



Sheetlines

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

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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.



SHEETLINES

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Charles Close Society — Future Meetings

Annual General Meeting — Birkbeck College, LONDON Saturday, 14th May 1994

The 1994 Annual General Meeting will be held in Room 401, Birkbeck College, Gresse Street, London, W1P 1PA, 1030 for 1100. The AGM Agenda will be distributed with the April Sheetlines; preceding the A.G.M. Brian Adams will talk on “From 18° W to Longitude 0° — episodes from the lives of a cartographer and a meridian”

The now traditional Map Market will be held in the afternoon.

Lunch will be available at the local hostelry, The Bricklayers Arms. Please inform David Archer, CSS Secretary, if you wish to be booked in for lunch; we need a minimum number in order to book the function room. **So please do it now.** Cost is £4 per head

Please also let David know if you would like to have space at the Map Market

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Visits to the Ordnance Survey, SOUTHAMPTON

Friday 17th June, 1994 This is now fully booked.

Friday, 23rd September, 1994 A second meeting has been arranged for this date. Places have been offered to members who missed a place in June. A few places are still available for this visit, but again numbers will be limited. **Anyone wishing to attend, please contact David Archer CSS Secretary, NOW, and certainly not later than tomorrow.**

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CCS Lake District Meeting, SHAP — 22nd October, 1994

Shap Wells Hotel, Shap, Penrith, CA10 3QU. (map ref. NY 579606) 1030 for 1100

Our Chairman, Yolande Hodson, will give an illustrated talk on “Maps of the Lake District”. The full programme has yet to be finalised.

A buffet lunch will be available at £5 per head at the meeting.

It is anticipated that some members will arrive on the Friday afternoon and stay on until Sunday lunchtime. Something of interest will be arranged for the Friday evening and possibly Sunday morning, depending on numbers. Details of accommodation for Society members and family at advantageous rates can be obtained from Steve Simpson (Manager and Society member) at the above address (tel 0931 716628).

Editorial

Any organisation exists for a number of reasons. The Charles Close Society is no exception and the report on the Society's Membership Questionnaire, a summary of which was published in *Sheetlines 38*, gave a range of reasons why people join our Society. Yes, it is our Society, which means that it is for every member to be able to have a say in its running, its way forward and what it offers. The Annual General Meeting is being held on Saturday, 14th May, in London (full details are given under Future Meetings inside the front cover) and it is an opportunity for all members to come and have their say. Additionally, and this is an important part of the function of any society, it is the occasion to meet other members and to hear another member speak on a subject of particular interest. On 14th May, Brian Adams will be giving some background to the early days of surveying, a time without sophisticated instrumentation or measuring devices, but which undoubtedly laid the foundation of the best cartographic organisation, The Ordnance Survey, in the world. And of course there is the chance that you might find that elusive map at the afternoon Map Market.

The Society is also trying to foster the idea of members meeting with each other through area meetings, very much on an informal basis. Have *YOU* been to one yet? There is no need to be an expert to attend — just excited about Ordnance Survey maps. Those members who went to the Lake District meeting last October, and more recently to that in Bath enjoyed the day. However, these days do not organise themselves and some members have indicated that they would be willing to help. If you are willing and able, why not give the Secretary a weekend 10p telephone call and volunteer? You would be amazed how easy it is to find a suitable meeting place, reasonably priced and centrally located. Look forward to meeting you there.

Marginalia

Celebration:

It is a pleasant duty to record that Richard Oliver reached a “significant age” on Thursday, 19th March. To mark such an auspicious occasion, The Charles Close Society presented him with a small token, namely a framed copy of the poster advertising the Mayson Model of the Lake District. I'm sure that all members of the Society will wish Richard “Many Happy Returns” on his birthday.

Puzzle Corner:

As we all guessed, the trail which one would have followed in Guy Messenger's last puzzle was a river — in fact the River Witham. The answers to the questions are:

- | | | |
|----|---------------------------|--|
| 1. | most northerly point | Lincoln |
| | most westerly point | Long Bennington |
| | most southerly point | Witham source, near Edmond Thorpe |
| | most easterly point | the Wash outflow |
| 2. | rifle range | Beckingham |
| | cathedral bells | Lincoln |
| 3. | integral meridian | 0° at Boston |
| 4. | journey start | parish of Wymondham and Edmond Thorpe
in Leicestershire |
| 5. | county boundaries crossed | only one, from Leicestershire into Lincolnshire |

An Ordnance Survey Non-Map:

During the First World War, the Ordnance Survey was responsible for printing some identification silhouettes of warships. Tim Nicholson has one for a class of patrol boat and has seen another. At the bottom right hand corner is "Ordnance Survey 1916", and at the bottom left hand corner "A.W.S. (I.D.) May 1916". "I.D." probably means Intelligence Division; does anyone know the meaning of "A.W.S."? And has there been any other OS printing that is completely unconnected with maps?

More Towns in London Town (Sheetlines 35, 37 and 38)

Terry Blats from Leicester writes that he has located even more 'towns' in London:

Mile End Old Town on Rocque's map of 1746;

Peckham New Town on *A Map Of London showing the several Sanitary Districts*, Stamford, 1891, also on Rapkin's map of 1851;

Hoxton New Town and Holland Town on a map by Brian Rees Davies, 1841;

Park Town — the title on the map of a proposed estate around Queen's Road, Battersea in 1864. The area when built was also known as Queenstown;

Holland Town on sheet 71, N of North Brixton, on the David and Charles reprint;

Kensington New Town, an area including Allison, Claredon and Eldon Roads off Gloucester Road on J.Wylds *London and its Environs* of c. 1862;

Downtown, an area round Salter Road in the Surrey Docks area on a London Docklands Development Corporation map of 1984;

Hoxton Town; Hope Town, an area round Gosset Street, off Bethnal Green; Waterloo Town, an area north and south of Winchester Street, near Bethnal Green; Walworth New Town, an area round Wansey Street, off Walworth Road; all on *A Map of London in 1855*, published in *A History of London Street Improvements*, by Percy Edwards, London County Council, 1898:

Mr Blats also listed six 'towns' outside the area of the the old London County Council which your editor has arbitrarily decreed to be the limits for the point of this exercise.

Embossed dates on Ordnance Survey maps

At the Bath meeting there was some uncertainty as to what the embossing or blind-stamp with date found in the top margin of some old OS maps signifies. Richard Oliver explains that it indicates the date of printing (day-month-year until March 1858; thereafter month-year), and was applied when the map had come off the press, the ink had dried, and the individual impression was passed as fit for issue. (It does NOT indicate either the date the sheet was dispatched from the OS nor the date at which it was sold!) It was applied to all OS maps, whether engraved, lithographed or zincographed, printed between about March 1851 and the early 1880s; thereafter it was only applied to maps printed directly from copper, and the practice ceased altogether in 1912. Even so, the blind stamp is sometimes missing from maps on which one might expect it to appear. This is usually because the margins have been cropped, though occasionally the blind-stamping seems to have been accidentally omitted, and by

the 1880s it was (if a proof of New Series Sheet 284 exhibited at the Bath meeting is a sure guide) omitted from proof copies of engraved maps as well. Various styles of stamp were used, according to the OS's current 'sponsoring department', and the legibility of them varies, according to shallowness or depth of impression. Those used before 1858 and between 1870 and 1890 are often shallow and hard to decipher, whereas those used between 1895 and 1912 are usually very legible.

In Ireland, until about 1903, an undated blind-stamp was used; in very worn form it appears on early (1902-3) Irish coloured One-inch sheets. Engraved sheets were certified as fit to issue by the chief engraver, and before about 1880 were dated as well, but, as in Britain, this potentially most useful information is often cropped from surviving copies

Ordnance Survey Topics

Superseded Ordnance Survey Maps

At the Ordnance Survey Director General's Conference in May 1993 there was a discussion about the value of superseded Ordnance Survey maps. This was in the context of the Royal Society seminar "The Future History of our Landscape", held in October 1992, to discuss how large scale OS maps could continue to be preserved for use by future generations once the OS had ceased conventional publication.

To help formulate policy on this, the OS is compiling an inventory of the groups that use non-current mapping information.

The following information is requested from interested parties:

- profession, institution, interest group, etc. that has need/uses non-current large scale OS mapping,
- the types of information extracted from the maps,
- the use made of the information,

- the effect if access to non-current analogue maps were to become impossible in the future.

Responses should cover maps used in the traditional way as analogue images (paper, microfilm) and, where possible, the anticipated future use of superseded digital cartographic data. It is intended that the analysis of the value to the nation of the historical content of OS large scale maps should be fed into the continuing discussion about the archiving of such maps in the future.

Requests for further information and responses should be sent to:

Trevor Mouncey,
Consultative Committee Liaison,
Superseded Mapping, N357,
Ordnance Survey,
Romsey Road, Maybush,
Southampton
SO9 4DH. (Tel. 0703 792605)

Ordnance Survey products:

Ricard Oliver wrote to all members of the Society in December in respect of the Ordnance Survey requesting views on what products they should provide in the future, or what improvements could be incorporated in current products.

Apparently the response has been disappointing, and there is a final opportunity to express any views that you might hold to the same address as above, and from where copies of the consultative comments can also be obtained.

Royal Geographical Society OS Education Committee Meeting 16th November 1993

The Committee considered a paper on the "Achievements of the Ordnance Survey 1990-1993" by the Chairman of the Committee, Dr Christopher Board; the minutes of the Director General's Conference (26 May 1993); the Survey's Annual Report 1992-93; and six OS Information Papers (see below).

Dr Board's paper had been written in response to a letter from the OS addressed to all the Consultative Committees asking for views on the effectiveness of the consultation machinery; the paper was largely concerned with the

requirements of the education industry and the developments, negative and positive which affect that sector, including the launch of the OS Teacher Resource Files with the Port Talbot pack, the 1:50 000 Project Maps for school use, the appointment of an Education Officer on the OS's staff, the inauguration of Mapping News (an OS newsletter especially for the educational world), the Approved Educational Suppliers scheme with its much reduced discounts, and the difficulty of defining agency (i.e. OS) performance indicators to measure how well the

OS is serving education at all levels. A particular anxiety, of more general concern, expressed in the paper concerns the proposals in the [Consultative Paper] 7/93 on OS revision practice, and especially the fear that small-scale, derived mapping might become increasingly out of date if long-term cycles are adopted for rural areas, as proposed. Some dissatisfaction was expressed about the inadequacy of the marginal statements about revision dates on small-scale maps.

Discussion of the minutes of the Director General's Conference and of the Annual Report also focused largely on the education sector's requirements, including the provision of digital data for schools and universities. Experimentally the OS proposes to launch a simplified "entry-level" data set, with a demonstration at BETT 94, a major educational event at Olympia in January 1994. The discussion of access to publication and pricing information centred on the three 1994 trade catalogues (each with separate price-lists): these are Maps Atlases and Guides, Large Scale Mapping Services (including Overseas Mapping Consultancy and Services) and Digital Map Data; these will be accessible to all schools. There is a possibility of this information being made available on-line through an Ordnance Survey bulletin board (BBS) at sometime in the future.

The first of the OS Information Papers discussed (9/93 — *Summary of Responses to the Consultative and Information Papers*) detailed, paper by paper, the responses, generally very few in number, to the papers published by the OS in the Spring of 1993. Information Paper 8 *Cartographic Concepts* had received by far the largest number of responses — twenty-three, most of which came from the CCS. Discussion on this paper gave the Society's representative the opportunity to remind the Committee that in spite of its name it embraced representation from bodies such as the CCS whose interests are only marginally concerned with education and which might have views on topics such as the Land Line Database coordinate shift problem (Consultation Paper 3/1993) which would perhaps be of limited interest to the education

sector. The Chairman acknowledged this broader remit of the Committee. Nevertheless, it still remains for consideration whether this particular Consultative Committee is the most appropriate for the Society to be represented on. It may also have occurred to CCS members who are also Fellows or members of the RGS that perhaps a broader remit for this RGS-sponsored consultative committee should be made more explicit, by the removal of the word "education" from its title, and wider publicising of its role as a channel of communication between geographers (and other Fellows etc. of the RGS) and our national mapping agency, particularly at a time of unprecedented change and development in the OS.

Information Paper 10/93 *Project 93* reported on the investigation of the technical problems and particularly the economics of providing and maintaining an Object-based dataset to support the type of polygon-structured information which may be required by the GIS community.

Information Paper 11/93 *The Future of OS International*. Although much reduced in size, this entity will continue as one of the new Business Units which now constitute the main structure of the OS. The OSI Library will continue to exist.

Information Paper 12/93 *A New Small Scale Map Series — "Explorer Map Series"* introduces another economy measure dictated by financial targets: the patching together of existing Pathfinder sheets, with an overlay of limited tourist information, for popular leisure areas not covered by the Outdoor Leisure Map series, along the lines of the Gower Special Pathfinder published in April 1992. Five sheets are proposed for 1994. The new sheets will be combinations of whole Pathfinder sheets, sometimes in a double-sided presentation. Existing Pathfinders for the corresponding area will be withdrawn but full 1:25,000 coverage will be maintained. The new maps will be available in both flat and folded form.

Information Paper 13/93 *1:25,000 Pathfinder Review Cycle and Revision Notes*. Consumers have said that the outdatedness of many sheets has been a barrier to purchase and the OS will now tackle this problem by the

introduction of fixed three or five year "review" (not necessarily "revision") cycles to replace the previous review policy based on stock levels. OS will try to ensure that the consumer can identify and understand easily when the map was last revised. As noted above, the Chairman's paper on *Achievements ... 1990-93* had also addressed this problem and the proposals in this Information Paper gave rise to a lively discussion; it was agreed that members of the Committee would endeavour to devise wording that would be more meaningful to map users. The current proposals would allow revision notes to include statements such as "reviewed 1993; no selected change required." OS will consider issuing a leaflet or statement setting out their current definitions of "selected change" etc..

Information Paper 14/93 *Items of Special Interest* included paragraphs on a symposium on Global Positioning and Maps (London, 10 December 1993), the use of remotely-sensed imagery, the 'adoption' of trig pillars, height model developments, collaborative ventures, OSCAR development, Boundary-Line ("the definitive administrative and electoral data product"), the OS's HelpLine [to be trendy these days you have to put capiTal leTters in the miDdle of woRds] telephone service — seen as a response to the Citizens Charter, Customer Satisfaction Surveys, and Mapping for

Emergencies (including a leaflet about the 24 hour-a-day supply service). Of these only trig pillar adoption and customer satisfaction surveys provoked comment. Other matters discussed at this meeting included a proposed inventory of users of non-current mapping, which it was hoped would strengthen the case for measures to preserve the national resource of historical data contained in superseded mapping, in both analogue and digital form, in the context of proposals which were expected to follow from the October 1992 Royal Society seminar "The Future History of our Landscape". CCS enquired if there had been any developments on the future of map archives of previous national bodies such as British Coal and British Rail mentioned at the previous meeting of the Committee; on that occasion OS had indicated that they had enough problems with their own archives and that the issue should remain with the archivists. The OS response on this occasion was less categorical: OS is "not disinterested" in becoming a repository for data but do not want to take the lead in archiving historic data. After further discussion the OS agreed to draw the matter to the attention of the consultative committee of BRICMICS (the British Committee on Map Information and Catalogue Systems) — a forum for map librarians and archivists.

Peter Clark

Twenty years of the Ordnance Survey 1:50,000 map

by Richard Oliver

The Ordnance Survey was formally authorised to adopt the 1:50,000 scale as a metric replacement for the 1:63,360 (One-inch) in November 1971, and the first sheets were published on Thursday, 7 March 1974.¹ A complete history of the British 1:50,000 would have go back at least to the early 1930s, with the production of an experimental sheet by the War Office in 1933, and the consideration by the Davidson Committee in 1936-7 of adopting the 1:50,000 as part of a general change by the OS to metric scales. Metrication was studied again by the OS in the early 1960s. In 1965 the Labour Government announced a programme with a view to a widespread conversion to the metric system by 1975. The OS started to publish fully metric maps in 1969, but as yet the metric scale to replace the 1:63,360 was undecided. Although 1:50,000 was an international standard and drawing of an experimental 1:50,000 section around Luton was put in hand at this time,² and although an experimental enlargement of part of a 1:63,360 sheet with contours at 20 metres interval was produced for information purposes, 1:75,000 and 1:100,000 were also considered, but rejected.³ Both would have involved

reducing the amount of detail shown as compared with the 1:63,360, and both, like the 1:63,360, but unlike the 1:50,000, would have had to be drawn and revised at larger than publication scale. 1:62,500 was rejected as being unlikely to be a permanent solution for a metric-minded public (!) and as un-acceptable to the armed forces,⁴ and 1:40,000 was rejected as too large a scale, involving too many sheets.

