



Sheetlines

The journal of
THE CHARLES CLOSE SOCIETY
for the Study of Ordnance Survey Maps

“The early years of the National Grid fifty-
inch map”

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Sheetlines, 81 (April 2008), pp.36-39

Stable URL: <http://www.charlescloseociety.org/files/Issue81page36.pdf>

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Published by
THE CHARLES CLOSE SOCIETY
for the Study of Ordnance Survey Maps
www.CharlesCloseSociety.org

The Charles Close Society was founded in 1980 to bring together all those with an interest in the maps and history of the Ordnance Survey of Great Britain and its counterparts in the island of Ireland. The Society takes its name from Colonel Sir Charles Arden-Close, OS Director General from 1911 to 1922, and initiator of many of the maps now sought after by collectors.

The Society publishes a wide range of books and booklets on historic OS map series and its journal, *Sheetlines*, is recognised internationally for its specialist articles on Ordnance Survey-related topics.

The early years of the National Grid fifty-inch map (continued)

John Cole

At the commencement of work in 1943 guidance was available for detail (chain) surveyors in the form of *Notes on field survey* issued during 1939-45¹ and for examination (map completion), *Provisional instructions for field examination*, dated late 1943 or early 1944. These comprised only fifteen pages and a diagram but were purely to cover the differences between 1:1250 and 1:2500. Otherwise the 1932 *Instructions* still applied. The pages were reissued in 1945, with some amendments, but in spite of metrication (except for boundaries and levelling information) the link was still in use for widths etc.

In 1948, for detail survey, the 'Biscuit Book' appeared. It ran to some 43 pages and eight appendices. Sections were as follows:

- | | | | |
|---|--|---|--|
| A | Introductory note (survey by triangles) | E | Special methods |
| B | Detail survey of urban areas at scale of
1/1250 – general description | F | Amount and type of detail to be surveyed |
| C | Preliminary preparation for detail
survey field content book | G | Density of framework and survey |
| D | Actions involved in detail survey | H | Re-chaining. Causes of errors |
| | | J | Recording of progress |

Amongst the appendices was a specimen field content book. The book was re-issued in 1956 with the notable inclusion of tachy survey.

Also in 1948, for field and office examination and revision at 1:1250, the 'Green Book' appeared,² 117 pages, four appendices and fourteen plates. Sections were as follows:

- | | | | |
|---|--|---|--|
| A | Introduction and explanation of
examination | G | Duties of office examiners |
| B | General rules for field examiners | H | Utilisation of Old Series 1:500 or 1:528
survey (and 1:1056 in London only) |
| C | Representation of detail | J | Survey of administrative boundaries |
| D | Antiquities | K | Supplying of special types of detail |
| E | Collection and authorisation of names | L | Penning in on field plates |
| F | Superintendence | M | Use and care of instruments |

A year later a similar book (this time in stiff covers with screws for securing pages) was issued for 1:2500 and known as the 'Red Book'. There was little justification for this and three years later another Red Book combined the large scales, with dimensions for 1:2500 work appearing in brackets alongside the 1:1250. In this form, with twenty or so amendments and the addition of a section dealing with work for HM Land Registry (resulting in extensions to the screws being necessary), it lasted until re-issue in 1963.

Air survey experiments started in 1946, involving possibly four maps at Bournemouth and six at Kingston upon Hull (which were also surveyed by chain for comparison). These eventually resulted in the 'Brown Book', *Instructions for graphical plotting from vertical air photographs*, being issued in 1950 for office use. It is not known if instructions for field completion of 1:1250 maps where the air graphic method applied were ever issued. Certainly they were not for the later and more straightforward air machine, even though (in the author's experience) a degree of perplexity seemed to affect surveyors more comfortable with the extremely accurate tachy method.

¹ The previous *Instructions for surveyors* is thought to be that of 1908.

² Not to be confused with that for small scales – see *Sheetlines* 52.

