on. (Grey is used to considerable effect on some of the experimental coloured One-inches of 1914.) I can only think that blue was considered a 'discreet' change as compared with the previous dot-dash in combination with the 'black plate' detail.

The contours were presumably drawn on a separate plate as an economy, as they would not need redrawing when the map was revised, and the costs of two printings were presumably outweighed by the saving in drawing costs. This is conjecture: as with so many similar OS design and content changes, no documentary confirmation, or discussion of alternatives, is available.



Blue contours on Six-inch sheet Sussex LXVI.NW, revised 1906, published 1912, reproduced by kind permission of National Library of Scotland

These questions were posed in the now-defunct Yahoo group devoted to OS-related matters. A new 'IO' group has been set up to replace it, and members wishing to become involved in online discussions on OS issues, whether it be to ask questions, assist in research, pass on information or simply to read what others are saying, may join by emailing ordnancemaps+subscribe@groups.io

Kerry musings

David Archer

I find it a real pleasure to be able to open an Ordnance Survey map and know that I will not be bombarded with advertisements when looking at it. Unlike so many other things in life these days, the OS has not succumbed to degrading its maps by letting out the blank map margins to Tom Dick and Harry. Even when under great pressure to bring in money, map margins were sacrosanct from advertisers of walking boots, vacuum cleaners and mohair cardigans, all favoured by map users I understand. And long may this continue. Yes, I admit that the *Hardings' guide maps* of the early twentieth century now have an appeal with coloured adverts all around the very wide margins, but these were the products of advertising companies where the maps were secondary to the adverts, not the other way around.

Adverts on OS maps? You are on Cadair Idris, watching a distant farmer with three dogs gather in a couple of hundred mealy bugs and you remember that the cat's insurance has expired. Not to worry, somewhere in the margin of your map is an advert with a telephone number for renewals. With adverts in map margins you would never again be on the hills and away from it all. Ordnance Survey maps have always been kept free from advertising. Today, I assume the idea of advertising in the margins would be seen as being too far away from the target, say a pub. A marker and name on the map at the exact location and nothing less would be sought. Just like those on Google and elsewhere. Enough people complain of all the tourist symbols on maps, so what would mini-adverts do to the cherished product?

Companies and organisations have always had access to the public through their products; indeed, the OS has a long history of using map margins as direct lines of communication with map users. Here, I am not thinking of marginal clutter such as diagrams of adjacent sheets, price details, the copyright statement and *For official use only*, which if absent would not hinder anyone using a map.¹ My interest this week is messages from the OS, little notes, usually explanations which enhance the use of a map, that help one get the most out of a purchase. On small scale civil aviation maps: *Air information correct to 1-6-34* must have been a bonus for giving a date to the information shown, whilst the RAF air maps went further, telling where updates would appear: *Subsequent corrections will be issued in Air Ministry Notices to Airmen & A.M.O..* If a map user was curious about Welsh names on Populars, a discreet note: *A glossary of the most common Welsh words used on the Ordnance Survey maps can be purchased* should have been useful.

The best known note appears on all scales: *The representation on this map of a road, track or footpath is no evidence of the existence of a right of way*, the wording seemingly little changed for over a hundred years. As with price details

¹ Nor am I thinking of error corrections, such as the slips pasted on Ordnance Survey Eclipse maps.

in the lower margin, it does nothing to help one use the map, but is a friendly bit of advice from the OS, a warning not to go waving the map about and quoting it when you are in the wrong by being in the wrong place. Why is this semi-legal note about ways shown on maps of all scales? Might its addition have been in response to a widely held belief to the contrary? Was the OS constantly bombarded with enquiries on the subject, and thought it easiest to put the answer where everyone could see it? Why is this the only note of its kind? Why do we not see *The representation of a river or canal is no evidence of the existence of a right to swim?* Or *The word park on this map does not necessarily mean a right to have picnics and play football.*