It would have been perfectly feasible to produce a 1:50,000 series by straightforward photo-enlargement of the 1:63,360 Seventh Series, with metricated contours and spot-heights, but only eight such sheets were produced, as a short-term makeshift for educational purposes. Retention of the existing sheet lines was rejected, as a 40 x 45 km area at 1:50,000 was felt to be too large;⁵ 40 x 35 and 40 x 30 km were considered, but rejected as involving too great an increase in the number of sheets. A 40 x 40 km sheet size involved an increase of only 15 sheets, combined with a manageable sheet size. Long-term retention of the 1:63,360 material was also rejected, as some of it was deteriorating in quality, due to the photo-mechanical duplication process used in adding revision. Redrawing *ad hoc* at 1:50,000 would enable drawing in ink on glass, as used for the 1:63,360, to be replaced by scribing on plastic, which had been used for the larger OS scales since the 1950s. To redraw by scribing would take several years, without a large temporary increase in staff, and so it was decided

¹. The main sources are: *Report on the development of the 1:50,000 map series* (Ordnance Survey, May 1972, unpublished, main report by Brigadier G.A. Hardy; copy held by Charles Close Society); G.A. Hardy 'The Ordnance Survey 1:50,000 map series', *Geographical Journal* 140 (1974), 275-83); J.G. Price, 'A review of the design and production factors for the Ordnance Survey 1:50,000 map series', *Cartographic Journal* 12 (1975), 22-9; sheet history files for First Series sheets and the A editions of Sheets 111, 176 and 177, deposited with the Charles Close Society; and the maps themselves. The Hardy and Price articles derive substantially from the unpublished report. Unless noted otherwise, this article derives from these sources.

². A copy of this is deposited with the Charles Close Society archives.

³. The 1:50,000 enlargement was from part of Sheet 170. To assist the consultation and decision processes, in 1970 a 1:75,000 reduction of the whole of 1:63,360 Seventh Series Sheet 170 and a reprint with new footnotes of the 1:126,720 *Greater London* sheet of 1962 were

produced. I do not know if any 1:100,000 experimental mapping was produced at this time, but the production of the 1:126,720 suggests not.

⁴. As the forces were using the imperial 1:63,360, it is a little difficult to see why a metric 1:62,500 should have been less rather than more acceptable.

⁵. I.e. 80 x 90 cm within the neat lines. As at about the same time the first 1:25,000 Outdoor Leisure sheets were being put in hand, with slightly larger sheet lines, this decision seems eccentric, unless it was thought that the public would object to the necessarily extensive use of the cross-Bender fold, or it was thought that a 40 x 45 sheet would have to be conventionally Bender-folded.

to produce most sheets initially as part of a First Series, enlarged from 1:63,360 material, and a limited number as Second Series, drawn *ad hoc*, with the First Series sheets being redrawn as Second Series as they became due for full revision. Many of the sheets published from the start as Second Series were of the highlands and islands of Scotland, where the 1:63,360 was unsuitable for enlargement to 1:50,000 because of small errors brought about by the compilation method used for the Seventh Series. Thus of the southern block of 103 sheets published in March 1974, only three were Second Series, as against 48 of the 101 sheets in the northern block, published in February 1976.

Although the 1:50,000 was adopted as a 'metric' scale, it would initially have been only a partly metric map as, when formally authorised in November 1971, it was intended to retain Imperial contours and spot heights, as on the 1:25,000 Provisional Edition and on earlier sheets of the 1:25,000 Second Series; a fully metric map was expected to be 'opposed by some members of Parliament'.⁶ In the event, the now Conservative Government adopted a new metrication policy in the spring of 1972, and this difficulty disappeared. A further problem was resolved at about the same time, when the Local Government Act, which established new administrative county boundaries, passed into law, just in time for these to be included on those 1:50,000 sheets which were nearly ready for printing.⁷ Although as far as the public was concerned the changeover from 1:63,360 to 1:50,000 was to be accomplished over the shortest possible period, it was necessary to start printing in the autumn of 1972, in order to spread the burden evenly over the OS presses. The first sheet to be printed was 198, in a run of about 140,000 copies, in October 1972.

With the introduction of the Second Series the opportunity was taken to redesign the map

⁶. *Report*, 1972, section 3. This interesting point was omitted from the two published articles.

⁷. It is possible that the delay in the publication date of the southern block, from January to March 1974, is attributable to this; it was certainly not due to the 'three-day week' in the winter of 1973-4.

completely.⁸ The most striking change was the adoption of Univers in place of Times Roman and Gill Sans for lettering; Univers was adopted as providing a more 'integrated' look, and the avoidance of italic for other than administrative names enabled names either to be written in a smaller space, or in the same space slightly larger: either way there was a gain in clarity, which offset the shock for many of so radical a departure from established practice. Less immediately noticeable, but also radical, were the omission of parish boundaries⁹, of the distinction between coniferous and non-coniferous woodland,¹⁰ and of the distinction between single and multiple track railways.¹¹ Orchards were to be shown by dots rather than by tree symbols, tourist information symbols were to be shown, and part of the legend was to be in French and German as well as English. Other radical changes contemplated in 1969-70, such as the abolition of the distinction between fenced and unfenced roads, were dropped after consultation with users. The main changes in the colour scheme were the use of blue rather than black for grid lines, blue rather than red for motorways, screened orange rather than screened black for building infill, and orange-brown rather than dark brown for contours and B roads. To maximise

⁸. Or rather, much of what had been tried in the Luton experiment of 1969-70 was now to be adopted as standard practice. Curiously, there is no reference to this experiment in the 1972 *Report*.

⁹. They were included on the Outline Edition of the Second Series until the early 1980s, when they were dropped as the dots were troublesome to scribe. Parish boundaries had of course been omitted from the Popular Edition of England and Wales.

¹⁰. This had been omitted on later sheets of the 1:63,360 Fifth Edition and on Fifth-style sheets of the New Popular Edition. The reasons for this, and for its restoration to the Seventh Series, deserve further study.

¹¹. This had always been shown on the 1:25,000 and larger scales, but was only introduced to the 1:63,360 in the mid-1890s, probably at military behest, though by the 1970s the information was of much greater use to railway enthusiasts. The chequer symbol used on the Seventh Series for single track would be awkward to scribe, but the use of a narrower gauge of line for single-track lines, as on the aviation derivatives of the 1:253,440 Fourth Edition, might have answered.

homogeneity, the colour scheme adopted for the Second Series was also to be used for the First Series. It was originally intended to print public rights of way in green, but, not long before the first sheets were printed,¹² the red of the 1:63,360 was reverted to. Four-colour rather than six-colour printing was also tried, but was abandoned, not least, it seems, because it was difficult to provide a satisfactory synthetic green for rights of way passing across woodland.¹³

The simultaneous publication of Sheets 102-204 in March 1974 and of Sheets 1-101 in February 1976 must rank amongst the Ordnance Survey's greatest achievements, even though many of the maps were effectively 'provisional editions', the last of a number of such at various scales produced since the 1940s.¹⁴ Provisional editions or not, the design of the First Series did not stay static. Except on a few very early reprints, tourist information was added at the first convenient opportunity, (though as sufficient stocks to last until conversion to Second Series had been printed of some sheets, not all First Series sheets appeared with this information), replacing an index to the new maps which, on folded copies, merely duplicated that on the back cover. A few other design changes were effected around 1976-7, including the substitution of a more prominent windmill symbol on the Second Series. Early in 1978 what was at first known as trichromatic and later as four-colour process printing was adopted for both the First and the Second Series, which were now to be printed in black, magenta, cyan and yellow. At first the early six-colour scheme was approximated to, by such devices as mixing magenta and yellow to produce a synthetic red, but in 1980-81 a slightly modified colour scheme

was adopted, characterised by full cyan instead of screened blue for motorways, full magenta instead of red for A roads, and screened magenta contours. The contour colour was legible, but perhaps rather brash; subsequently a synthetic brown was adopted, visually more pleasing but not so legible.

The change to what one might call the 'magenta style' was made for reasons of economy; another, unrelated, economy, effected at the same time, was the adoption of a joint civil-military specification for the map.¹⁵ Since about 1919 separate civil and military versions of the 1:63,360 and 1:50,000 had been produced, mainly because of the different grid formerly used by the military, but on the new 1:50,000 the only real difference between the civil and military versions was the printing of grid figures and letters on the map face, in addition to the margins. Following a consultation exercise in the autumn of 1980,¹⁶ printing grid figures and letters on the map face was adopted universally, and the need for a separate military version ceased.¹⁷ Economy or not, putting the grid figures on the map face was an immense boon for that minority who use the grid, and a few years later these figures started to appear on the 1:25,000 as well. A further economy, of using an integral cover (to make space for which the French and German legends were jettisoned), was unsuccessful, as it meant reverting to separate civil and military printings. The economy in adopting magenta and merging civil and military versions was offset by some improvements in content, notably the restoration

¹². Certainly after the unpublished *Report* was completed, in May 1972.

¹³. The whole question of how the OS avoided four-colour printing for so long is worthy of further study. Some printings of the 1:63,360 Popular and Fifth Editions were in as few as five colours, and colour combination for tints -blue and red for orange, blue and yellow for green - had been used on the 1:63,360 indexes to 6-inch and 1:2500 as early as 1898!!!

¹⁴. The outline editions of a few sheets were only published later in 1974.

¹⁵. Conspiracy theorists seeing in this an icon of the revival of the 'cold war' by the new Conservative Government will be interested to learn that the decision was taken under the outgoing Labour Government.

¹⁶. Carried out by putting questionnaires inside sales copies of the maps. These questionnaires also sought opinions on the use of magenta rather than red.

¹⁷. A few grid figures which would have obscured map detail were removed. Military print codes, in the style of quantity/month/year/MOD order number, appear when a proportion of the sheets in a run are for military use, and it was to this, rather than the civil run (usually much greater) that the quantity printed (more recently omitted) referred. These print-codes are useful for identifying 'facsimile' reprints: see *Sheetlines* 33, p.53.

of the distinction of various woodland types, and - hitherto not shown at smaller than 1:25,000 scale - the distinction on foreshore of sand, mud and shingle, no doubt so as to provide a guide to sandy beaches. At the same time the 1:50,000 received a name: the *Landranger*. The Second Series was completed in January 1988 with the publication of Sheet 29; in June 1988 fully revised 'B' editions of Sheets 109 and 115 were published, and since then an average of about 16 sheets a year have been republished with full revision.¹⁸ (For the statistically-minded, 320 editions of the 1st Series and 834 of the Second Series have been traced to 31 December 1993, a total of 1154.)

The marked design changes in 1980-1 have been the last of their sort to date; subsequent changes have been small, discreet and probably unnoticed by most users. They include the omission from 1988-9 onwards of the showing of Forestry Commission land,¹⁹ and some changes in revision practice, notably the adding of some substantial urban growth at intermediate rather than full revision²⁰, and in adding yellow infill to some tarred dead-end roads. Other changes have not progressed beyond the experimental stage; they include a lurid layered version of Sheet 42, printed in 1981, and a much more attractive hill-shaded version of Sheet 90.²¹ How long this stability may be expected to continue is open to question: the 1:50,000 is at present still largely produced by analogue methods,²² but in 1990 some experimental

1:50,000 vector data of east Kent was produced,²³ the whole country has recently been made available in raster form,²⁴ to produce such a map by analogue means is increasingly anomalous,²⁵ and Ordnance Survey has invited contributions to a discussion on 'cartographic concepts' which must inevitably touch on the design and content of the 1:50,000. What those changes will be remains to be seen. The one thing that does seem certain is that the 1:50,000 will be produced as a conventional paper map for many years to come.²⁶

²³. Not, I understand, to the full 1:50,000 specification. But in 1983 a digital version, to Second Series specification, of Sheet 76 was produced and publicly exhibited, to the British Cartographic Society, the Royal Geographical Society and others. There was no noticeable difference between it and an analogue map.

²⁴. See *Sheetlines* 35, pp 32-3.

²⁵. By the end of 1995 digitisation of the basic-scale mapping at 1:1250, 1:2500 and 1:10,000 should have been completed, and it is understood that a raster-digital method of maintaining the 1:25,000 is being adopted.

²⁶. I am indebted to David Archer, Peter Clark, Roger Hellyer, Yo Hodson, John Taylor and Lez Watson for assistance of various sorts towards this article and the list of editions which follows.

¹⁸. Or fairly full: see the review of Sheets 113 and 192 in *Sheetlines* 36 (April 1993), pp 36-41. Sheet 111 had been republished in a B edition in 1983; it is understood that this was in connection with a digitising experiment.

¹⁹. It is understood that this was because of the expected privatisation of the Forestry Commission, which might result in the loss of access to some woodland.

²⁰. The writer has only seen this on a minority of sheets. There are occasional earlier examples on the 1:63,360 and 1:50,000, usually acknowledged in the footnotes.

²¹. Copies in private collection.

²². The rights of way information has been provided by digital methods for a long time, and, indeed, when the rights of way symbols for the Second Series were designed it was with a long-term view to digital output.

A list of 1:50,000 editions, 1974-1994

The following list endeavours to cover all separate letter, letter-and-bar, letter-bar-and-star and letter-and-number editions for the coloured version of the 1:50,000 map; a few edition-codes for outline editions have been included when these are known to differ from those for the coloured edition, but completeness is not claimed in this respect. The list should be complete for all editions of the First Series, having been checked against the official job files, but it may omit a few bar-without-star editions of the Second Series, in which case corrections will be welcomed by the writer. (The bar-without-star versions, of which production has now ceased, were not listed in the publication reports.) This list does not attempt to list all printings, even where different printings of the same nominal edition can be identified from the military print codes.

The full revision dates have been derived from the maps themselves. The other dates are:

where given in round brackets, in the style '(2/76)', the month and year of *publication*, as

noted in the official publication reports. It should be noted that, apart from the special case of the advance printings of these maps in 1972-5, this may differ by several months from the date of *printing*;

where given in square brackets, e.g. '[2/80]', the month and year of *printing*, as deduced from the military print-code;

where given as a year in square brackets, e.g. '[1980]' the year of printing where by collation of other information this seems fairly certain;

the addition of '?' and '??' indicates increasing degrees of uncertainty.

It is hoped that this list will be updated in *Sheetlines* as new editions are published. It includes all editions announced in the publication reports to 31 December 1993, plus a few more recent ones which have appeared in map sellers' stocks.

Addendum:

The following should be added to the list that follows:

Sheet 176 2nd Series C1 (9/90)

Sheet 204 1st Series A/* (4/80)

Ordnance Survey 1:50,000 map: summary list of editions to 31 December 1993

Sheet 1 -	[1st Series not published] 2nd Series: revised 1973:	A (2/76); A/* (6/87).
Sheet 2 -	[1st Series not published] 2nd Series: revised 1973:	A (2/76); A/* (7/83); A2 [3/89].
Sheet 3 -	[1st Series not published] 2nd Series: revised 1973:	A (2/76); A/* (5/85); A2 (1/89).
Sheet 4 -	[1st Series not published] 2nd Series: revised 1973:	A (2/76); A/* (6/85); A2 (3/89).
Sheet 5 -	1st Series: revised 1957: 2nd Series: revised 1985:	A (2/76). A (7/87).
Sheet 6 -	1st Series: revised 1957: 2nd Series: revised 1985:	A (2/76). A (7/87); A1 (1/89).
Sheet 7 -	1st Series: revised 1956-7: 2nd Series: revised 1985:	A (2/76). A (7/87); A1 (8/89).
Sheet 8 -	[1st Series not published] 2nd Series: revised 1973:	A (2/76); A/* (5/87).
Sheet 9 -	[1st Series not published] 2nd Series: revised 1973:	A (2/76); A/* (12/84).
Sheet 10 -	[1st Series not published] 2nd Series: revised 1973:	A (2/76); A/; A/* (3/88).