Possibly, accuracy tests on all methods carried out between 1956 and 1960 revealed very little to worry about. In fact whilst results were in line with what was theoretically expected, there is reason to suppose that Ordnance Survey management were quite delighted with the condition of the 1:1250 map.

Initially it was intended that four chain survey and two air machine locations be tested but the good agreement of London (Croydon) and an unspecified area of Manchester nullified any requirement to test a further two chain surveyed areas. Unexpectedly, a problem with one of the air machine towns, Maidstone, whilst not particularly serious, led to the result being discounted and another test being carried out at Wrexham. Here a Thompson-Watts plotting machine was used, as opposed to the Wild A5 for Maidstone and the other town, Oxford. This time, as in the case of chain survey, results were virtually identical.

Samples of both the skeleton survey and detail later added or completed were taken in all cases of testing, except for Oxford (and later Northampton) where only the skeleton was so treated. One of the Maidstone tests indicated the added or completed detail to be a shade more accurate than the skeleton from which it had been supplied – an impossible situation! The reason was traced to far more detail than could have been positively identified from the photograph being inked in by the plotter. A thorough investigation found the A5 machine to have been slightly out of adjustment at the time of plotting as well.

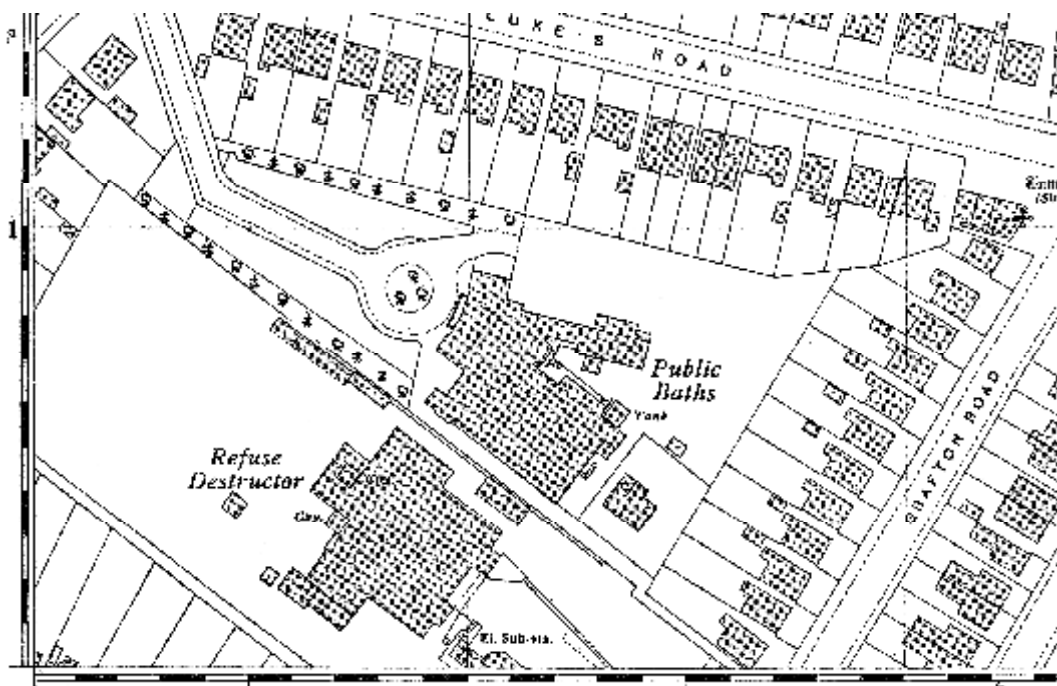
For Northampton the control was supplied by air triangulation, showing a slight decrease in accuracy (about 0.03 metres) compared with Oxford and Wrexham. It was not possible to pin down the reason nor was it considered significant. Testing at a further air machine town (Ashford, Kent) was cancelled.

For air graphic survey, Bradford and London (possibly the Islington area) were tested and as had been predicted the accuracy was little different from chain survey – Bradford slightly better; London slightly worse. The reason for that discrepancy was down to poor photography taken about five years earlier in London than Bradford. It was ruled that such photography would not have been acceptable at the later date.