Notes on large scale maps are fascinating. Well, to me they are, though sometimes it is difficult to know why the OS provided what it thought was a helpful note: *The parish of Bishop's Hatfield has been re-numbered on this edition* on a 1:2500 sheet is fair enough, but consider: *The following parcel numbers do not appear on this edition: – Parish of Southampton, 285, 287.* Nor do a lot of others one might add; did the OS receive numerous reports of people having wasted many hours seeking missing numbers? Looking at the sheet, one can see parcel 286 squeezed in between two blocks of buildings, so maybe one of them was 285 or 287? If true, why did the OS point out the absence of two parcel numbers, when they might also have noted that five cottages were also now absent, as they were demolished to make way for the building on 287?

Other friendly little notes aim to prevent confusion by providing clarification. After 1884, parcel numbers and areas appeared on maps rather than in Books of Reference, with a short-lived note in the top left margin:

Every parcel is numbered, thus 27

Its area is given underneath, thus 4.370

Where a parcel was split between more than one sheet 27 4.370 would appear on all sheets, without stating that parcel areas included portions shown on other sheets. This is exactly what surveyors wanted, the acreage of a single parcel as in the books.

But after 1922, in response to pressure on costs and speed of output, areas were henceforth only calculated to plan edges, eliminating the necessity for the OS to work on adjacent sheets. So another useful note appeared *Areas to plan edge only*, and was most certainly needed after being otherwise for so long. A helpful note, maybe, but also an annoying reminder for surveyors who now had to consult several sheets for a field acreage. Nobody ever needs to know the part acreage figure shown on maps.²

My favourite missive from the OS also appears on 1:2500 scale maps and should have been written in an Old English script similar to that used for the Ordnance Survey Domesday books:

² Post 1922 reprints of pre-1922 sheets often/usually have acreage figures only to plan edges. Another example of changes within the neat line accompanied by unchanged dates without.

To convert Decimal parts of an Acre into Roods and Perches, multiply by 4, this will give Roods and Decimals of a Rood, multiply this Decimal by 40 thus obtaining Perches and Decimals of a Perch.

Example: .357 = 1 Rood 17.120 Perches

$$\begin{array}{r} \underline{4} \\ \text{Roods } 1.428 \\ \underline{40} \\ \text{Perches } 17.120 \end{array}$$

Every time I see this note, I am reminded of 6d exercise books bought from Woolworths which had rear covers with multiplication and other tables, including length. I am sure many will remember rod, pole and perch but have absolutely no idea of where they fit in the general scheme of things. A good deal of searching has left me slightly more informed but with questions.

If County series parcel numbers are in acres to three decimal points, 4.370, my first question was why was an imperial measure given to three decimal points, rather than an all imperial figure?³ I have not found an answer,⁴ but Brian Harley suggests parcels were numbered and measured in response to public demand, as noted in the *Report from the Registration and Conveyancing Commission*, British Parliamentary Paper, 1850.⁵ If this was true, it seems that the public used acres, roods and perches in preference to decimalised acres, hence the note on maps as an *aide memoir*. They were certainly still well used in 1919 when the big estate around us was sold. The sale catalogue offers Drefor Farm as 327a 2r 14p, whilst the individual field figures, taken from the local 1903 1:2500 map total 327.591 acres. Spot on. Try the calculation yourself.

Why was this note felt necessary? Were the imperial measures falling into disuse by 1899, the earliest dated note I have found? Surely those who used the maps daily knew the simple arithmetic, and from experience a vast number of 1:2500 sheets have possession stamps of surveyors or estate agents who would not need the note. So, was the note provided for the lay public, in which case, why did they want the area figures and why in imperial units?