Sheet 11 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A1 (1/89).
Sheet 12 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/* (2/87); A2 (9/89).
Sheet 13 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1973:	A (2/76); A/; A//* (3/88).
Sheet 14 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1973:	A (2/76); A/; A//* (12/87); A2 (7/92).
Sheet 15 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/* (11/81); A/** (8/87); A3 (7/93).
Sheet 16 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/* (2/79); A/** (5/85); A3 (12/89).
Sheet 17 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/; A//* (5/86); A2 (11/90).
Sheet 18 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1973:	A (2/76); A/; A//* (4/88).
Sheet 19 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A1 (12/88).
Sheet 20 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/* (4/85); A/** (6/88).
Sheet 21 -	1st Series: <i>revised</i> 1955-6: 2nd Series: <i>revised</i> 1977:	A (2/76). A (5/80); A/* (2/82); A/** (3/85); A3 (3/89); A4 (2/92).
Sheet 22 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1973:	A (2/76); A/* (4/86); A2 (10/88).
Sheet 23 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1973:	A (2/76); A/; A//* (6/85); A2 (9/89); A3 (2/92).
Sheet 24 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/* (2/80); A*/ [1981??]; A*//; A*///; A2 (8/91).
Sheet 25 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/ [1981??]; A1 (12/88).
Sheet 26 -	1st Series: <i>revised</i> 1955: 2nd Series: <i>revised</i> 1977:	A (2/76). A (6/80); A/* (3/82); A/** (7/87); A3 (1/89); A4 (7/93).
Sheet 27 -	1st Series: <i>revised</i> 1955-6: 2nd Series: <i>revised</i> 1977:	A (2/76). A (5/80); A/* (1/82); A2 (7/88).
Sheet 28 -	1st Series: <i>revised</i> 1955: 2nd Series: <i>revised</i> 1986:	A (2/76); A/* (1/83). A (11/87).
Sheet 29 -	1st Series: <i>revised</i> 1955/67: 2nd Series: <i>revised</i> 1986:	A (2/76); A/* (3/82). A (1/88).
Sheet 30 -	1st Series: <i>revised</i> 1955/67: 2nd Series: <i>revised</i> 1985/67:	A (2/76); A/* (5/84). A (11/87); A1 (6/91).
Sheet 31 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1973:	A (2/76); A/ [8/86].
Sheet 32 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1973:	A (2/76); A/* (8/84); A2 (9/89).
Sheet 33 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/ [1979??]; A//* (1/85); A//* (2/89); A2 (11/89).
Sheet 34 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/ [1980]; A//* (5/84); A2 (11/89).
Sheet 35 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/* (4/81); A/** (5/82); A3 (11/89).
Sheet 36 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/* (3/81); A*/; A/** (6/86); A3 (3/90); A4 (10/92).
Sheet 37 -	1st Series: <i>revised</i> 1955/67: 2nd Series: <i>revised</i> 1986:	A (2/76); A/ [2/80]. A (11/87); A1 (11/92).
Sheet 38 -	1st Series: <i>revised</i> 1967: 2nd Series: <i>revised</i> 1983:	A (2/76); A/* (3/81); A/** (3/83). A (2/86); A1 (11/89); A2 (7/91).
Sheet 39 -	[<i>Ist Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/ [1986]; A1 (6/92).
Sheet 40 -	[<i>Ist Series not published</i>]	

	2nd Series: <i>revised</i> 1974:	A (2/76); A/* (8/84); A2 (2/89).
Sheet 41 -	[<i>1st Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/; A/* (8/84); A3 (7/91); A2 (3/89).
	<i>revised</i> 1990:	B (9/92).
Sheet 42 -	1st Series: <i>revised</i> 1954/5:	A (2/76).
	2nd Series: <i>revised</i> 1977:	A (2/80); A/* (3/82); A/*/; A/*/* (11/87); A3 (3/90).
Sheet 43 -	[<i>1st Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A/* (7/84); A2 (3/90).
Sheet 44 -	[<i>1st Series not published</i>] 2nd Series: <i>revised</i> 1974:	A (2/76); A1 (4/90).
Sheet 45 -	1st Series: <i>revised</i> 1955/67:	A (2/76); A/ [11/79].
	2nd Series: <i>revised</i> 1983:	A (9/85); A1 (8/89).
Sheet 46 -	1st Series: <i>revised</i> 1954:	A (2/76).
	2nd Series: <i>revised</i> 1985:	A (8/86).
Sheet 47 -	1st Series: <i>revised</i> 1954:	A (2/76); A/ [6/82]; A/* (12/84).
	2nd Series: <i>revised</i> 1985:	A (3/87).
Sheet 48 -	1st Series: <i>revised</i> 1953-4:	A (2/76); A/* (4/85).
	2nd Series: <i>revised</i> 1985:	A (1/87).
Sheet 49 -	1st Series: <i>revised</i> 1953-4:	A (2/76); A/ [12/78]; A/* (8/83).
	2nd Series: <i>revised</i> 1984:	A (3/86); A1 (8/92).
Sheet 50 -	1st Series: <i>revised</i> 1954:	A (2/76); A/ [6/79]; A/* (2/83).
	2nd Series: <i>revised</i> 1984:	A (8/86); A1 (3/89).
Sheet 51 -	1st Series: <i>revised</i> 1954:	A (2/76); A/ [10/80]; A/* (3/82).
	2nd Series: <i>revised</i> 1984:	A (11/86); A1 (1/89); A2 (7/93).
Sheet 52 -	1st Series: <i>revised</i> 1954/67:	A (2/76); A/* (3/81); A/*/* (7/82); A/*/*/ [2/83]; A/*/*/* (7/84).
	2nd Series: <i>revised</i> 1984:	A (11/86); A/* (5/88); A2 (11/89).
Sheet 53 -	1st Series: <i>revised</i> 1954-5/67-8:	A (2/76); A/* (12/80); A/*/* (7/84).
	2nd Series: <i>revised</i> 1984:	A (11/86); A1 (1/90); A2 (10/93).
Sheet 54 -	1st Series: <i>revised</i> 1967-9:	A (2/76); A/ [5/79]; A/* (1/83).
	2nd Series: <i>revised</i> 1984:	A (8/86); A/* (2/88); A2 (12/91).
Sheet 55 -	1st Series: <i>revised</i> 1953-4/63:	A (2/76); A/* (8/79).
	2nd Series: <i>revised</i> 1985:	A (4/87).
Sheet 56 -	1st Series: <i>revised</i> 1954/63:	A (2/76); A/* (6/81).
	2nd Series: <i>revised</i> 1984:	A (8/86); A1 (9/89); A2 (7/92).
Sheet 57 -	1st Series: <i>revised</i> 1954/63:	A (2/76); A/* (3/82).
	2nd Series: <i>revised</i> 1984-5:	A (1/87); A1 (6/88); A2 (6/91).
Sheet 58 -	1st Series: <i>revised</i> 1954/67:	A (2/76); A/* (11/79); A/*/* (3/82); A/*/*/* (3/84).
	2nd Series: <i>revised</i> 1985:	A (3/87); A1 (7/88).
Sheet 59 -	1st Series: <i>revised</i> 1967-8:	A (2/76); A/* (1/83).
	2nd Series: <i>revised</i> 1986:	A (7/87); A1 (3/90); A2 (7/93).
Sheet 60 -	1st Series: <i>revised</i> 1953:	A (2/76).
	2nd Series: <i>revised</i> 1986:	A (7/87).
Sheet 61 -	1st Series: <i>revised</i> 1953-4:	A (2/76).
	2nd Series: <i>revised</i> 1985:	A (11/87).
Sheet 62 -	1st Series: <i>revised</i> 1953-4/63:	A (2/76); A/* (10/82).
	2nd Series: <i>revised</i> 1986:	A (7/87).
Sheet 63 -	1st Series: <i>revised</i> 1953-4/63:	A (2/76); A/* (4/79); A/*/* (5/80); A/*/*/* (7/84).
	2nd Series: <i>revised</i> 1985:	A (8/87); A1 (3/89).
Sheet 64 -	[<i>1st Series not published</i>] 2nd Series: <i>revised</i> 1973:	A (2/76); A/* (5/80); A/*/* (9/81); A/*/*/* (6/82); A/*/*/*/* (8/85).
	<i>revised</i> 1987:	B (12/88); B1 (9/90); B2 (11/92).
Sheet 65 -	[<i>1st Series not published</i>] 2nd Series: <i>revised</i> 1973:	A (2/76); A/* (1/82); A/*/; A/*/* (3/85); A/*/*/*/* (12/86).
	<i>revised</i> 1987:	B (9/88); B1 (6/90); B2 (7/92).
Sheet 66 -	[<i>1st Series not published</i>] 2nd Series: <i>revised</i> 1973:	A (2/76); A/* (3/81); A/*/; A/*/* (3/84); A/*/*/* (3/85); A/*/*/*/* [1985]; A/*/*/*/* (2/87).
	<i>revised</i> 1987:	B (11/89); B1 (12/91).
Sheet 67 -	1st Series: <i>revised</i> 1963-4/67-8:	A (2/76); A/ [3/79].

	2nd Series: <i>revised</i> 1982:	A (3/84); A1 (6/89).
Sheet 68 -	1st Series: <i>revised</i> 1953-4:	A (2/76); A/* (6/83).
	2nd Series: <i>revised</i> 1986:	A (7/87).
Sheet 69 -	1st Series: <i>revised</i> 1953-4/63:	A (2/76); A/* (8/80).
	2nd Series: <i>revised</i> 1985-6:	A (7/87).
Sheet 70 -	1st Series: <i>revised</i> 1962/3:	A (2/76); A/* (8/80); A/** (1/82); A/**/* (3/84).
	2nd Series: <i>revised</i> 1985:	A (7/87); A1 (1/89); A2 (10/92).
Sheet 71 -	1st Series: <i>revised</i> 1962/3:	A (2/76); A/* (6/82); A/** (4/85).
	2nd Series: <i>revised</i> 1986:	A (9/87); A1 (6/89); A2 (7/93).
Sheet 72 -	[1st Series not published]	
	2nd Series: <i>revised</i> 1973:	A (2/76); A/* (10/82); A/** (6/87); A3 (1/89).
Sheet 73 -	[1st Series not published]	
	2nd Series: <i>revised</i> 1973:	A (2/76); A/* (5/82); A/** (7/87); A3 (12/88).
	<i>revised</i> 1992:	B (12/93).
Sheet 74 -	1st Series: <i>revised</i> 1961-2/63-4:	A (2/76).
	2nd Series: <i>revised</i> 1982:	A (4/84); A1 (5/89).
Sheet 75 -	1st Series: <i>revised</i> 1963-4:	A (2/76); A/ [2/77]; A//* (2/81).
	2nd Series: <i>revised</i> 1983:	A (3/85); A1 (11/91).
Sheet 76 -	1st Series: <i>revised</i> 1961/63:	A (2/76); A/* (4/82).
	2nd Series: <i>revised</i> 1985:	A (9/86); A1 (11/89).
Sheet 77 -	1st Series: <i>revised</i> 1961/2/3:	A (2/76); A/* (6/79); A/** (1/82).
	2nd Series: <i>revised</i> 1985:	A (10/86); A1 (11/91).
Sheet 78 -	1st Series: <i>revised</i> 1962/63:	A (2/76).
	2nd Series: <i>revised</i> 1985:	A (4/87).
Sheet 79 -	[1st Series not published]	
	2nd Series: <i>revised</i> 1974:	A (2/76); A/* (9/84); A/** (7/86); A3 (7/89).
Sheet 80 -	[1st Series not published]	
	2nd Series: <i>revised</i> 1973:	A (2/76); A/* (5/82); A/** [2/86]; A/**/* (6/88).
Sheet 81 -	1st Series: <i>revised</i> 1962/3-4/70:	A (2/76); A/* (9/81).
	2nd Series: <i>revised</i> 1983:	A (3/85); A/* (9/87); A2 (4/91).
Sheet 82 -	1st Series: <i>revised</i> 1961/63:	A (2/76); A/* (6/79).
	2nd Series: <i>revised</i> 1985:	A (1/87); A1 (6/92).
Sheet 83 -	1st Series: <i>revised</i> 1961/63:	A (2/76); A/* (10/80).
	2nd Series: <i>revised</i> 1985:	A (7/87); A1 (6/90).
Sheet 84 -	1st Series: <i>revised</i> 1961/63:	A (2/76); A/ [5/79]; A//* (1/82).
	2nd Series: <i>revised</i> 1985:	A (3/87); A1 (6/89); (A/* -8/89-o); A2 (6/91).
Sheet 85 -	[1st Series not published]	
	2nd Series: <i>revised</i> 1974:	A (2/76); A/* (3/84); A/** (2/87); A/**/* (7/88).
	<i>revised</i> 1990:	B (10/92).
Sheet 86 -	[1st Series not published]	
	2nd Series: <i>revised</i> 1973:	A (2/76); A/* (6/84).
	<i>revised</i> 1990:	B (4/92).
Sheet 87 -	[1st Series not published]	
	2nd Series: <i>revised</i> 1973:	A (2/76); A/* (11/77); A/** (6/81); A/**/*; A/**/** (9/85).
	<i>revised</i> 1990:	B (3/92).
Sheet 88 -	[1st Series not published]	
	2nd Series: <i>revised</i> 1973:	A (2/76); A/* (10/78); A/** (6/80); A/**/* (2/83); A/**/** (1/86); A/**/**/* (12/87).
	<i>revised</i> 1988:	B (8/90); B1 (9/91).
Sheet 89 -	1st Series: <i>revised</i> 1962-3:	A (2/76); A/* (7/79).
	2nd Series: <i>revised</i> 1980:	A (7/82); A/* (5/86); A/** (12/87); A3 (7/89); A4 (6/91).
Sheet 90 -	1st Series: <i>revised</i> 1962-4:	A (2/76); A/ [9/77]; A//* (4/79).
	2i~ Series: <i>revised</i> 1980:	A (5/82); A/; A//* (7/88).
	<i>revised</i> 1992:	B (12/93).
Sheet 91 -	1st Series: <i>revised</i> 1959/62-3/4:	A (2/76); A/* (2/80).
	2nd Series: <i>revised</i> 1981:	A (1/83); A1 (6/90).
Sheet 92 -	1st Series: <i>revised</i> 1958/9/60/2:	A (2/76).
	2nd Series: <i>revised</i> 1981:	A (11/82); A/* (4/85); A//.
Sheet 93 -	[1st Series not published]	

	2nd Series: <i>revised</i> 1972-3:	A (2/76); A/* (11/79); A/** (2/82); A/**/* (12/83); A/**/*/* (4/86); A/**/*/*/* (3/88).
	<i>revised</i> 1988:	B (6/91).
Sheet 94 -	[1st Series <i>not published</i>]	
	2nd Series: <i>revised</i> 1972-3:	A (2/76); A/* (3/79); A/*/ [1981?]; A/**/* (6/83).
	<i>revised</i> 1988:	B (1/90).
Sheet 95 -	1st Series: <i>revised</i> 1969:	A (2/76); A/* (12/80); A/*/ [2/85].
	2nd Series: <i>revised</i> 1984:	A (8/86).
Sheet 96 -	1st Series: <i>revised</i> 1962-4:	A (2/76).
	2nd Series: <i>revised</i> 1980:	A (3/82); A1 [1982?]; A1 (1/89).
	<i>revised</i> 1991:	B (1/93).
Sheet 97 -	1st Series: <i>revised</i> 1962-4:	A (2/76); A/* (1/81).
	2nd Series: <i>revised</i> 1981:	A (9/82); A1 [6/86?]; A/* (12/87); A2 (11/89).
	<i>revised</i> 1991-2:	B (7/93).
Sheet 98 -	1st Series: <i>revised</i> 1959/63-4:	A (2/76).
	2nd Series: <i>revised</i> 1981:	A (4/83); A1 (3/89).
Sheet 99 -	[1st Series <i>not published</i>]	
	2nd Series: <i>revised</i> 1972:	A (2/76); A/* (9/79); A/**/* (9/83).
	<i>revised</i> 1987:	B (11/89).
Sheet 100 -	[1st Series <i>not published</i>]	
	2nd Series: <i>revised</i> 1972:	A (2/76); A/* (4/80); A/**/* (5/83).
	<i>revised</i> 1988:	B (4/90).
Sheet 101 -	[1st Series <i>not published</i>]	
	2nd Series: <i>revised</i> 1972:	A (2/72); A/; A//; A/**/* (6/84)
	<i>revised</i> 1988:	B (1/90).
Sheet 102 -	1st Series: <i>revised</i> 1971-2:	A (3/74); A/* (10/78); A/**/* (5/79); A/**/*/* (6/80).
	2nd Series: <i>revised</i> 1979:	A (12/81); A/* (4/84); A/*/ [6/85]; A/**/* (3/87); A3 (10/88).
	<i>revised</i> 1990:	B (3/92).
Sheet 103 -	1st Series: <i>revised</i> 1971/2:	A (3/74); A/* (9/77).
	2nd Series: <i>revised</i> 1979:	A (3/82); A/* (4/84); A/**/* (5/87); A3 (1/89).
	<i>revised</i> 1989:	B (6/92).
Sheet 104 -	1st Series: <i>revised</i> 1971-2:	A (3/74); A/* (8/74); A/**/* (2/77).
	2nd Series: <i>revised</i> 1977:	A (8/79); A/* (6/84); A/**/* (7/86); A/**/*/* (5/88).
	<i>revised</i> 1988:	B (3/91).
Sheet 105 -	1st Series: <i>revised</i> 1958:	A (3/74); A/* (12/74).
	2nd Series: <i>revised</i> 1974:	A (3/78); A/* (12/80); A/**/* (7/83); A/**/*/ [1985]; A/**/*/* (11/86).
	<i>revised</i> 1988:	B (3/90).
Sheet 106 -	1st Series: <i>revised</i> 1958/60:	A (3/74); A/* (1/75).
	2nd Series: <i>revised</i> 1974:	A (2/78); A/* (1/83); A/**/* (3/85).
	<i>revised</i> 1989:	B (6/90); B1 (6/92).
Sheet 107 -	1st Series: <i>revised</i> 1960:	A (3/74).
	2nd Series: <i>revised</i> 1974:	A (6/77); A/* (12/81); A/**/* (6/83); A/**/*/* (12/86); A4 (10/88); A5 (9/90).
	<i>revised</i> 1991:	B (11/92).
Sheet 108 -	1st Series: <i>revised</i> 1971:	A (3/74).
	2nd Series: <i>revised</i> 1976:	A (12/78); A/* (1/82); A/**/* (3/84); A/**/*/* (5/86); A/**/*/*/* (5/88).
	<i>revised</i> 1989:	B (11/91).
Sheet 109 -	1st Series: <i>revised</i> 1972:	A (3/74); A/ [3/75]; A/**/* (2/77).
	2nd Series: <i>revised</i> 1976:	A (5/79); A/* (2/82); A/**/* (2/84).
	<i>revised</i> 1986:	B (5/88); B1 (6/90); B2 (6/92).
Sheet 110 -	1st Series: <i>revised</i> 1958-9/60/66:	A (3/74).
	2nd Series: <i>revised</i> 1975:	A (6/78); A/ [2/979]; A/**/* (8/83); A/**/*/* (7/85).
	<i>revised</i> 1986:	B (8/88); B1 (5/93).
Sheet 111 -	1st Series: <i>revised</i> 1959/60/66:	A (3/74).
	2nd Series: <i>revised</i> 1975:	A (5/78); A/* (9/79).
	<i>revised</i> 1982:	B (8/83); B/* (1/87); B2 (10/88).
Sheet 112 -	1st Series: <i>revised</i> 1958/60/66:	A (3/74).
	2nd Series: <i>revised</i> 1974:	A (9/77); A/* (2/81); A/**/* (7/82); A/**/*/* (11/89).
	<i>revised</i> 1988:	B (11/89); B1 (2/92).