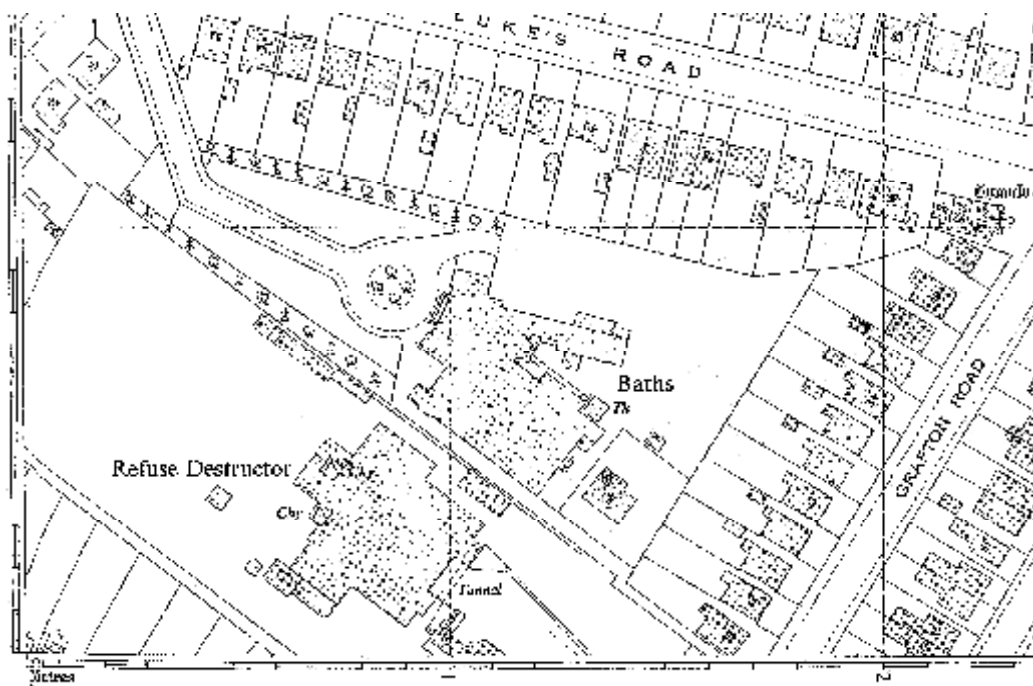
Tacheometer surveys were tested at Colwyn Bay, where the traverses were less than 400 metres in length, and Tonbridge / Tunbridge Wells where they were up to 1500 metres. No differences were apparent and tachy proved to be the most accurate method. Roughly, the order was tachy, air machine, air graphic and chain, with both of the last two falling off slightly in hilly areas. It was considered to be unwise to ‘mix’ two methods of survey but in the author’s experience tachy and air machine integrated without difficulty, and indeed chain survey revision points agreed exactly in one town. Tachy and chain did not enjoy quite so happy a relationship.

It was further mentioned in *Sheetlines 67* that some of the central London air graphic maps bore no revision points. The reason appears to have been the convenience of flat roof control points (many of which already existed) doing away with awkward and expensive traversing. The Director General did not consider the inability to subsequently establish revision points (for future revision or other surveys) a valid objection to the method. The rough limits of the air graphic area were north grid 186, south 179, west 518 and east 533, (24/02/48). Revision points have been noted around the fifty or so central London maps.

With twenty or so locations needing tidal survey in hand before 1950 – either river or coast – investigations took place into the accuracy of ground and air survey of the low water mark. Again, Bournemouth was the location chosen and here it was decided that an accurate survey was impracticable either by ground or air methods. Conclusions reached in October



A section of a pilot publication (above) of 40(SZ)0993SW (thought to be the very first National Grid 1:1250 map) and (below) the edition which eventually was published, probably in 1947, price 2/-. Survey and publication of the pilot sheet was given as 1944 but the sale copy quotes the actual survey date as October 1943. Lettering, vegetation symbols and heighting figures on the pilot are that of the county series maps; revision points and house numbers are absent. There are other minor changes to detail and annotation though it is fairly certain that the map was not subjected to any further ground examination before going on sale. (Both extracts about 50% of actual size.)