I have not found any information on when imperial measures of area began to decline in favour of metric acres. When did roods and perches fall out of favour with the general public? No answer has been forthcoming, but I suspect the decline was similar to decimalisation, when in 1985, over ten years later, one would be told in the builders' 'merchants that a length of wood had been measured in metric feet. Today, everything is metric with no mention of feet by builders. There must be CCS members who were brought up using one-inch maps and acres, and some who have only known the 1:50,000 map and hectares. Whilst having a preliminary skirmish with this problem, I noted the scale bar of a

³ 4.370 acres converts to 4 acres 1 rood 19 and a bit perches, or 19.2 perches which brings in the decimals again, unless you calculate the 0.2 perches in square yards feet and inches. Life is too short.

⁴ Nor why Roman and Arabic numbers were mixed to give 1:2500 County series sheet numbers.

⁵ JB Harley, *Ordnance Survey maps: a descriptive manual*, Ordnance Survey, 1975, 58.

six-inch quarter-sheet gave a mile in furlongs, chains, feet and perches. Perches were an area on the 1:2500 maps, but now a length on a six-inch map. Oh, for the nice and simple millimetres, metres and kilometres.⁶ It appears that language was to blame. A perch is a measure of length, and when squared should be called a square perch, or a square rod, with 40 of them to a rood and four roods to an acre. Not that we should lose any sleep over it as in England the perch was officially discouraged in favour of the rod as early as the 15th century, with the rod phased out as a legal unit of measurement only in 1965 as part of the metrication process. The advantages of decimals were appreciated in the 1850s as in 4.370 acres, so why were mediaeval lengths fossilised on exercise books until the 1960s?

I scoured all the technical books held but could find nothing to say how the OS arrived at the decimal acres shown on maps. I had a vague memory that one divided an area into easily measured areas such as rectangles and triangles, and summed the individual areas.

The nearest to an official reference was on page 304 of Seymour,⁷ where we are told that in the 1950s the *Measurement of parcel areas on the 1:2500 plans [is] by the time-honoured scale and trace method* with a footnote: *The scale and trace method, invented by a sapper before 1850 uses a sort of slide rule which totals the number of squares printed on a sheet of tracing paper. The tracing paper is laid over the map, covering the parcel being measured.* More questions, such as how large are the squares and what about the fiddly incomplete squares at the edges?

One could spend a lifetime investigating the curiosities lurking in the margins of maps, especially large scales. Now, how many chains in a furlong, or is it furlongs in a chain? Anyone under sixty-five can move on to the next question.

Campbell Kennedy

It was Campbell Kennedy who told me of the founding of the Charles Close Society by sending a leaflet distributed in June 1981 by Alan Godfrey. I had just made contact with Campbell through an advertisement one of us had placed seeking Ordnance Survey maps, and to have made contact was quite exciting, as he was the first person I knew who was also interested in OS maps. It was obvious that Campbell was already very knowledgeable on the subject, and had even got to the stage of having both a wants list and a list of items for sale. We exchanged maybe half a dozen letters, until he diplomatically suggested that once in its stride, the society might provide the answers to my endless list of questions. His kindness to a novice will never be forgotten.

The society's first meeting was held at the National Library of Scotland in November 1981, and advertised as 'Starting at 11.00 am and probably going into the afternoon...'. Two of the twelve pages of *Sheetlines* 2 contained Campbell's meeting report, whilst page 10 hosted his suggestion for a regular 'For

⁶ I do not use centimetres.

⁷ WA Seymour (ed.), *A history of the Ordnance Survey*, Dawson, 1980, 304.

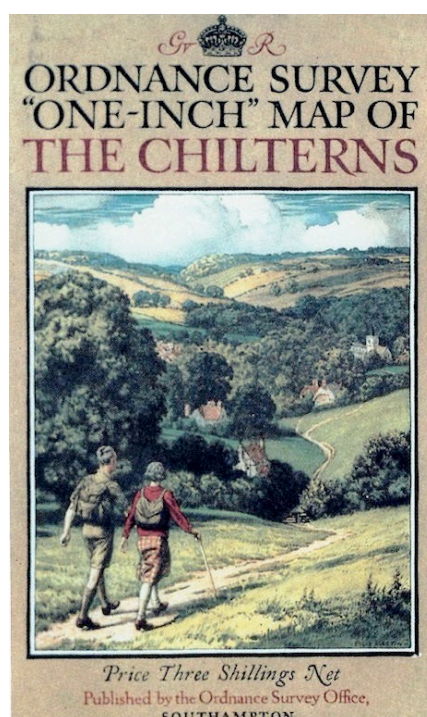
sale/Wanted/Swap section' in *Sheetlines*, along with a note of his own wants of the moment.