- Sheet 113** - 1st Series: *revised* 1960: A (3/74).
2nd Series: *revised* 1975: A (10/77); A/* (3/83); A/** (6/85); A/**/* (8/87).
revised 1991: B (11/92).
- Sheet 114** - 1st Series: *revised* 1971: A (3/74); A/* (3/79); A/** (6/82).
2nd Series: *revised* 1982: A (11/83); A/* (8/88).
- Sheet 115** - [*1st Series not published*]
2nd Series: *revised* 1971: A (3/74); A/; A/* (7/78); A/**/* (5/82); A/**/*/* (6/84);
A/**/*/*/* (8/86).
revised 1986: B (5/88); B1 (1/90); B2 (3/92).
- Sheet 116** - 1st Series: *revised* 1971: A (3/74); A/* (8/78); A/** (6/80); A/**/* (7/82).
revised 1982: A (1/84); A/* (3/87); A1 (7/88).
revised 1992: B (?1/94).
- Sheet 117** - 1st Series: *revised* 1971-2: A (3/74).
2nd Series: *revised* 1976-7: A (12/78); A/* (1/82); A/** (4/84); A/**/* (1/86);
A/**/*/* (12/86).
revised 1989: B (11/90); B1 (12/92).
- Sheet 118** - 1st Series: *revised* 1959/66: A (3/74).
2nd Series: *revised* 1975: A (3/78); A/* (5/79); A/** (8/83); A/**/* (9/85); A/**/*/* (10/86).
revised 1989: B (5/91); B1 (9/93).
- Sheet 119** - 1st Series: *revised* 1959/60/66: A (3/74).
2nd Series: *revised* 1975: A (11/77); A/* (6/79); A/** (12/84); A/**/* (1/87).
revised 1987: B (12/89).
- Sheet 120** - 1st Series: *revised* 1972: A (3/74); A/* (2/77); A/** (4/79).
2nd Series: *revised* 1978: A (1/80); A/ [1981?]; A/* (6/85); A/**/* (7/87); A3 (12/88);
A4 (12/90).
revised 1991: B (11/92).
- Sheet 121** - 1st Series: *revised* 1960-1/66: A (3/74); A/* (12/74).
2nd Series: *revised* 1978: A (2/81); A/ [12/83]; A/* (3/86); A/**/* (12/87); A3 (7/89);
A4 (10/92).
- Sheet 122** - 1st Series: *revised* 1960-1: A (3/74).
2nd Series: *revised* 1979: A (3/81); A/ [7/82]; A1 (8/90).
revised 1991-2: B (9/93).
- Sheet 123** - 1st Series: *revised* 1971: A (3/74); A/* (9/76).
2nd Series: *revised* 1983: A (3/85); A1 (4/91).
- Sheet 124** - 1st Series: *revised* 1971: A (3/74); A/* (3/79); A/** (5/82).
2nd Series: *revised* 1982: A (6/84); A/; A/ [3/88]; A1 (4/91).
- Sheet 125** - 1st Series: *revised* 1971: A (3/74); A/* (6/80).
2nd Series: *revised* 1983: A (10/84); A/ [1986?].
- Sheet 126** - 1st Series: *revised* 1971: A (3/74); A/* (7/79).
2nd Series: *revised* 1983: A (4/85); A/* (3/87); A2 (12/89); A3 (1/92).
- Sheet 127** - 1st Series: *revised* 1959/60/61: A (3/74).
2nd Series: *revised* 1975: A (10/77); A/* (9/80); A/** (6/82); A/**/* (6/84);
A/**/*/* (9/86); A/**/*/*/* (7/88).
revised 1988: B (12/90); B1 (3/93).
- Sheet 128** - 1st Series: *revised* 1959-60: A (3/74).
2nd Series: *revised* 1975: A (12/77); A/* (1/79); A/** (1/82); A/**/* (12/83);
A/**/*/* (11/85); A/**/*/*/* (10/87); A6 (7/89).
revised 1989: B (11/91).
- Sheet 129** - 1st Series: *revised* 1971/2: A (3/74); A/* (9/76).
2nd Series: *revised* 1976-7: A (1/80); A/* (2/82); A/** (1/84); A/**/* (1/86);
A/**/*/* (11/87); A5 (9/89).
revised 1989: B (4/91); B1 (9/93).
- Sheet 130** - 1st Series: *revised* 1960-1: A (3/74).
2nd Series: *revised* 1979: A (2/81); A/; A/* (6/85); A2 (3/90).
- Sheet 131** - 1st Series: *revised* 1960-1: A (3/74).
2nd Series: *revised* 1977: A (9/79); A/* (3/82); A/** (2/84); A/**/* (2/87); A4 (9/88).
revised 1990: B (3/92).
- Sheet 132** - 1st Series: *revised* 1961/66-7: A (3/74); A/* (4/78).
2nd Series: *revised* 1977: A (5/80); A/* (7/84); A/** (3/87).

		<i>revised</i> 1990:	B (8/92).
Sheet 133 -	1st Series:	<i>revised</i> 1967:	A (3/74).
	2nd Series:	<i>revised</i> 1978:	A (9/80); A/* (11/85); A2 (6/89).
		<i>revised</i> 1991:	B (3/93).
Sheet 134 -	1st Series:	<i>revised</i> 1967:	A (3/74).
	2nd Series:	<i>revised</i> 1978:	A (10/80); A/* (7/84); A/** (8/87); A3 (11/89).
		<i>revised</i> 1991:	B (3/93).
Sheet 135 -	1st Series:	<i>revised</i> 1972:	A (3/74); A/ [10/79]; A/** (8/81).
	2nd Series:	<i>revised</i> 1984:	A (4/86); A1 (8/89).
Sheet 136 -	1st Series:	<i>revised</i> 1972:	A (3/74); A/* (1/82).
	2nd Series:	<i>revised</i> 1984:	A (3/86); A1 (7/91); A2 (7/93).
Sheet 137 -	1st Series:	<i>revised</i> 1964-5:	A (3/74); A/* (6/80).
	2nd Series:	<i>revised</i> 1983:	A (8/85)
Sheet 138 -	1st Series:	<i>revised</i> 1964-5:	A (3/74); A/* (6/80); A/** (4/84).
	2nd Series:	<i>revised</i> 1983:	A (8/85); A/* (5/88).
Sheet 139 -	1st Series:	<i>revised</i> 1972:	A (3/74); A/* [3/75].
	2nd Series:	<i>revised</i> 1975-6:	A (3/79); A/ [1980?]; A/** (4/81); A/**/ (1/83); A/**/** (3/85); A/**/**/ (2/87).
		<i>revised</i> 1988:	B (8/90); B1 (9/92).
Sheet 140 -	1st Series:	<i>revised</i> 1972:	A (3/74); A/* (6/77)
	2nd Series:	<i>revised</i> 1978:	A (9/80); A/* (10/84); A/** (10/86); A3 (9/88).
		<i>revised</i> 1989:	B (1/91); B1 (10/92).
Sheet 141 -	1st Series:	<i>revised</i> 1959 60/61/66:	A (3/74).
	2nd Series:	<i>revised</i> 1977:	A (9/77); A/* (3/84); A/** (2/87); A/**/** (12/87).
		<i>revised</i> 1989:	B (4/92); B1 (12/93).
Sheet 142 -	1st Series:	<i>revised</i> 1960-1/66-7:	A (3/74); A/* (1/75).
	2nd Series:	<i>revised</i> 1977-9:	A (1/82); A/* (12/84); A/** (10/86); A/**/** (5/88).
		<i>revised</i> 1989:	B (8/91).
Sheet 143 -	1st Series:	<i>revised</i> 1961/66-7:	A (3/74); A/* (12/80).
	2nd Series:	<i>revised</i> 1977-9:	A (12/81); A/* (3/85); A/** (5/87); A3 (3/91).
		<i>revised</i> 1989-90:	B (10/92).
Sheet 144 -	1st Series:	<i>revised</i> 1966-7:	A (3/74); A/* (10/80).
		<i>revised</i> 1980:	A (1/82); A/* (3/85); A/** (12/86); A3 (8/90).
Sheet 145 -	1st Series:	<i>revised</i> 1964:	A (3/74); A/* (6/80).
	2nd Series:	<i>revised</i> 1983:	A (6/85); A1 (8/92).
Sheet 146 -	1st Series:	<i>revised</i> 1964 5:	A (3/74); A/* (5/80); A/** (6/84).
	2nd Series:	<i>revised</i> 1983:	A (6/85).
Sheet 147 -	1st Series:	<i>revised</i> 1964-5:	A (3/74); A/* (2/83).
	2nd Series:	<i>revised</i> 1983:	A (8/85).
Sheet 148 -	1st Series:	<i>revised</i> 1964/5/6:	A (3/74); A/ [11/74].
		<i>revised</i> 1985:	A (6/86); A1 (4/92).
Sheet 149 -	1st Series:	<i>revised</i> 1965-6:	A (3/74); A/* (4/82).
	2nd Series:	<i>revised</i> 1984:	A (1/86); A1 (7/89); A2 (7/93).
Sheet 150 -	1st Series:	<i>revised</i> 1964-5/6:	A (3/74); A/* (12/76).
	2nd Series:	<i>revised</i> 1976-7:	A (1/79); A/* (2/81); A/** (10/84); A/**/** (9/87).
		<i>revised</i> 1989:	B (10/91).
Sheet 151 -	1st Series:	<i>revised</i> 1965-6:	A (3/74).
	2nd Series:	<i>revised</i> 1977:	A (6/79); A/* (3/85).
		<i>revised</i> 1988:	B (8/90); B1 (6/92).
Sheet 152 -	1st Series:	<i>revised</i> 1966:	A (3/74); A/* (9/77).
	2nd Series:	<i>revised</i> 1977:	A (6/79); A/* (7/81); A/** (3/83); A/**/** (4/85); A/**/**/ (3/87); A5 (12/88).
		<i>revised</i> 1989:	B (1/92).
Sheet 153 -	1st Series:	<i>revised</i> 1966/7:	A (3/74).
	2nd Series:	<i>revised</i> 1976-7:	A (9/79); A/* (9/82); A/** (8/84); A/**/** (8/86); A/**/**/ (4/88).
		<i>revised</i> 1990:	B (3/92).
Sheet 154 -	1st Series:	<i>revised</i> 1966-7:	A (3/74).
	2nd Series:	<i>revised</i> 1978:	A (8/80); A/* (5/82); A/** (8/86).
		<i>revised</i> 1989:	B (1/92).

- Sheet 155** - 1st Series: *revised* 1967: A (3/74); A/* (7/78); A/** (9/79).
2nd Series: *revised* 1978: A (12/80); A/ [1981?]; A//; A/** (5/86); A2 (10/88).
revised 1988-9: B (3/92).
- Sheet 156** - 1st Series: *revised* 1967: A (3/74); A/* (6/79).
2nd Series: *revised* 1980: A (1/82); A/* (3/85); A2 (3/89).
- Sheet 157** - 1st Series: *revised* 1964: A (3/74); A/* (9/80).
2nd Series: *revised* 1982: A (11/83); A1 (5/90); A2 (2/92).
- Sheet 158** - 1st Series: *revised* 1964: A (3/74); A/* (9/80).
2nd Series: *revised* 1982: A (12/83); A/* (8/85); A2 (4/90).
- Sheet 159** - 1st Series: *revised* 1964/5/71: A (3/74).
2nd Series: *revised* 1977: A (5/80); A/* (7/82); A/** (7/85); A/**/* (7/87).
revised 1991: B (12/93).
- Sheet 160** - 1st Series: *revised* 1964-5/71: A (3/74); A/* (9/77); A/** (11/78); A/**/* (12/81).
2nd Series: *revised* 1983: A (1/84); A/ [1986?]; A1 (10/91).
- Sheet 161** - 1st Series: *revised* 1964/6/70-1: A (3/74); A/* (6/80); A/** (6/81).
2nd Series: *revised* 1983: A (12/84); A1 (8/88); A2 (6/91).
- Sheet 162** - 1st Series: *revised* 1966/70: A (3/74); A/* (9/77).
2nd Series: *revised* 1978: A (10/80); A/; A/* (10/84); A/**/* (12/87).
revised 1988: B (11/90); B1 (8/93).
- Sheet 163** - 1st Series: *revised* 1965-6: A (3/74).
2nd Series: *revised* 1977: A (12/78); A/* (3/82); A/** (6/85).
revised 1988: B (4/90).
- Sheet 164** - 1st Series: *revised* 1965-6: A (3/74); A/* (8/78); A/** (9/79).
2nd Series: *revised* 1979: A (2/81); A/* (5/83); A/** (7/85); A/**/* [2/87]; A3 (11/89).
revised 1989: B (5/91).
- Sheet 165** - 1st Series: *revised* 1965-6/8: A (3/74); A/* (4/75); A/** (2/78).
revised 1976-9: A (1/82); A/* (9/84); A2 (8/89).
revised 1989: B (11/91); B1 (12/93).
- Sheet 166** - 1st Series: *revised* 1966/7/8: A (3/74); A/* (4/75).
2nd Series: *revised* 1976: A (11/78); A/* (1/80); A/** (6/81); A/**/* (2/83);
A/**/*/* (6/84); A/**/*/*/* (7/86).
revised 1986: B (6/88); B1 (7/90); B2 (12/93).
- Sheet 167** - 1st Series: *revised* 1967/68: A (3/74); A/* (4/77).
2nd Series: *revised* 1975: A (6/78); A/* (3/81); A/** (2/82); A/**/* (4/84);
A/**/*/* (3/87); A5 (2/89).
revised 1990: B (10/92).
- Sheet 168** - 1st Series: *revised* 1967-8: A (3/74); A/* (5/75).
2nd Series: *revised* 1978: A (10/80); A/* (10/83); A/** (12/87).
revised 1988/90: B (5/92).
- Sheet 169** - 1st Series: *revised* 1967: A (3/74); A/* (8/78).
2nd Series: *revised* 1978: A (11/80); A/* (5/82); A/** (8/84); A/**/* (8/86); A/**/*/* (5/88).
revised 1988: B (8/90); B1 (10/93).
- Sheet 170** - 1st Series: *revised* 1971: A (3/74); A/* (12/76).
2nd Series: *revised* 1977: A (6/80); A/* (9/82); A/** (7/84); A/**/* (5/86);
A/**/*/* (3/88); A5 (11/89).
revised 1990: B (5/92).
- Sheet 171** - 1st Series: *revised* 1970/71: A (3/74); A/* (6/76); A/** (9/79).
2nd Series: *revised* 1979-80: A (1/82); A/* (8/83); A/** (8/85); A/**/* (9/86); A4 (5/89).
revised 1989: B (11/91).
- Sheet 172** - 1st Series: *revised* 1970: A (3/74); A/* (4/77).
2nd Series: *revised* 1978-9: A (1/82); A/* (12/83); A/** (7/88); A3 (6/90).
revised 1991: B (12/93).
- Sheet 173** - 1st Series: *revised* 1966/9/70: A (3/74); A/* (1/76); A/** (12/78).
2nd Series: *revised* 1979: A (12/81); A/* (11/85); A/** (8/87); A3 (6/89); B (8/93).
- Sheet 174** - 1st Series: *revised* 1965-6/9: A (3/74); A/* (12/77); A/** (2/80).
2nd Series: *revised* 1979: A (8/81); A/ [2/83]; A/* (8/85); A2 (8/89).
revised 1991: B (8/93).
- Sheet 175** - 1st Series: *revised* 1965-6/68-9: A (3/74); A/* (4/75).
2nd Series: *revised* 1976: A (12/78); A/* (12/80); A/** (6/82); A/**/* (7/84);