1947 were that (a) true position of Low Water Mark Medium Tides (or Mean Low Water in modern parlance) cannot be determined, (b) air photography gives an adequate position and (c) inherent inaccuracy allowed use of photos and plotting at 1:10,000 and 1:10,560 with enlarging to 1:1250 or 1:2500. Difficulties to be overcome were plotting from the photograph

if too much of the area was in fact sea, the problem of computing the height of LWMMT, and daily tides when they would be within one foot of the acceptable level.

It was concluded, that if tides were regular there would be no error exceeding this one foot but actual tides were likely to be erratic. Suitable conditions for photos were considered to be fairly standard and errors unlikely to be very large from climatic conditions. Further experiments regarding plotting methods took place at Exmouth and Poole.

It was mentioned in *Sheetlines* 67 that difficult railway and industrial complexes were surveyed by air graphic methods in chain survey areas. This also applied to difficult coastline, examples being: Torquay, harbour to Babbacombe, and Swansea, Oystermouth to Langlands Bay.

List of survey methods; approximate start dates and locations 1943-65

There are some corrections and additions to the lists in *Sheetlines* 67 and 68 as a result of further information and maps obtained this year. Approximate start of survey dates were obtained from a provisional list appearing in *Sheetlines* 24. Where these conflict with dates given in the *Concise guide*,³ the latter should be taken as correct, although the complications of the subject e.g. an Ordnance Survey tendency for lumping certain locations together, mean that further amendment can never be ruled out.

This applies equally to survey methods, a further list of amendments to hand appearing below. Where a location in the *Guide* does not appear in the pre-1965 methods list it can sometimes be deduced from the date and nearest place to be listed, e.g. Bebington 1954-5 (Birkenhead) and Billingham 1950-1 (Stockton-on-Tees) are both thus chain survey.

Mention should be made however of the most significant alteration, the survey of Banstead (1952) which should be classed (in spite of the tachy experiments) as chain survey. A view of these experiments and the initially incorrect conclusions is to be found in the 1980 Ordnance Survey history.⁴ In fact the first town to be tachy surveyed was Colwyn Bay in 1956, closely followed by Chester (which had started as chain survey). Ilkeston and Kilmarnock are wrongly dated, 1958 is correct. The list of tachy surveyed towns for 1957 is broadly correct. By now several chain survey locations were switching to tachy, a notable example being the southern part of Wolverhampton, survey still incomplete in spite of a mid-1940s start. The detailed amendments are as follows:

1951	<i>chain survey</i>	Substitute Stourbridge for Dudley.
1952	<i>chain survey</i>	Delete West Bromwich; add Banstead.
	<i>tachy</i>	Delete Banstead.
1956	<i>chain survey</i>	Delete Rhondda.
	<i>tachy</i>	Delete Ilkeston and Kilmarnock.
1957	<i>chain survey</i>	Add Rhondda Fawr and Taff Vale.
1958	<i>chain survey</i>	Add West Bromwich and Pontypridd; delete Taff Vale.
	<i>tachy</i>	Add Ilkeston and Kilmarnock; delete Wrexham.
	<i>air machine</i>	Add Wrexham.
1959	<i>air machine</i>	Delete Lytham & St Annes.
1963	<i>tachy</i>	Add Dudley.
	<i>air machine</i>	Add Lytham & St Annes on the Sea.

The following locations all commenced post 1965 and should be deleted: Ashton-in-Makerfield, Cheshunt, Chippenham, Hereford, Hoddesdon, Leighton Buzzard, Milford Haven, Port Glasgow and Redruth.

³ Richard Oliver, *Ordnance Survey maps, a concise guide for historians*, second edition, Charles Close Society, 2005.

⁴ W A Seymour (editor), *A history of the Ordnance Survey*, Folkestone: Dawson, 1980, 302-3.