I think it fair to say that Campbell alerted the second-hand book trade in general to the potential of Ordnance Survey maps, when he penned an article *Ordnance Survey maps : an introduction to this growing specialist field* for an early issue of the very popular *Book and Magazine Collector*.⁸ His list of suggested values resulted in prices rising significantly overnight,⁹ resulting in more maps becoming available as booksellers, having been invited to a viewing, no longer left maps to be re-cycled along with unwanted books. And with more maps in bookshops, so the number of scarce maps offered to the public increased.

From Campbell's collection, the society's archives have received a most generous donation of the original artwork for three map covers: *The Chilterns* by Ellis Martin, together with *Bristol District*, and the unused *New Forest* drawing by Arthur Palmer,¹⁰ together with a collection of 23 OS leaflets (1924-63), and other items. Cambridge University Library's Map library was similarly remembered.

Sadly, the name Campbell Kennedy will not ring a bell with most members; I only met Campbell once, at one of the Nuneaton AGMs, 1997 I think, and found him just as charming and enthusiastic as his letters of earlier years.

Campbell was obviously a very experienced collector long before most of us had discovered Ordnance Survey maps, and did a lot to consolidate the early work of the society, for which we are all extremely grateful.



⁸ *Book and Magazine Collector*, 1984, number 8, 27-33.

⁹ And after a couple of years they slowly drifted down again.

¹⁰ Illustrated in John Paddy Browne, *Map Cover Art : Bristol District H63 and The Chilterns H66* page 131, *New Forest H35* page 127.

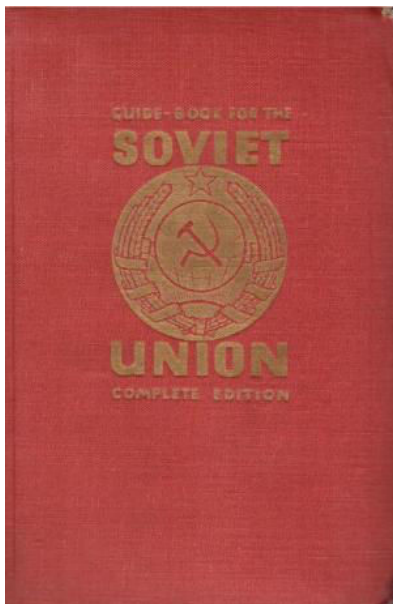
Letters

In *Sheetlines* 114 (a good read as usual) one item caught my eye from the normally accurate David Andrews on page 52 about a piece in the July 1968 *Readers Digest* about the Queen opening the new OS HQ at Maybush, Southampton. Not so, it opened in May 1969. I should know as I was there.

Nigel Smith

The story about the School of Military Survey in *Sheetlines* 106 mentions Bryn Howel in North Wales.¹ My father trained there as a boy from September 1943 to April 1946. I wondered if you were aware of any other information sources about the centre, or if any archives from there still exist, as I'm doing some family history research at present. Any pointers would be very welcome.

Adam Kerfoot-Roberts



Further to John Cruickshank's article,² there is a reference to Murmansk (but no map) in *Guide book for the Soviet Union* by A Radó (1929): "The youngest town in the USSR, formed in 1915, on the desert swamps of the shore of Kola Bay. In 1926 it had more than 8000 inhabitants. The chief importance of the town lies in its port which never freezes. It is now the centre of a province nearly all of which lies in the Polar circle and occupies the whole of the Kola Peninsula. Murmansk and the entire Peninsula were occupied by Allied troops during the intervention of 1918. The foreign invaders were finally expelled on 21 February 1920. The province of Murmansk was formed in 1921."