		A/*/*/* (8/86).
	revised 1987:	B (11/88); B1 [©1990].
Sheet 176 -	[1st Series not published]	
	2nd Series: revised 1968:	A (3/74); A/* (6/75); A/*/* (9/77).
	revised 1976:	B (12/78); B/* (1/82); B/*/* (12/84); B/*/*/* (1/87).
	revised 1987:	C (11/88).
Sheet 177 -	[1st Series not published]	
	2nd Series: revised 1967-8:	A (3/74).
	revised 1976:	B (12/78); B/* (3/81); B/*/* (2/83); B/*/*/* (4/85).
	revised 1986:	C (8/88); C1 (2/91); C2 (3/93).
Sheet 178 -	1st Series: revised 1967-8:	A (3/74).
	2nd Series: revised 1979:	A (12/81); A/* (12/84); A/*/* (11/86); A3 (9/88); A4 (11/90).
	revised 1990:	B (10/92).
Sheet 179 -	1st Series: revised 1967-8:	A (3/74); A/* (2/80).
	2nd Series: revised 1978:	A (1/81); A/* (6/82); A/*/* (8/86); A/*/*/* (7/88).
	revised 1991:	B (3/93).
Sheet 180 -	1st Series: revised 1970-1:	A (3/74); A/ [2/79]; A/* (10/80).
	2nd Series: revised 1981:	A (4/83); A/* (7/87); A2 (3/89); A3 (6/90); A4 (6/92).
Sheet 181 -	1st Series: revised 1971:	A (3/74); A/* (6/77); A/*/* (3/80).
	2nd Series: revised 1981:	A (4/83); A/* (4/85); A2 (11/88).
Sheet 182 -	1st Series: revised 1970:	A (3/74); A/* (9/77).
	2nd Series: revised 1981:	A (8/82); A1 (11/89).
	revised 1992:	B (12/93).
Sheet 183 -	1st Series: revised 1968/70:	A (3/74); A/* (10/78).
	2nd Series: revised 1982:	A (9/83); A/* (7/85); A/*/* (2/88); A3 (11/89); A4 (8/91).
	revised 1991-2:	B (?1/94).
Sheet 184 -	1st Series: revised 1968-9:	A (3/74); A/* (10/77); A/*/* (7/79).
	2nd Series: revised 1981:	A (10/83); A1 (12/88).
Sheet 185 -	1st Series: revised 1969:	A (3/74); A/* (4/77); A/*/* (11/79).
	2nd Series: revised 1981:	A (11/82); A/* (8/84); A/*/* (9/86); A/*/*/* (6/88).
	revised 1990:	B (8/92).
Sheet 186 -	1st Series: revised 1968-9:	A (3/74); A/* (1/78); A/*/* (4/79).
	2nd Series: revised 1976-8:	A (2/81); A/* (9/82); A/*/* (12/84).
	revised 1987:	B (2/89); B1 (5/91); B2 (10/93).
Sheet 187 -	1st Series: revised 1967-8:	A (3/74); A/* (9/76).
	2nd Series: revised 1975:	A (7/78); A/* (5/80); A/*/* (6/81); A/*/*/* (4/83); A/*/*/*/* (4/85); A/*/*/*/*/* (7/87).
	revised 1987:	B (2/89); B1 (6/91); B2 (12/93).
Sheet 188 -	1st Series: revised 1967-8:	A (3/74); A/* (2/77).
	2nd Series: revised 1976:	A (10/78); A/* (5/82); A/*/* (3/84); A/*/*/* (3/86); A/*/*/*/* (3/87).
	revised 1987:	B (2/90); B1 (6/92).
Sheet 189 -	1st Series: revised 1967-8:	A (3/74).
	2nd Series: revised 1978:	A (1/81); A/* (7/82); A/*/* (11/85); A3 (7/89).
	revised 1991:	B (7/93).
Sheet 190 -	1st Series: revised 1970-1:	A (3/74); A/* (11/80).
	2nd Series: revised 1981:	A (1/83); A/* (9/86); A2 (11/89) ¹ ; A3 (12/93).
Sheet 191 -	1st Series: revised 1970-1:	A (3/74); A/* (3/77); A/*/* (4/80).
	2nd Series: revised 1981:	A (1/83); A1 (11/88); A2 (1/92).
Sheet 192 -	1st Series: revised 1968/71:	A (3/74); A/* (4/79).
	2nd Series: revised 1982:	A (9/83); A/* (10/86); A2 (1/92).
	revised 1991:	B (11/92).
Sheet 193 -	1st Series: revised 1968/71:	A (3/74); A/* (4/75); A/*/* (12/78); A/*/*/* (11/80).
	2nd Series: revised 1982:	A (3/83); A/* (5/87); A2 (1/89).
	revised 1991:	B (3/93).
Sheet 194 -	1st Series: revised 1968:	A (3/74); A1 [9/77]; A1/* (9/80).
	2nd Series: revised 1981:	A (3/83); A/* (4/86); A/*/* (2/88); A3 (11/89).

¹ Coloured edition only; outline edition is A/*/*, issued 2/90.

	<i>revised</i> 1991:	B (5/93).
Sheet 195 -	1st Series: <i>revised</i> 1969-70:	A (3/74); A/* (8/76); A/** (5/80).
	2nd Series: <i>revised</i> 1981:	A (3/83); A/* (3/85); A/** (9/87); A3 (7/89).
	<i>revised</i> 1990:	B (5/93).
Sheet 196 -	1st Series: <i>revised</i> 1969:	A (3/74); A/* (8/78).
	2nd Series: <i>revised</i> 1978:	A (6/80); A/* (5/84); A/** (6/86); A3 (7/89).
	<i>revised</i> 1989:	B (1/92).
Sheet 197 -	1st Series: <i>revised</i> 1967-9:	A (3/74); A1 [11/78].
	2nd Series: <i>revised</i> 1978:	A (10/80); A/* (6/84); A/** [3/87?]; A/**/* (6/88); A3 (6/90).
	<i>revised</i> 1990:	B (7/92).
Sheet 198 -	1st Series: <i>revised</i> 1967-8:	A (3/74).
	2nd Series: <i>revised</i> 1978:	A (9/80); A/* (5/82); A/** (8/84); A/**/* (10/87); A4 (11/89).
	<i>revised</i> 1990:	B (5/92).
Sheet 199 -	1st Series: <i>revised</i> 1967-8:	A (3/74).
	2nd Series: <i>revised</i> 1978:	A (6/80); A/* (5/84); A/** (8/87).
	<i>revised</i> 1990:	B (10/92).
Sheet 200 -	1st Series: <i>revised</i> 1970:	A (3/74); A/* (8/78).
	2nd Series: <i>revised</i> 1980:	A (6/82); A/; A/** (5/88).
	<i>revised</i> 1990:	B (7/92).
Sheet 201 -	1st Series: <i>revised</i> 1970-1:	A (3/74); A/* (5/80).
	2nd Series: <i>revised</i> 1980:	A (3/82); A/* (3/84); A/** (5/86); A3 (12/88).
	<i>revised</i> 1990:	B (9/92).
Sheet 202 -	1st Series: <i>revised</i> 1970-1:	A (3/74); A/ [11/74]; A/** (9/77).
	2nd Series: <i>revised</i> 1980:	A (3/82); A/* (4/85).
	<i>revised</i> 1991:	B (10/92).
Sheet 203 -	1st Series: <i>revised</i> 1970:	A (3/74); A/* (9/77).
	2nd Series: <i>revised</i> 1980:	A (2/82); A/* (1/84); A/** (5/86); A/**/* (4/88); A4 (1/90).
	<i>revised</i> 1990:	B (9/92).
Sheet 204 -	1st Series: <i>revised</i> 1970:	A (3/74).
	2nd Series: <i>revised</i> 1980:	A (6/82); A/ [3/84]; A//; A1 (3/89).
	<i>revised</i> 1990:	B (9/92).

**A Major Military “Special”:
The 2–inch/mile Map *War Department Land on Salisbury Plain, 1899–1914,*
and its Companions
by Tim Nicholson**

In 1897 Britain’s imperial power was at its height, and Queen Victoria’s Diamond Jubilee was a celebration of national pride in the fact. Yet in the same year the clear-sighted heard a warning note in Kipling’s sombre new poem *Recessional*, Britain was isolated and friendless among the powers, and invasion scare stories proliferated. As well as a navy, an up-to-date, efficient army was needed, but the Army lacked permanent training grounds extensive enough to permit unrestricted manoeuvring of large bodies of troops in extended formations, and to allow the use of the latest, long-range weapons — lands broad enough to permit, in other words, the creation of a modern force. Aldershot, available since the 1850s, was now too cramped and incapable of much expansion, being increasingly encroached upon by urban development. After the last invasion scare following the Franco-Prussian War, large scale manoeuvres had been held on Salisbury Plain in 1872, on private land. The Plain was much more spacious than Aldershot; its light soil over chalk dried out quickly, making easy going for men, horses and wheels; the area was well placed between London, Aldershot and the great embarkation port of Southampton; and lastly, the land being poorish, was inexpensive.

Impelled by the military, Parliament acted. Between August 1897 and December 1899 the War Office acquired 45 lots of land on the Plain totalling 41,021 acres (about 60 square miles), mostly in the Bulford and Tidworth areas, and began the acquisition of land for an artillery range north of Larkhill. Another 7888 acres were added before the end of 1912. The first construction was of rifle ranges, probably in 1898–9. Manoeuvres were again held on the Plain in 1898, but at that time there were not yet any military structures except, perhaps, the rifle ranges. Barracks and other buildings followed in the Bulford and Tidworth areas from 1900 and 1902 respectively. In 1904 a cavalry school was established at Netheravon. At Larkhill, however,

the only military installations until 1914 were a solitary hut for the gunnery instructor and a scatter of “splinter proof” shelters and “danger posts” on the ranges. Artillery exercises were conducted under canvas. Other tented camp sites were laid out near Tidworth and Ludgershall. To serve Bulford Camp, the Amesbury and Military Camp Light Railway was opened from the London and South Western Railway at Grately to Amesbury in 1902, and extended to the camp in 1906. In 1901 another light railway, a branch from the Midland and South Western Railway at Ludgershall, was opened to Tidworth Camp.

Finally, from 1909 onwards, a new arm began to appear on the Plain. In that year private aviators, including Army officers, erected the first three aeroplane sheds, or hangars, on the Plain east of Larkhill. In 1910–11 War Department sheds followed, and others for the civilian flying schools that trained service aviators at this time. From 1912 the centre of service aviation on the Plain shifted north, first to Upavon, where sheds were built for the new Royal Flying Corps’ own Central Flying School, and then in 1913 to Netheravon.¹

A profusion of special Ordnance Survey mapping, over and above the standard sectional sheets covering the area, underlined the new, national importance of the Plain. The OS Report for 1899–1900 mentioned that barrack sites had been surveyed for the War Office, and that large scale barrack plans had been given to Southampton for reproduction; while the 1903–4 Report added that “special surveys for the War Department have been carried out, or are in progress” on Salisbury Plain and elsewhere. However, most OS mapping was on small scales, and was based on existing standard material. Small scale maps seem to have appeared earlier than large scale plans. They

¹ For the background history of the military presence on the Plain, see N.D.G. James *Plain Soldiering*, HobNob Press, Salisbury, 1987.

were easier to produce, base maps being already available. Also, from the beginning, before buildings were called for, there was a need for small scale maps among the planners of military operations on the Plain, and also, no doubt, among civilian property owners whose land bordered Army ground, and among the local authorities involved.

The 1898 manoeuvres attracted small scale mapping², created exclusively for the occasion; but maps for general, long term use were what indicated an area's permanent significance for the military, as at Aldershot. There was an unparalleled number of these, in bewildering variety, but, with a single exception, they had two things in common — whatever the scale, all were ultimately derived from the One-inch map, and all consisted of combinations of standard small sheets or parts of sheets. Some maps had the boundary of War Department land, and perhaps other military information, overprinted in red. Most had no overt military purpose, but the sheer quantity, all homing-in on one area and all appearing at the time of the Plain's "militarisation", is circumstantial evidence — there is no other kind — for their being produced in response to this development.

A One-inch map entitled *War Department Land on Salisbury Plain* was published in 1898³, and possibly reprinted four times up to 1904⁴. The writer has seen no printings of this map. Its title suggests that it had an overprint showing the boundary of WD land. It was presumably based on the relevant small sheets of the New Series first revision (second edition), revised between 1893 and 1897. Going by later OS practice, one would expect a non-overprinted equivalent to be

² *Salisbury and Surrounding Country Manoeuvre Map, One-inch/mile; Map Showing the Limits of the Ground Referred to in the Order in Council for Military Manoeuvres 1898, Quarter inch/mile.*

³ The only record of it known to the writer is in *Catalogue of Maps in the Intelligence Division, War Office, British Library, N.Tab. 1999/15, and Royal Geographical Society Map Library.*

⁴ 1899, 1900, 1902, 1904. It would be most interesting if readers could report any states of this map to *Sheetlines*, with a note of how, if at all, military information was recorded and updated. Here, to date, is the biggest gap in the story.

listed at the same time; but none was. Shortly afterwards, however, a positive welter of other non-overprinted One-inch maps, which may or may not have been related to the 1898 "boundary" map, did appear. Three were made up of permutations of the same eight⁵ second edition coloured sheets: *Salisbury Plain (North)* of 1899, *Salisbury Plain* (1900), and *Salisbury* (1901). There was never a *Salisbury Plain (South)*. Instead, *Salisbury* complemented *Salisbury Plain (North)*, butting on to it to the south. *Salisbury Plain* was centred on the Plain, as the title indicated; but none of this trio took in all of the War Department's land, even at its 1898 extent.

Why there should have been so many special sheets — together clearly prompted by the military presence on the Plain, while not being really helpful to it — is a mystery. The only useful function of the coloured maps seems to have been to bring "sheets" 282 and 298 before the public. In second edition coloured form, these were never published on their own: they had no existence except as part of one or another of the composite maps, or combined maps, as they were called⁶. Only with the Third Edition were the coloured maps published separately. To worsen the confusion, a further One-inch composite map was issued in 1901; but this, at least, was a member of an independent series. *Salisbury* was one of the new black outline, coloured roads district maps that had started to come out in 1899.

We are on firmer ground by 1906, when a One-inch composite map *War Department Land on Salisbury Plain*, based on New Series second revision (Third Edition) small sheets, appeared with the War Department land overprinted in red, and a limited amount of military information

⁵ Sheets 281, 282, 283, 297, 298, 299, 313, 314.

⁶ Technically, therefore, the combined sheets should be regarded as standard sheets, not "specials"; but such overkill of an area was not typical of the use of combined sheets. These were mostly to be found on the coast, where a sheet consisting mainly of sea was combined with an adjacent one of the land, to give fair value: a concept new to an institution driven by military needs.

Tidworth area, eastern Plain: 1899 Two-
inch map

Tidworth area: 1911 Two-inch map. Note
railway to Tidworth, camps and ranges

the black plate⁷. In parallel, a map *Salisbury Plain*, without overprint but otherwise identical, was published the same year. The overprinted map was reprinted in 1909 with a slightly altered boundary, much more military detail in the overprint, and updating of military information on the black plate⁸. A further reprint in 1914 showed still more change in both red and black plate⁹.

In 1901 the Army went to Bartholomew for a special Half-inch map of the Plain¹⁰, on which recent military developments were included. The resulting row over allowing an arm of the State to go to a commercial publisher instead of the OS for this and other maps prompted the Survey to produce its own standard Half-inch series, and in 1903, the new scale's first year of publication, there also appeared a special coloured Half-inch sheet *Salisbury Plain*, based on the standard map and with the War Department land boundary overprinted in red. The Half-inch series was reduced from the New Series One-inch second edition base revised in 1893–7, but the black plate of the new “special” was updated with some military information to 1903¹¹. A 1906 reprint covered a larger area. It had a One-inch Third Edition base, and took in the 1906 One-inch map's boundary changes and black-plate military information. And as with the 1906 One-inch map, each of these Half-inch maps came in a non-overprinted version, published at the same time.

In 1901 the Quarter-inch standard series — also reduced from the One-inch map — had

⁷ This map was puzzlingly selective with the detail on the contemporary Two-inch map (see below), let alone that on the latter's 1906 reprint. Shown were Bulford Camp and its buildings, Perham Down and Park House Camps, the West Down camps, the light railway to Amesbury, and the Larkhill artillery range.

⁸ It incorporated most of the changes included in the Two-inch map printings of 1903, 1906 and 1908: see below.

⁹ It included most of the alterations in the 1914 reprint of the Two-inch map: see below. A “bivouac camp” on the Two-inch map was called a “rest camp” on the One-inch; surely a contradiction in terms.

¹⁰ IDWO (Intelligence Division, War Office) 1511.

¹¹ Railways to Amesbury and Tidworth, Bulford Camp, rifle ranges (some), and the Larkhill artillery range.

been going for a year when a batch of district maps based on it was published, in black outline with coloured roads. Among them was *Salisbury Plain*, without overprint, extracted from sheet 19 of the standard map. In the following year, sepia hachured hills, green woods and blue water were added.

All this riotous multiplicity consisted of “civilian” maps little altered, few of them truly suited to military needs. Even the One-inch map — let alone the Half-inch and Quarter-inch — gave the user huge areas outside the Plain that he did not need for training or moving troops; while the smallness of the scales deprived him of fine detail. As it happened, the War Department's land was of such a size and shape to allow it on a single sheet small enough to fold into a tunic pocket, at a scale twice that of the nearest OS standard offering. The logical result, in 1899, was the Two-inch map *War Department Land on Salisbury Plain*.

The scale was of known value to the Army. It had been used for around a dozen military area and manoeuvre maps during the decade, and was the most popular scale for military maps after the One-inch. The longest-lived Two-inch map to date was *Aldershot and Surrounding Country*, first published in 1889 and reprinted for the fourth time in 1897¹². Most, if not all, were enlargements by photozincography or heliozincography of the standard One-inch map, often with brown horizontal hachures added. Hachures for hills were favoured by the Army until well into the next century. Horizontal hachures resembled contours insofar as they followed the lie of the land, and were closer together the steeper the slope. They did not provide exact heights, as did contours, but to the trained eye showed the shape of the ground better than conventional vertical hachures. The fact that horizontal hachuring was based on existing manuscript hill drawings, which were the source for vertical hachures, helped accuracy and made it relatively cheap to produce.

¹² For a fuller discussion of these maps, their characteristics, and the production processes involved, see “The Ordnance Survey and smaller scale Military Maps of Britain, 1854–1914”, *Cartographic Journal*, Dec 1988, pp 109–127.

Enlargement of an existing One-inch map was the cheapest and quickest option open, though it brought its disadvantages. When commenting on the Two-inch scale, the *Report of the War Office Committee on a Military Map of the United Kingdom*, published in 1892, had expressed a preference for reduction from the Six-inch map (itself a reduction from the 1:2500 scale) rather than enlargement from the One-inch, which gave less detail, and which vastly exaggerated the dimensions of features such as roads and rivers. An ordinary main road, probably unchanged in width since Macadam's day, would appear to be more than fifty yards across. Nevertheless, the Army's Two-inch map continued to be enlargements of the One-inch, no doubt for economic reasons; and the new *War Department Land on Salisbury Plain* was no exception¹³.

In area, the new map covered parts of sheets 282 and 283 of the second edition coloured map, forming a rectangle bound by Urchfont in the northwest corner and Grately station in the southeast. Enlargement was done by heliozincography¹⁴. The boundary of War Department land was overprinted in red, a solid line shading into hatching. The information on the other plates included no specifically military detail; but this was by no means a simple enlargement of the base map. Most obviously, brown horizontal hachures took the place of sepia vertical hachures. Surprisingly, in view of the 1892 Committee's favourable view of this feature, the alphanumerical marginal squaring system, which helped to pinpoint positions on a map, was dropped. Not so surprisingly — since the Committee looked on them as unnecessary clutter — parish boundaries were removed. Although roads and rivers had to be left enlarged out of all proportion, some black detail,

including place names, was reduced in size. Some was moved, and some was added to take advantage of the larger scale. The conventional signs for single and multiple track railways reverted to those on the original black outline map, being hatched and chequered respectively, instead of chequered and solid black as in the coloured version. The printing date given was June 1898, but the magnetic variation diagram date was 1899, which indicates a publication date of 1899¹⁵. The price was 2s 6d as a flat sheet. One reprint is recorded, in 1900¹⁶.

In May 1903 the Army got the first, and only, example of the sort of Two-inch map for which the War Office committee had asked 11 years earlier. The black information on *War Department Land on Salisbury Plain* was reduced by heliozincography from the current 1:2500 map (from which, of course, the Six-inch map was itself a reduction). This, the Second Edition of 1901, had been revised to 1899, with rifle ranges and other military information added to 1900. Naturally, a more than twelvefold reduction required the removal or generalisation of much information, especially where it was dense, as in towns and villages. Other detail would have gone anyway — parish names and boundaries, numbers and acreage of parcels of land — because the Army considered them as superfluous. Some detail already reduced from the concurrent Six-inch reduction from the 1:2500 map was not reduced further: for example, placenames such as Amesbury and Bulford stayed the same size. Surprisingly, most of the 1:2500 field boundaries survived. Some topographical detail was added or altered. For instance, Larkhill Copse was named, and Nine Mile River northeast of Bulford, described on the 1:2500 map as “liable to floods”, was re-labelled “Sometimes dry”. Both changes were likely to be useful to the Army.

¹³ This was, just possibly, an enlargement of the 1898 *War Department Land on Salisbury Plain*.

¹⁴ Heliozincography was a form of photolithography, used to make photographically reduced or enlarged copies of engraved maps, or parts of them, with added information in black or other colours. Each image was photographed, and light was shone through the negative — one for each colour — on to a sensitised zinc printing plate.

¹⁵ So does the map's acquisition date in the *Catalogue of Maps in the Intelligence Division, War Office*: see note 3.

¹⁶ IDWO 1471. Why, one wonders, was the reprint not published by the Ordnance Survey? And did this imply any major changes to the map? The questions may be academic, since IDWO numbers might be allocated to maps which never existed.

Strictly military information was expanded, in spite of the massive reduction in scale. The 1899–1900 updating on the 1:2500 map had included rifle ranges, the artillery range north of Larkhill, the danger posts for these, the Amesbury branch railway in the course of construction, and Bulford Camp. At Bulford a scatter of ambiguous looking structures up to 30ft long were shown: nothing like barracks yet, of course. The 1903 Two-inch map took in the new barracks at Bulford and Tidworth, camping grounds on the eastern Plain at Park House, Tidworth Park, Perham Down, Windmill Hill and Tidworth Pennings, and on the western Plain, the gunner camp sites at Larkhill and West Down, and splinter-proof shelters on the artillery range. The light railway to Tidworth barracks and the Amesbury light railway as far as Amesbury station were as complete.

The 1899 Two-inch map, like the One-inch but unlike the 1:2500, had contours at 100 ft intervals. The 1903 Two-inch map inherited these, but as well as giving up-to-date military information, was an improvement in other ways. The area covered differed slightly. A shift of about a mile eastwards, to beyond Grately village, had the desirable effect of containing the easternmost part of War Department land within the map frame, instead of allowing it to extrude into the margin. There was also a slight shift northwards, to no apparent end. The area of WD land south of Tidworth shrank, around Shipton Bellenger and Park House Camp.

The overprinting was now much more complex. As well as the outermost boundary of WD land, the boundaries of the Larkhill artillery range and other danger zones were shown in red, as was the position of danger flags, flown when firing was in progress. A green overprint indicated cultivated land forbidden to troops in the Avon valley between the western and eastern Plain, and the “crossings” through it by which troops could pass. Other colours were the same as for the 1899 map: brown horizontal hachures, red contours, burnt sienna (yellow) roads, blue water. Conventional signs, including those for railways and the writing for ancient monuments, were basically those of the 1:2500 parent map; though many were dropped. The windmill

symbol from the One-inch map was added. The price of this much superior map was actually reduced, to 2s for a flat sheet¹⁷.

The map was reprinted in 1906. Its red overprint was little altered, but the black plate was considerably updated. Major changes included the extension of the Amesbury light railway to Bulford Camp. Larkhill Camp spawned a satellite, more artillery tented camp sites on the western Plain were added — Fargo Down Camp, Rollestone Camp, Bustard Camp, Pond Farm Camp — and a new camping ground on the eastern Plain was marked at Windmill Hill. Roads were now in red. The price was 2s, both as a flat sheet and mounted and folded in OS covers.

With the 1908 reprint, the colour scheme was radically altered — or at least, an altered version became available, perhaps as an option¹⁸. The red overprint was little affected: the WD boundary was slightly modified, and there was some changes to the artillery range and danger zone perimeters. However, all land outside War Department property was now given a buff wash, leaving the area inside even more clearly defined. Maybe there had been too much straying on to private land during the 1907 or 1908 manoeuvres. Plantations on WD property were given a green wash and enclosed in a black border. No doubt because of the new use of green, the cultivated land in the Avon valley became buff, and the troop crossings over it defined within heavy black lines. Among other black changes was the addition of the cavalry school at Netheravon (oddly omitted from the 1906 reprint), alteration of camp site boundaries, and the naming of parts of the gunners’ camp at Larkhill: Larkhill Camp and Durrington Camp.

By 1911 the extent of War Department land had grown sufficiently to demand a bigger map.

¹⁷ This 1903 printing, and possibly others, was available without hachuring. The writer has seen only one presentation of this map: directly printed on to cloth.

¹⁸ The writer has only seen a map with the new colour scheme.

Larkhill area, western Plain: 1899 Two-inch map

Larkhill area: 1911 Two-inch map. Note camps and aeroplane sheds on Durrington Down

Before it was reprinted that year, the WD area had been expanded on the west to touch the Salisbury – Devizes road at Tilshead and Orcheston St Mary. The map was extended westward accordingly, so that in the northwest, it took in Easterton and Market Lavington. Elsewhere, boundary changes were minor, though inside them the new West Down artillery range, which fell within the westward expansion of WD land, was defined within red rules. The writer has seen the 1911 reprint in the “1908” colour scheme. The colours appear to revert to those of 1906: but perhaps there was a choice.

The black plate showed striking developments. The barracks at Tidworth were greatly extended, as were the Larkhill and Fargo Down camping grounds, and a new tented camp, Hamilton Camp, appeared between them. Significantly, a modest row of “aeroplane sheds” spouted on Durrington Down, east of Larkhill. Very oddly, the magnetic variation diagram date, which hitherto seem to have kept in line with reprint dates, was now given as 1902. The conventional signs panel was dropped.

The 1914 reprint retained the unlikely magnetic variation date, but there were further WD boundary changes, this time on the northern Plain. One, around Enford, was minor; the other was major, resulting in the Army’s acquisition of the land from north of Upavon southeastwards to take in Upavon Down and Littlecot Down. Red “danger cones” now supplemented danger flags around ranges, some of whose danger areas were altered. The West Down artillery range was renamed Rollestone artillery range. On Upavon Down the black plate showed the Royal Flying Corps’ flying school and sheds; while further south there were the new RFC barracks and sheds east of Netheravon, together with a revolver range. The flying sheds at Larkhill remained. Bivouac camps appeared on two of the crossings of cultivated land, and some of the rifle ranges were deleted.

The writer knows of no further reprints of the Two-inch map of Salisbury Plain. By 1914 it was, in any case, almost alone; the scale had fallen out of favour, being too large for the wide ranging manoeuvres of the new Army, and it seems that apart from Salisbury Plain, only the

artillery training area at Trawsfynydd¹ in Wales was now compact enough to fit on to a Two-inch map. After the First World War, the sole surviving OS maps to show the whole War Department area were on the One-inch scale². Although by then it had been superseded by maps based on the Popular Edition, the old Third edition *War Department Land on Salisbury Plain* soldiered on, being updated and reprinted as late as 1927³. After 1920 the Army finally got its long-desired maps entirely to its own specification, uninfluenced by civilian needs, at first on a 1:20,000 scale (GSGS 2748), and later at 1:25,000 (GSGS 3906); but the writer knows of no single sheets on either scale big enough to accommodate all the WD land on the Plain. Why the useful Two-inch map should have died is just another of the puzzles surrounding the story of small scale maps of the area.

Acknowledgments

The writer is grateful for the help and advice of the following:

Dr Roger Hellyer for the loan of maps; Dr Richard Oliver for running a critical eye over the text; Francis Herbert, Map Librarian, Royal Geographical Society; the staff of the British Library Map Library and Public Record Office, Kew; Lt Col C.W. Payne, Badley Library, Royal School of Artillery, Larkhill, without whose kind welcome no study of the 1914 Two-inch map would have been possible; Mrs P. Coleman, Wiltshire Archaeological Society, Devizes Museum; Bruce Purvis, Local Studies Librarian, Salisbury Public Library, the County local Studies Librarian, Wiltshire County Council; Major N.G.A. Payne, Bulford Conservation Group, Bulford Camp; Christopher Waldren, Defence land Agent, Estate Office, Durrington.

¹ *Map of Trawsfynydd Camp*, 2 in/mile, 1909. From 1913 or thereabouts there was a military 2½ in/mile series covering part of East Anglia and Essex.

² See “One-inch Military *Specials* 1923–40”, *Sheetlines* 33, pp 21–34.

³ See *Sheetlines* 33, p60.

Small Scale Maps Of The Western Front

John L Cruickshank

In *Trench Maps*¹ and *Topography of Armageddon*² Peter Chasseaud has described the large scale maps produced of the Western Front during the Great War. These, however, were not the maps with which the British Expeditionary Force was sent to France in 1914. Initially only small scale maps were available. These were printed before and during the war in substantial numbers, and have survived in private hands in greater numbers than have the larger scale maps. Thirty years ago trench maps may have turned up for pence in bookshops in the cardboard box under the table. My experience is that this does not happen now. The small scale maps do still appear occasionally. I know however of no accessible description of these series and their history; this paper is very much a preliminary attempt to provide one.

Pre-War Development

The origin of the Western Front Small Scale Map series provides a clear example of the complex inter-relations of the Ordnance Survey and the Geographical Section General Staff, with Charles Close involved on both sides. The GSGS was created (as the Topographical and Statistical Depot of the War Department) during the Crimean War when British military mapping of the area chosen for war, and the holdings of Russian maps that might be used to remedy this, were found to be non-existent³. Forty-five years later the preparedness of the minuscule Intelligence Department of the War Office (as it was then called) to fight the Boer War was little better. The maps actually used by the British forces in South Africa were not the unsatisfactory compilations of the IDWO and Ordnance Survey (IDWO 1367), but the copies of Jeppé's map of the Transvaal ordered by the

Transvaal government from Switzerland, which, by chance, were intercepted as they passed through Cape Town. No soldier, senior or junior, had thought to go to Stanfords to buy a few copies before they left. The scandal resulting when this became known led to some searching questioning by the Royal Commission on the South African War when it took evidence in December 1902.

Charles Close had been sent from Ordnance Survey to South Africa in January 1900, but was then invalided home in July 1900 with enteric fever^{4,5}. Following the publication of the Royal Commission's Report (1904)⁶, and Lord Esher's resultant creation of a modern General Staff, he was appointed head of the new Topographical Section General Staff in 1905. He built up the organisation vigorously. *The Textbook of Topographical Surveying* 1st edition⁷ came out the same year (not cited in Freeman) and in 1906 the first edition of the War Office *Manual of Map Reading and Field Sketching*⁸ was published (anonymously, but clearly written by Close, also not cited in Freeman). Both the Textbook and the Manual include a wide range of reproductions of overseas maps and clearly the push was on to provide TSGS (after 1907 GSGS) editions of mapping of any possible area of military action. The provision of map printing facilities within the new War Office (occupied November 1906) became part of this drive.

⁴ Charles Frederick Arden-Close, 1865-1952, T.W.Freeman, 1985, *Geographers Bibliographical Studies* 9, pp 1-13.

⁵ *A Man for his Time? Sir Charles Arden-Close*, C.I.M.O'Brien, *Sheetlines* 34, pp 1-7.

⁶ *Royal Commission on the South African War*. 1904 report: Cd 1789, Minutes: Cd 1790, 1791, 1792

⁷ *Textbook of Topographical and Geographical Surveying*, C.F.Close, 1905, HMSO, London

⁸ Successive editions and reprints of the *Manual of Map Reading and Field Sketching* (1906, 1912, 1914, 1921), HMSO, London, have been extensively consulted throughout.

¹ *Trench Maps, a Collector's Guide*, P. Chasseaud, 1986, Mapbooks, Lewes.

² *Topography of Armageddon*, P.Chasseaud, 1991, Mapbooks, Lewes

³ *The World in Maps*, W.W.Jervis 1936, George Phillip and Son, London.