Peter Banister

David Purchase indicates that he is happy for Le Shuttle, two transporter bridges, and a 'horizontal cable car' to be considered as Ferries.

Personally, I should prefer to stick to water-borne devices, but if we are to accept David's argument then surely we should add London Underground's Waterloo & City line, which is simply a cross-river shuttle, and the Emirates Air Line, which performs the same function rather more expensively.

Graham Bird

¹ *Sheetlines* 106, 21, available at www.charlesclosesociety.org/files/Issue106page21.pdf

² *Sheetlines* 114, 24.

I've been following the 'London Area A D' map series of articles in *Sheetlines* (102, 113 and 114) with great interest, the more so as I am the author of one of the books mentioned in the articles (*Air Raids on South-West Essex in the Great War*, Pen & Sword, 2015).

I am not able to add anything to Gerry Zierler's, Bernard Anderson's and Deborah Stebbing's meticulous research about the map, but I do have a couple of related items that may be of interest. These are: an album of forty four, possibly official, photographs of the King's Cross and Highbury gun stations in 1916-1917; and an album of fifty five - definitely unofficial - photographs of the searchlight stations at Little Heath, Hertfordshire, and Noak Hill, Essex, in 1916-1918. Any member interested in seeing these is welcome to contact me at alan.d.simpson@talk21.com; I can also readily provide scans.

The searchlights album was put together by Frank Heap, of the Royal Engineers, No 6 London Anti-Aircraft Company. He was based at the searchlight stations at Little Heath, near Potter's Bar, and then at Noak Hill, north of Romford. His album also includes lots of informal photos of members of his unit at work and play, and some close-ups of bits of machinery. His searchlight unit was in action at Little Heath on 2/3 September 1916 when Zeppelin SL11 was shot down nearby at Cuffley; I have a letter he wrote to his wife describing the action that night.

Incidentally, I've not seen Gerry's map, but if he were able to provide me with a photograph of the south-west Essex area (bounded by the River Lea, River Thames, Shenfield to the east, and North Weald to the north), I would be most grateful.

Alan Simpson



Triple Light, Noak Hill, Essex, 1918



Testing the equipment at King's Cross or Highbury anti-aircraft battery

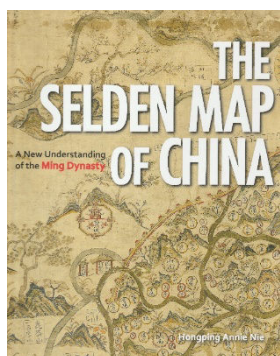


The King's Cross and Highbury gun stations were manned by members of the Royal Naval Volunteer Reserve. Ellis Martin would have liked the pipes.

The Selden map of China: A new understanding of the Ming Dynasty, Hongping Annie Nie, 80pp, hardback, Bodleian Library Publishing, £20, 2019, ISBN 978-1-85124-524-6

Talking maps, Jerry Brotton & Nick Millea, 208pp, hardback, Bodleian Library Publishing, £35, 2019, ISBN 978-1-85124-515-4

Fifty maps and the stories they tell, Jerry Brotton & Nick Millea, 144pp, paperback, Bodleian Library Publishing, £12, 2019, ISBN 978-1-85124-523-9



If the sign of a good book is its ability to draw in the reader who has little interest and even less knowledge of its topic, then *The Selden map of China* is indeed a winner. When he opened it, your reviewer, in common, no doubt, with many CCS members, had given little thought to ancient Chinese cartography. By the time he had finished it, he was gripped.