The possibility of British involvement in a European war became a subject for active military planning from 1905⁹. The likelihood of any German attack on France being through Belgium was recognised. The production of maps of Northern France and Belgium was an obvious priority. The technology for producing facsimiles of monochrome maps had been extensively developed during the nineteenth century and was well established. The copying of colour printed maps was an unsolved problem, and could only be achieved, in the absence of the original reproduction material, by the time consuming process of redrawing the map and separating the colours in the process. Initially reproductions of the monochrome French 1:80,000 General Staff Map (*Carte de l'Etat-Major*) were produced with English marginalia, for example sheet 32 *Beauvais* printed at the Ordnance Survey 1909 without a GSGS number. Part of sheet 33 *Soissans* 1909 is reproduced by Chasseaud (1991 p 12), although the caption is not strictly correct.

More elaborate efforts then followed. The multicoloured Belgian 1:100,000 map was redrawn at the War Office, copper plates were photoetched at Ordnance Survey, and then printed at the War Office. This was GSGS 2364. From the dates on the early sheets they were produced between 1910 and 1912. A single sheet map of Belgium and the North East of France at 6 miles to the inch (1:380,160) was prepared (GSGS 2517). At the same time the northern sheets of the 1:80,000 map of France were revamped by overprinting longitudes from Greenwich and guesstimate contours. This contoured map was GSGS 2526.

The Belgian 1:100,000 series GSGS 2364 was laid out as ten full sheets (of which sheet 4 *Maeseyck* was not initially printed) together with a small sheet 7A of Mons (an afterthought, it does not appear on all the early indexes). The projection was polyconic. The sheetlines were the graticule. The sheets were completed to the margin where they covered non-Belgian

territory. They did not quite cover the entirety of Belgium along the French frontier as can be seen in Figure 1.

The 1:80,000 series of France with contours and Greenwich longitudes, GSGS 2526, preserved the sheetlines and numbering system of the *Carte de l'Etat-Major*, except at the junction with the Belgian series and at the coast. Here a number of non-standard sheet sizes were created to avoid small scraps of coastal land on separate sheets, and to mesh with the Belgian sheets (see Figure 1). Sheet 8 (originally *Douai*) became a portrait format sheet titled *Lille* (1912), to avoid having to produce a separate sheet 5. This had the effect of creating a gap between the two series which was covered by the additional Belgian sheet 7A *Mons*. French sheet 24 also was altered to portrait format; however this produced a far more convincing fit with the Belgian series. The magnetic variation diagrams preserve the dates of the uncontroled maps. The contoured French series did not extend further south than Laon, and totalled sixteen sheets. South of this the uncontroled maps remained current, were issued, and have survived to enter private collections.

GSGS 2517 of Belgium and North East France at 1:380,160 was a very elaborate layered map. Drawn on a conical projection with two standard parallels, with sheetlines based on the Paris meridian but a graticule based on Greenwich, It had 14 separate layer shades including four depths of sea. The map was drawn at GSGS then photoetched at Ordnance Survey. The plates originally bore the date 1910, but all copies seen have had this rather transparently altered to 1912. The 1914 additions to the *Manual of Map Reading and Field Sketching* 1912 refer to this as "the strategical map", and state that it was only issued to the Staffs of Corps and Divisions.

Secrecy was in vogue¹⁰ and these maps were not publicised even in the 1912 edition of the *Manual of Map Reading and Field Sketching*, which contained the same example plates of European maps as the 1906 edition despite a very different selection of non-European maps.

⁹ *British Military Intelligence, 1870-1914*, T.G.Fergusson, 1984, University of America Publications Inc., Frederick, Maryland.

¹⁰ Official Secrets Act, 1911

Figure 1 Index diagram of 1914 states of
GSGS 2364 and 2526

The posting of Charles Close from GSGS to be Director-General of the Ordnance Survey in 1911 seems to have brought development of these series to a halt. Even after the war they were clearly regarded as Close's creation¹¹. One can speculate whether sheet 4 of Belgium would have been printed if his posting had been delayed.

The Outbreak of War

The mapping available at the beginning of the war is described and illustrated in the October 1914 additions appended to the 1912 *Manual of Map Reading and Field Sketching*. Huge numbers of copies of the Manual with Additions were printed at various dates through the war. Copies with print codes in 1914 and 1915 include as plate 25 an index map showing the 1914 state of GSGS 2364 and 2526 (see Figure 1). The example plate 11 of the German 1:100,000 series is no longer the pre-war one of Neheim but a gridded map of Coblenz, by implication representative of the projected GSGS series. The French 1:80,000 example plate however was not updated from the uncounted 1906 map of Mouzon. The contoured 1:80,000 was not illustrated until the 1921 edition, five years after the map was superseded!

In addition to the maps described above, a further series (GSGS 2733 & 2738) at 1:250,000 covering France, Belgium and part of Germany was produced in 1914, and also described in the 1914 additions to the Manual. Four sheets (nos. 1, 2, 4, & 5) covered Belgium on the Belgian Bonne projection as GSGS 2733. The French sheets (GSGS 2738) reproduced the French Service Geographique de l'Armée 1:200,000 Type 1880 maps, each covering the area of four 1:80,000 maps, and hence lay obliquely to the Belgian sheets as shown in Figure 2. The Belgian sheets were prepared at the War Office with August 1914 imprints. The French ones bear Ordnance Survey imprints and judging by the marginal index diagrams were produced later in 1914. The series as a whole was titled "North West Europe", which betrays a limited view of the size and shape of the continent!

Surviving maps are almost all folded with direct printed integral cover panels on the reverse including an index map. The cover panels frequently record a later stage of the development of the series than that recorded on

the face. This implies that the maps were stored as flat sheets after printing and only had the cover panel printed when folding for issue. The earliest covers seen group the sheets into "Sets" presumably issued together. For example Set C included Belgian 1:100,000 sheets 2, 3, 5, 6, & 7; Set A was Belgian sheet 1 with French 1:80,000 sheets 2, 3, 4, 6, & 7; Set D included Belgian sheets 7A, 8, & 9, with French sheet 8, and Set P included sheets of Germany east of Belgium. Initial provision of these maps was generous; Hedley¹² quotes that three or four hundred thousand maps were apparently lost in the retreat from Mons.

When the British Expeditionary Force started to use the maps problems rapidly arose. While the Belgian 1:100,000 map was good, most of the ground it covered ended up in German hands very rapidly. The French 1:80,000 map was found to be grossly out of date, inaccurate and the height representation wrong. Woodland representation was intimidating and obscured any other information. Despite attempts the map could not be enlarged satisfactorily. While the war remained mobile these things had to be coped with. For the Battle of the Aisne in September 1914 an isolated new French "Type 1900" 1:50,000 sheet existed and was used (Chasseaud 1991). However when the British section of the Western Front settled down more or less at the junction of the Belgian and French mapping systems it became clear that the only practical course was to replace the French series with new maps compatible with the Belgian series.

War-time Development

Sheet 4 of the Belgian 1:100,000 series was produced in February 1915 by the War Office. The index diagram in the margin does not include any sheet numbers or sheet 7A *Mons* suggesting that some at least of the preparation of the sheet

¹² *Ibid.*

¹¹ Discussion in *Geographical Journal* 54, p25 W.C.Hedley, 1919, ,

Figure 2 Index diagram of northern sheets of
GSGS 2733 and 2738

Figure 3 Index diagram of GSGS 2364 May
1916

had been done in 1910 with the others. The first addition to GSGS 2364 was sheet 5A *Hazebrouck* produced by Ordnance Survey early in 1915. The use of a suffix rather than a brand new number suggests that at this stage wholesale extension of the series had yet to be planned. Shortly after this, Sheet 7A was dropped and replaced by a new full size sheet 11 *Lens*, also produced by Ordnance Survey. Judging by the sequence of sheet diagrams Sheet 12 *Valenciennes* seems to have been issued at the same time bearing a War Office imprint dated May 1915. At this stage the design of a numbering system for further additions to the series was clearly an issue and sheet diagrams include two unnumbered unnamed sheets eventually to be 18 and 19.

Through 1915, 1916 and 1917 further 1:100,000 sheets were issued, now on a sheet numbering scheme extending the existing series in an organised and extendible way (see Figure 3). With the exception of sheet 13 *Calais* (OSO 1917) all of these bore War Offices imprints giving month and year. Sheets 22 *Soissons* (January 1917), 1A *Dunkerque* (February 1917) and 13 *Calais* were the last new sheets. Sheets 20 *Rouen* and 23 *Reims* appear, as in preparation, in the index on the margin of one state of the 2nd edition of sheet 12 *Valenciennes*, but seem not to have been completed (but see below for GSGS 4336).

The new sheets were not based on any new survey. The resurvey of the Western Front did not start until 1915 and did not cover extended areas until much later. However comparison of the old and new shows that the 10 metre contours of the new maps were completely new, owing little to the 20 metre contours of GSGS 2526. How much this represents a drawing room exercise based on the 1:80,000 spot heights and hachures, and how much the new levelling of France was used is unclear. Construction of contours from the hachured map had been studied by the French General Staff. The drawing of the map was thought to allow a semi-mathematical construction of contours based on reconstructing gradients from the intensity of the hachuring, and manuals were produced describing the process (for an English

version see Maxwell¹³). Nevertheless at best this was intuitive, to the point that it was described as an after dinner entertainment, particularly when trying to apply it to the larger scales.

The production of the new sheets allowed the contoured 1:80,000 map to be abandoned. The April 1916 printing of the *Manual of Map Reading and Field Sketching* includes the same text as before but on an erratum slip is a note that the French 1:80,000 series was superseded, and a new Plate 25 dated May 1916 shows only the then current state of the 1:100,000 series.

The October 1914 Additions to the *Manual of Map Reading and Field Sketching* stated that new railways had already made the Belgian maps out of date. Second editions were eventually produced of 1:100,000 sheets 2 (1916), 5 (1917), 5A (1916), 8, 11 (1916), 12 (April 1916) and 17 (October 1916) with updated railways and in the case of sheet 12 at least, updated canals.

Three 2nd edition 1:100,000 sheets (5, 5A, 11) are known in states with hill-shading (in the style used for the contemporary British 1/4" maps), although unshaded states also occur. There is no comment about this addition either on the cover or the margin of these sheets and in low relief country (particularly when the map is grubby) its presence is easily overlooked.

Different layouts of the marginal information exist for several 1:100,000 sheets. The original layout includes extensive reference lists in a broad south margin. A second version has a much reduced south margin, and the reference list and index diagram are in the east margin. No obvious reason for this is shown and it appears that both styles were in use for both the first and second editions of sheet 11. Both styles exist with and without hill shading. Parallel sets of the reproduction material clearly existed for both editions. Sheets with only War Office imprints seem generally to retain the original style of margins. Ordnance Survey productions or reprints often (but not always) seem to have the modified style. This layout does fit the map onto a smaller sheet of paper. Whether this indicates economy or the

¹³ *The Military Map – Elements of Topography*, G.Maxwell, 1918, Enlarged Edition, Macmillan, London

dimensions of different printing machines I do not know.

An addition to the marginal information was made in both of these layouts when instructions on using a crude map reference system based on the graticule were given. The text assumes a knowledge of the system of squaring used on trench maps and seems to have been added at some stage later than October 1916 (when sheet 17 was printed without it). All sheets with 1917 imprints that I have seen include it. The addition of this note to the marginalia did not lead to any change in the imprint dates on the maps. When present it does suggest a later date of printing than October 1916. It frequently occupies the space previously occupied by a list of GSGS sales agents.

The 1:250,000 map also evolved as the war progressed. The initial sheets of the map were felt to be over-generalised¹⁴. In February 1915 sheet 1 was reissued by the War Office in an extended and revised version covering part of the area of sheet 4 as far south as Valenciennes. Initially this bore the number GSGS 2733b but the suffix soon disappeared. I have not established the sequence of production of outlying 1:250,000 sheets, however sheet 1A produced by Ordnance Survey in 1917 is interesting in providing 1:250,000 mapping of south-east England including London long before this scale was accepted for civilian use!

Derivatives

Outline versions of the 1:100,000 mapping were prepared for overprinting of tactical information¹⁵, and for the First Army, Second Army and Third Army Areas special outline sheets were prepared (GSGS 3151 etc.). However, not all the outline versions carry GSGS numbers: examples seen of this include an outline print of sheet 11 and the outline First Army Area 2nd Edition. *Special Railway Maps* were produced with coloured railways on an outline base. These went through multiple editions (a dense but changing network of

railways was built to supply the trenches). *Road and Bridge Maps*, *Maps of Water Supply* and *Battle Situation Maps* (often called *Enemy Order of Battle Maps*) were similarly produced.

During the summer of 1917, because of the difficulty of transferring information between the gridded large scale maps and the ungridded 1:100,000, gridded 1:100,000 outline maps were produced using reductions of the 1:40,000 map assembled to form large composite sheets. GSGS 3621 *Cambrai* was a portrait format sheet produced in this way by Ordnance Survey in September 1917 which remained in use until the end of the war. It covered the area where sheets 11, 12, 17, and 18 met. Similarly, GSGS 3654 was an untitled outline base map in landscape format of much the same area produced by Ordnance Survey in April 1918. Both were used as bases for printing *Battle Situation Maps*. The writing is tiny but the grids match those of the large scale maps.

The range of 1:100,000 derivatives was huge and I have certainly not reviewed even a representative selection. As with trench maps the base maps were prepared in England but over-prints were prepared and printed in France. After the establishment of the Overseas Branch of the Ordnance Survey in April 1918 many were printed there. Most of these editions must have had very restricted circulation and currency. They have survived in even more restricted numbers.

Derivatives of the 1:250,000 map also exist. One particularly interesting derivative is the *Flying Map* which was produced as separate 12" squares of the map (presumably to fit the map case used in aircraft) each with a compass rose on the face, and only one north margin containing the scale, sheet number and printing information. These were produced by Ordnance Survey for the Admiralty War Staff, Intelligence Division as AWS(ID 1073) in 1916. The index map shows 43 sheets. I assume they were intended for Royal Naval Air Service units. Other experimental flying maps at this scale were produced with unconventional colours but were rapidly abandoned¹⁶.

¹⁴ *Manual of Map Reading and Field Sketching*, 1921

¹⁵ *Ibid.*

¹⁶ *Ibid.*

The End

Full intercompatibility of the maps of the Western Front was never achieved. The system of "squaring" of British large scale maps of the western front was based on the metric rectangular sheet lines and Belgian Bonne projection of the large scale maps, but was in yards and separate for each sheet. The 1:100,000 map was a series of graticule sheets with polyconic projections. The 1:250,000 was drawn to two different Bonne projections, one Belgian and one French. The problem of providing orthomorphic maps and grid systems for the Western Front attracted a good deal of thought¹⁷ ¹⁸, but in fact the small scale maps remained ungridded, and unco-ordinated with the large scale series. Perhaps an additional reason for the absence of grids on these maps is that squared maps during the early period of position warfare were seen primarily as artillery maps. More general use of grid reference systems only developed secondarily. Plans were well advanced in 1918, following the unification of allied commands early in the year, to discard the different yard grids (and for the Belgians to discard their metric theatre grid), and to adopt the French Lambert Zone I grid across the whole Western Front. The Armistice led to the abandonment of this. However by the cessation of hostilities the obsolescence of all British mapping of the Western Front was clear¹⁹ ²⁰ ²¹.

Eventually, when rearmament came in 1938 for the next European war, new British mapping of northern France was prepared. Even then much of France had not been resurveyed since the nineteenth century, so existing materials

were recycled²². GSGS 2364 was revamped with revised sheet numbering as GSGS 4336. This series included two sheets that would have been 23 and 24 in the Great War series, but discarded the old sheets 14 and 16. GSGS 2516 did not reappear, but the original 1:80,000 French mapping remained current for much the country in an enlargement to 1:50,000 ("Type 1889"), and therefore was used for GSGS 4040 A&B at that scale. The sheets of GSGS 2738 south and west of Paris were revised and reissued. Those of the Western Front area were replaced by GSGS 4042 of France, Belgium and Holland, based on GSGS 2733 with substantial revision and new sheetlines. GSGS 2517 remained available.

After the Great War the small scale maps were rather ignored when the cartographic achievements of the war were being described. The large scale surveying and mapping of the later part of the war had required such immense effort that even Charles Close²³ dismissed the earlier small scale maps. Winterbotham wrote extensively but largely ignored them, perhaps because he spent the entire war in France and was not involved in the production of small scale maps in England. Some post-war reprinting of the maps did take place, notably for the many volumes of the *Official History of the War*. The most accessible retrospective of the small-scale Western Front maps is probably in the *Manual of Map Reading and Field Sketching* (1921), which includes example plates of the main series. It is also a prospectus for the post-war development of the British System of metric gridded maps.

²² *France, 1944*, Naval Intelligence Division, Geographical Handbook Series, and indexes in, for example, *Through-way Town Plans of France 1944*, GSGS Misc 77(1).

²³ Articles "Maps", C.W.Close, 1922, 1926, 12th and 13th editions, Encyclopedia Britannica.