Several stories are told here, starting with the chance discovery of the map in 2008 in the archives of the Bodleian Library by a visiting American historian, Robert Batchelor. Next, we learn of its painstaking restoration by Robert Minter and his team of conservators. The map had been presented to the library in 1659 as part of John Selden's bequest (he had died in 1654) and for most of the time had been stored tightly rolled in a long box. It had become damaged by being taken out to show visitors and was further damaged by ill-judged renovation in 1919. With the recent conservation, it has now regained much of its original beauty and was first displayed in the *Treasures of the Bodleian* exhibition in 2011.

The map had been catalogued on acquisition as the Selden map, after its donor, but is now listed as the *Nautical Chart of the Eastern and Western Seas*, as nautical chart is exactly what it is. What it shows is not the land mass of the country, but vast areas of ocean and islands and the trading routes known to Ming merchants.

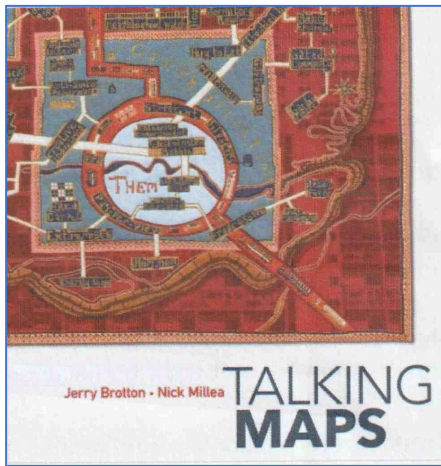
Dating from the seventeenth century, at the height of the Ming Dynasty, the map is indeed a work of art, beautifully painted in multiple colours and black Chinese carbon ink on three pieces of Mitsumata paper, made from the Japanese plant of that name. At almost 1600mm long by 1000mm wide it was too big to have been used as a working chart and probably hung in a wealthy merchant's house.

The book goes on to discuss the history of Chinese cartography and Ming maritime trade and concludes that the discovery of the Selden map has overturned hitherto popular misconceptions about the dynasty and urges us to see Ming China not as a conservative and isolated country, but as open, lively and diverse.

The Selden map also features in *Talking maps*, published in conjunction with the exhibition of the same name running at the Bodleian Library until March 2020. The title may mean maps that talk to us and tell us something new, or those which draw us into conversation; a discussion about maps, not as neutral

definitive statements of fact, but as subjective representations, designed to help the user understand his world in particular ways.

The book is arranged thematically, with ten chapters having titles such as Orientation, The Land, The Sea, War and, slightly incongruously, Oxford.



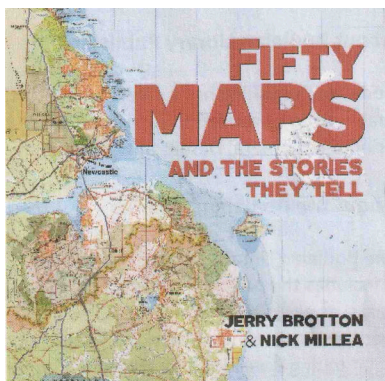
Unsurprisingly, Ordnance Survey maps don't feature very much in a book dedicated to the romantic, the beautiful, the mysterious, the intriguing and the fascinating. But there are several OS examples and each has an unusual story to tell. One such is the Popular Edition One-inch sheet 98, Clacton-on-Sea and Harwich, dated 1925, which appears here alongside its doppelganger, the self-same image reprinted at 1:50,000 with German overprinting, dated 1940, part of the preparations for an intended Nazi invasion.

Another OS publication seen here is an 'Air photo mosaic', an aerial image at 1:10,560 issued in 1948, alongside *its* doppelganger, the same image hastily reissued with false fields obscuring sensitive installations in the original, when the security implications were realised. As noted in the appendix, the story of the photo-mosaics was first narrated in *Sheetlines* 71 by Chris Board.

A third OS example is a line appearing on a 1:2500 sheet of 1959, which, as the text points out, only makes sense if the reader already knows what it depicts, which is a wall built to separate two housing estates in Oxford, one a private development, the other council housing.

But for the most part, *Talking maps* dwells not on the practical, but on the ancient, the colourful and the imaginary, of which there are over a hundred full-colour reproductions.

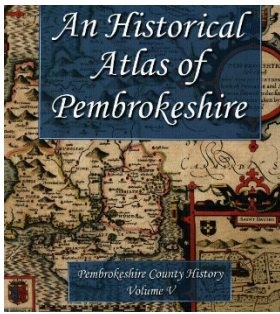
Examples include the 11th-century Arabic Book of Curiosities, Ptolemy's World map of 1486, Islamic world maps, portolan charts, Tibetan maps, Gough's map of Great Britain and Saxton's county maps, through to the fantasy worlds created by Tolkien, CS Lewis, Layla Curtis and Grayson Perry.



Fifty maps and the stories they tell is the *Talking maps* 'executive summary'; the greatest hits compilation. Here, fifty of the maps have been selected and are shown chronologically, each with a brief descriptive narrative. Examples not already noted include a Persian world map of 1297, the 14th-century Mappae Mundi, Dante's Hell, Thomas Moore's Utopia, a tapestry map of Gloucestershire and the First Edition (the 'Old Series') One-inch Ordnance Survey map of 1830.

As one would expect from Bodleian Publishing, all three books are beautifully produced, copiously illustrated in full-colour, excellent value and a joy to behold.

John Davies



An historical atlas of Pembrokeshire, David W Howell (ed), 205pp, paperback, Pembrokeshire County History Trust, £30, 2019, ISBN 978-1-5272-3938-8

This is volume 5 of the Pembrokeshire County History and its purpose is to show the history of the county through the medium of maps, supplemented with illustrative material such as graphs, drawings and photographs.

The book is a compilation of the work of forty-four scholars, including historians, geographers and archaeologists, and comprises eighty-two chapters in four sections: Historical mapping, Physical setting, Settlement and population and Economic life. Each of the chapters comprises a descriptive essay on the left-hand page facing a map or picture on the right-hand page. It's a format that works particularly well, as one quickly assimilates the main points being made and can see the graphical evidence, without getting overly bogged down in detail.

Almost all of the maps here are purpose-drawn (by Anna Ratcliffe), based on an outline black-and-white template having only the coastline and the parish boundaries. The salient information is added to each, thus focussing on the important points and avoiding confusing clutter. Only a few use colour; an effective example is the pair showing the distribution of Welsh language speakers in 1891 and 2001; increasing over time in the south, reducing in the north, but still greater in the north than the south – with less than 10% today in the south-west peninsula. Other attractively-coloured maps show the extent of the National Park and Coastal path and how the topography influenced the early settlements.

The topics covered range from the effects of the Ice Age to the distribution of sports teams; slate quarries to cinemas; Flemish settlements to Ale house licences; hill forts to newspapers. Truly a wide-ranging overview of the land, life, economy and culture of the county.

Disappointingly, from a map-lovers perspective, few original maps are included. One such is Richard Oliver's account of the OS Old Series One-inch map; another is Thomas Probert's map showing the progress of the failed French invasion of February 1797, described here as 'the most dramatic event in the modern history of the county'. A force of nearly 1400 men led by a veteran of the American War of Independence, William Tate, landed near Fishguard, but within a couple of days were routed by the fierce resistance by the local civilian population and the rapidly-mustered Voluntary Infantry led by Lord Cawdor.

The only other original mapping included are George Owen's 1602 map of Pembrokeshire and extracts of the 1950 large-scale Soviet plans of Milford Haven and Pembroke, accompanied by a narrative (full disclosure) by this reviewer and his CCS colleague Alexander Kent.

As well as the maps, the book has a Further Information section which provides a valuable directory of sources. Altogether, this volume provides a wealth of data, useful not only for the specifics of this particular county, but of interest to local historians everywhere.

John Davies

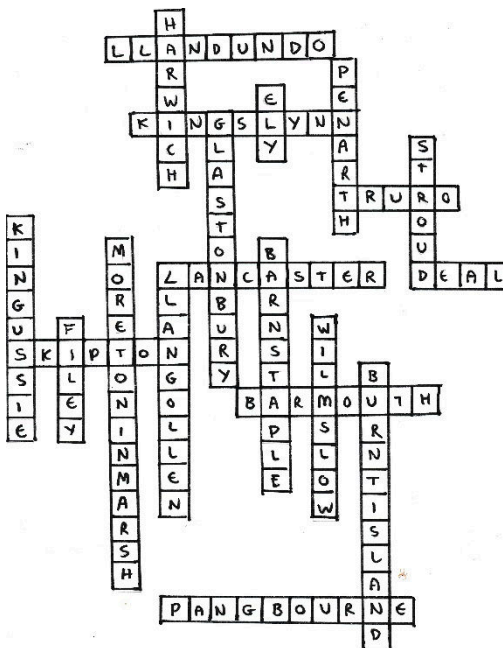
Solutions and solvers

The 'small towns' depicted in *Sheetlines* 114 were Barmouth (or Abermaw), Barnstaple, Burntisland, Deal, Ely, Filey, Glastonbury, Harwich, King's Lynn, Kingussie, Lancaster, Llandudno, Llangollen, Moreton-in-Marsh, Pangbourne, Penarth, Skipton, Stroud, Truro and Wilmslow.

Despite some deliberate mis-direction (south coast of Scotland at Burntisland, east coast of Wales at Penarth, non-National Rail stations at Llandudno and Llangollen) and some unintended confusion (grid line at Kingussie is actually 76, not 75 as shown on *Landrangers*, the trunk road at Ely is now unclassified), there was a bumper crop of over fifty entries. Solvers reported using a wide variety of aids, including the RNLI tea towel and the 1965 AA road atlas.

Some proud Lancastrians objected to the designation of this historic city as a 'small town'; as one who was born there, this compiler pleads guilty as charged, but in mitigation claims the heading was only a generalisation.

In order of landing on the editor's doormat or inbox, the solvers who identified all or most of the towns were: Jonathan Roberts, David Purchase, Alan Young, Tony Walduck, John Savage, Roger Holden, Dave Vaughan, Bill Henwood, Martyn and Helena Jackson, Peter Addiscott, Paul Jackson, Russell Johnson, John Winterbottom, John Ambler, Matt Ashley, Bill Hines, Geoff Kent, Chris Higley, David Sherren, Chris Cormack, Alan Mais, Mike Parker, Andrew Turnbull, Andrew Barton, Phil Pearson, Martin Buckley, Malcolm Stacey, Tony Collings, Duncan Stewart, Ray Flint, Ian Byrne, Peter Bailey, John Cole, David Winter, Barbara Jones, William Heaps, Graham James, David Smith, Keith Warman, Nick Roberts, Chris Harvey, David Fairbairn, Nick Millea, Don Clayton, Paul Swindell, Paul O'Kelly, Michael Spencer, Tony Kirby, Alan Fair and LW Knott



The winner, judged 'the best' on 31 May, was Alan Fair, who not only identified the locations, but submitted the solution in grid form (*left*), accompanied by an entertaining gazetteer, from which we learn that German U-boats surrendered at Harwich, Kenneth Graham's 'Ratty' hails from Pangbourne, SS Great Britain's last voyage was from Penarth and that more Aston Martins are sold in Wilmslow than anywhere else.

Railway stations were generally remarked on by solvers as valuable clues, so this month's puzzle, *overleaf*, avoids them and leads you in a more spiritual direction. Answers to the editor by 31 October for the chance to win the usual book prize.

Can you identify these geographically arranged Caths?
Answers to the editor by 31 October