¹⁷ *Map Projections*, A.R.Hinks, 2nd edition, 1922, Cambridge University Press

¹⁸ *Maps and Survey*, A.R.Hinks, 2nd edition, 1923, Cambridge University Press

¹⁹ *Ibid.*

²⁰ *British Survey on the Western Front*, H.S.L.Winter-bothom, 1919 *Geographical Journal* **53** pp253-276

²¹ *Geographical Work with the Army in France*, H.S.L.Winterbothom, 1919, *Geographical Journal*, **54**, pp12-28

Acknowledgement

Throughout this article I have relied principally on the maps in my own collection, supplemented by the maps of the Liddle Collection of the University of Leeds. Peter

Liddle, its keeper, has allowed me great freedom to explore this major collection.

For purely practical reasons I have not consulted the Public Record Office. Clearly a far more definitive account would have resulted had this been possible.

APPENDIX

GSGS Numbers of Selected Maps of the Western Front and Surrounding Areas
(From various sources)

2364	Belgium & later France 1:100,000 1910
2516	France 1:80,000 (contoured) 1911
2517	Belgium and NE France ("Strategical Map") 1:380,160 1910/12
2731	Index to Maps of Belgium and NE France (Book index of names on pre-1914 1:100,000 and 1:80,000 sheets)
2733	North West Europe (ie Belgium) 1:250,000 1914
2733b	Used for early prints of sheet 1&part4 of 2733
2738	France (North West Europe on covers) 1:250,000 1914
2739	Germany 1:100,000
2740	Germany 1:250,000
2742	Belgium and France 1:20,000 1914
2743	Belgium and France 1:40,000 1914
2758	Europe 1:1,000,000 1915-1945
2813	Index to GSGS 2364 1916
2847	Germany 1:200,000 1917 & 1919-1936
3024	Western Theatre of War 1:1,000,000 1915
3062	Belgium and France 1:10,000 1915
3134	First Army Brigade Trench Maps 1:10,000 1915
3151	Second Army Area 1:100,000 Outline 1917
3621	Cambrai 1:100,000 Outline Sept 1917 (from 1:40,000)
3654	Lens, Valenciennes, Amiens, St Quentin 1:100,000 Outline April 1918 (from 1:40,000)

Spring Meeting, Bath, Saturday, 12th March 1994

The topic for the Spring Meeting was "My favourite OS discovery – maps or related ephemera" with members asked to bring three (or so) items to show. Thus, on a most beautiful March morning, 16 members found themselves quietly seated in a semi circle ready to see what Mike Cottrell had in his bag. First of all he produced a lovely Bristol District map on Place's waterproof paper with the Ellis Martin cover of the Clifton Suspension Bridge; a very appropriate map to start with as we were in Bath, only a few miles from Bristol. Mike encouraged us to come closer and feel the special qualities of the Place's paper. From this point on, seats and quietness were both abandoned and serious examination of maps and discussion about maps began. A Middle Thames One-inch followed, also on Place's paper; and then two maps both hand assembled by Stanfords from 3 or 4 One-inch maps with Birchgrove House at the centre of one, and Harwood Lodge, Hungerford, at the centre of the other.

Then, with a flourish, Mike produced an example of "Major Ansell's Patent Mounted Map of the South of England". With deft movements he demonstrated its folds. I wasn't too sure how it was folded or why — but it seemed like magic to me.

That is how the day continued, as maps were conjured out of thin air like white rabbits out of a top hat.

"Nothing up my sleeve — but here is a Stanford Bridges Patent mounted map of "The Vale of the White Horse". See I open it; fold it up; fold it left; and down and right; and right and down; and then up again. "

"Now where am I?"

"Lost, most likely!"

Maps appeared from this pocket, that carrier bag — and where did Steve Simpson get that enormous map from? It consisted of 7 or 8 One-inch 3rd Edition Large Sheet Series maps joined together covering North Wales and Cheshire. It also took 7 or 8 people to hold it and fold it.

What was it used for? Nobody was too sure, but one idea was for Army recruitment.

Several other maps were for military use. David Watt had a Russian map (base information copied from the OS) of Chatham which showed very clearly all the features of the docks that the Ordnance Survey maps choose not to show. Even then the OS versions were not consistent with what they included or omitted — some features coming and going randomly: more confusing to UK map users, (but much more interesting) than to Russian target spotters, I should imagine.

Others brought home the fact that the map was just a prop to hold together and present some sort of information that was useful, indeed a matter of life or death to the intended user.

Several First World War Trench Maps of France showed this very graphically. The Enemy fortifications were marked in red and the Allies in blue. There were so many trenches and so very close together; the red trenches looked like weal marks on a body. It brought home to me how so many lives were so easily lost during the battles in that war.

A more modern example was a RAF "Powerline and Obstruction map" overprinted on a 1:50,000 Landranger - watch out for that pylon! Another military map for a particular purpose was an Aldershot Command 1907 Manoeuvre map of the area around Aylesbury with strict instructions to KEEP OUT of certain areas and in particular the grounds of the local stately homes.

Nearing the end of the afternoon Richard Oliver produced an Irish 1:50000 sheet 54 which had a rather dull map on one side but a stunning satellite photograph of the same area on the other side.

There were examples of guide books with OS maps, invitations with OS maps, a Trig Point Adoptions certificate from the OS. There were OS maps of Skye, The Eastern Counties, Snowdon, Exmoor, Glasgow, Kent, Ilkley and places beyond.

The meeting broke up at about four o'clock.

Thank you to Lionel Hooper for making the arrangements and finding the excellent venue of the Manvers Street Baptist Church Hall. Also, many thanks to those members who brought

along a fascinating selection of obscure and interesting items, which are rarely seen by such an appreciative audience.

Peter Stubbs

A “new” old retailer?

Three Old Series maps of northern England, packaged by Burghope and Strange of Burnley, Lancashire, have come to light. The firm seems to have run the “manufacturing stationery works” referred to at the bottom of the back covers of the two maps. Much of the back covers is devoted to maps available at the time the covers were printed (the date, *midsummer 1877*, being usefully provided). The “covers” in fact consist of pink paper labels pasted directly to a fold of the cloth on which the dissected maps are mounted. Two of them, *Burnley No. 1* and *Ilkeley, Bradford, and District*, consist respectively of sheet 92 SW, and sheets 92 NE and 93 SE combined. *Burnley No. 3*, the third map seen, is a very neat composite which has been given a standard piano–key border all round. None of the maps retains any marginal matter. Is any thing known of this mapseller’s history, and did the “others in preparation” ever appear?

Tim Nicholson

New maps

Ordnance Survey of Great Britain

New publications between 1 November and 31 December 1993 included

Conventional paper maps:

1:50,000 *Landranger* (2nd Series): revised sheets: 73, 90, 159, 172, 182 (all edition B).
(`B' editions of Sheets 116 and 183 have been published subsequently;
a `B' edition of Sheet 89 is expected shortly.)

1:25,000 *Pathfinder* (2nd Series): revised sheets: 890 (SJ 60/70); 960 (TL 27/37)
(both edition B).

County street atlases (pocket size): *Berkshire*; *Hertfordshire*. (*Buckinghamshire*, *Nottinghamshire*
and *Surrey* have already been published in this format: all are softback, £4.99 each.)

Digital mapping:

No new `products' have been `launched', but *Publication news* 1/1994 lists the following
summary of what is at present available:

- *Land-Line*: Large scales topographic data to OS 88 or OS 93 specification [1:1250 and 1:2500 scale].
- *ADDRESS-POINT*: Digitally coordinated postal address gazetteer.
- *OSCAR*: Ordnance Survey Centre Alignment of Roads.
- *Boundary-Line*: Administrative area polygons data.
- *ED-LINE*: 1991 Census Enumeration District Polygons Data.
- *Urban-Areas.91*: Urban area polygons data linking to 1981 and 1991 censuses.
- *Scale Black and White Raster*: Raster data from 1:10,000 scale published mapping.
- *Scale Colour Raster*: Raster data from *Landranger* published mapping.
- *Scale Gazetteer*: Definitive names data from *Landranger* published mapping.
- *Land-Form PANORAMA*: 1:50,000 scale digital height data.
- *Scale Height*: 1:10,000 scale digital height data.
- *Strategi*: 1:250,000 scale vector digital data.
- *BaseData.GB*: 1:625,000 scale vector digital map data.

(The apparent eccentricities of capitalisation are Ordnance Survey's.)

Incidentally, though progress in extending Superplan coverage continues apace (it is even starting to reach such strange places as Exmouth (but *not* Exeter), Grimsby, King's Lynn and Lincoln), as yet only one 100 km square has been wholly converted, TR (east Kent), which is mostly sea! About 75 per cent of TQ (which includes Greater London) has been converted. Historic counties wholly or almost wholly covered by Superplan include Glamorgan, Kent, Linlithgowshire (West Lothian) and Middlesex; counties with substantial coverage include Bedfordshire, Buckinghamshire, Cheshire, Essex and Warwickshire.

Ordnance Survey of Ireland

The following 1:50,000 *Discovery* series sheets have recently been published:

`Preliminary edition': sheets 1, 2, 3, 10, 11, 37, 38, 75.

`First edition': sheet 56.

Ordnance Survey of Northern Ireland

The following 1:50,000 *Discoverer* series sheets have recently been published:

First publication: Sheet 36A

`Reprinted with amendments': Sheets 4, 5.

The 1:2500 in the Republic of Ireland

The Ordnance Survey of Ireland's annual report for 1992 announces that revision at this scale has been discontinued, and replaced by aerial resurvey. The initial areas resurveyed will be in response to demand, and the new series will be known as the 'Digital 25 hundred' series.

The Godfrey Edition

Between 3rd December, 1993, and 9 March, 1994, coverage was extended to the following towns: Ashton-under-Lyne; Dewsbury; Douglas; Dukinfield; Forfar; Hadfield; Halifax; Leighton Buzzard and Linslade; Ludlow; Peel; Polmont; Ramsbottom; Saltburn by the Sea; Shildon; Southsea; Stockton-on-Tees; Stonehaven; Templecombe; Wells; and Wincanton. (The Peel map is the 700th map to be published in the Godfrey Edition.)

Richard Oliver

(Editor's note: I have been asked for Alan Godfrey's address, and for the benefit of all members it is: Alan Godfrey, 57-58, Spoor Street, Dunston, Gateshead)

Historical Transport Map of Wiltshire, Neil Butters, 1993; pub. Transmap, 25 Tithe Barn Crescent, Swindon, SN1 4JX. Price £3.95 folded, £4.95 flat.

Although this is not an Ordnance Survey map (the cartography is by European Map Graphics, Alberto House, Hogwood Lane, Finchhampstead, Berkshire), it will be of interest to the majority of members as it is an excellent source of information relating to railways, canals and airfields.

Neil Butters is a member of the Charles Close Society, and has spent many years compiling the information given on the map. but because no publisher showed interest in the map Neil has published it himself.

The underlying map is a Bacon's County Map of the 1930s printed in grey at a scale of 1 inch: 1.633 miles (1:103470). I think that it could be printed heavier so that the information contained on it is more legible. The area outside the Wiltshire boundary is coloured light green, which actually made the Bacon's map information easier to read.

Each of the original main railway companies (Midland and South Western, London and South Western, and Great Western Railways) is shown in a strong individual colour, with miscellaneous

lines, including standard gauge private owner sidings and narrow gauge, shown in a bright orange. Opening and closing dates are given for both passenger and goods services.

Canals are shown in a light blue with the position of each lock with its number clearly shown. Airfields are indicated by an orange aeroplane with opening and closing dates also given. There were some 35 airfields open in Wiltshire during World War II.

The price differential is because the flat map is printed on a thicker quality and higher priced paper.

This is an excellent production and worthy of purchase for the information contained on it. Without knowing the information on the map intimately, the only "error" that I could immediately see was in the conventional signs panel: amusingly, the airfield symbol is shown with an example Opening and Closing date of "1859-1902" (or does Neil know something the Wright Brothers didn't). I hope that Neil Butters will produce other maps showing such information.

Lionel Hooper

Additions to the list of OS mapping of the Channel Islands given in Sheetlines 36

1 *Jersey 1:31,680*

Heliozincographed at the Ordnance Survey Southampton 1902. Surveyed by No. 3 Survey Section RE 1901. This exists with printcode 1.06. (Black outline, brown contours, blue inland water, green sea.) MV not dated.

Sold with an adhesive label cover on the reverse of the map (see photocopy). Price 2/- on cloth. The label appears to be an omnibus label on which different retailers names could be printed.

2 *Jersey 1:31,360*

The map by BKS from April 1958 aerial photography exists in a state "New approach road and airport extension added 1960". Produced by BKS Air Survey Ltd. for the States of Jersey. Printed by George Phillip Printers Ltd. Bender fold, uniform with contemporary 1:15,840 map. Cover title "Official Map of Jersey". Price 3/6 (paper).

3 *Jersey 1:25,000*

States of Jersey Official Map. Published by Hunting Surveys Ltd. from air photos dated August 1965. UTM Grid. Copyright 1968. MV 1970. Bender fold with orange laminated cover design showing outline of Jersey. Price 6/6 (paper).

4 *Jersey 1:15,840*

The single sheet edition "with new approach road and airport extension added 1960" implies that a 1958 edition exists. The 1960 edition is printed George Phillip Printers Ltd. Bender fold cover uniform with 2 above titled "Official Map of Jersey". Price 10/6 (paper).

5 *Guernsey 1:21,120*

Revised 1933, printed 1934. This exists in edition D still bearing the 1000 yard grid. Bender fold. Cover Hellyer 96.4. Price 4/- paper.

The Ordnance Survey 1:25,000 maps family —Isles of Scilly Maps

John Symons writes that following Richard Oliver's article in *Sheetlines* 38, he fetched out his own collection of the 1:25,000 Provisionals for Cornwall, especially those for the Isles of Scilly. He has three Provisionals for the islands, viz. SV 81 (two editions), SV 91 and 00/80.

Marginal and other details are as follows:

<u>Ref</u>	<u>Pubⁿ</u>	<u>Code</u>	<u>Price</u>	<u>Cover</u>	<u>Compilation</u>
SV81	1951	A	4/6	H107	Compiled from 6" sheets last fully revised, in 1906. Other partial systematic revision, 1931, has been incorporated.
SV81	1960	B	5/6	H107	Compiled from 6" sheets last fully revised, in 1906. Other partial systematic revision, 1958, has been incorporated. © Crown Copyright 1960

SV91	1950	A	4/6	H107	Compiled from 6" sheets last fully revised, in 1906. Other partial systematic revision, 1931, has been incorporated.
00/81	1951	a	4/6	h98	Compiled from 6" sheets last fully revised, in 1906. Other partial systematic revision, 1931, has been incorporated.

SV81 covers the north west islands: Bryher, Tresco and the smaller islands; SV 91 covers St Mary's and St Martin's; and 00/80 covers the south west islands and St Agnes.

The West Cornwall sheets have publication dates of either 1950 or 1951. These sheets have dual reference, e.g. "SHEET SW42 (10/42)". Why was 00/80 published with the old grid reference system, yet contemporary with the new? When was the change made from the numerals to the letters? The two other Isles of Scilly sheets have only the new reference for their titles. Thus it would appear that three reference formats for titles were used simultaneously: 00/80, SW42 (10/42) and SV91.

He notices some later printings have the additional note "Republished with modified grid reference system 1953", but cannot see any change except for point size of the typeface when comparing with the earlier printings. What are the modifications?

Finally, the 1964 composite sheet has the same compilation as the 1960 printing of SV81 above, except that the copyright date is changed to 1964. This map, incidentally, was reprinted with minor changes in 1969.

Thus with reference to Richard Oliver's article in *Sheetlines* **38**, there are three 1:25,000 Provisional Maps for the Scilly Isles. Also, the 1964 composite, according to the 1969 reprint, made no use of the 1933 map, although in fairness to Richard Oliver, John Symons does not believe that he is making that specific point.

1:25,000 — Regular Edition

Turning briefly to the article in *Sheetlines* **36**, he has a small number of the Regular Edition, SX 46, 55 and 56. These all have an insert pasted in entitled:

Ordnance Survey
Two-and-a-Half-Inch Map
Regular Edition

below which is a diagram of the sheetlines of the eleven Regular Edition maps, and followed by the note:

The Regular Edition of the new Ordnance Survey map at a scale of Two-and-a-Half Inches to One Mile has been published for the eleven sheets bounded by the thick lines (SX45 .46 .47 .55 .56 .57 .64 .66 & 67) in the index above.

Maps of areas outside these limits of the thickened lines have not been published in the Regular Edition, but are available in the Provisional Edition.

A Response from Richard Oliver

John Symons raises several interesting points. The reason why I wrote some utter rubbish in *Sheetlines* 36 as to the Isles of Scilly not being mapped in the 1:25,000 Provisional Edition until 1964, was that I misinterpreted something in a 'closed' Public Record Office file, OS 1/183, which will not be 'open' until January 1995. I suspect that the continuing availability until 1964 of the two-inch map of 1933 must have drawn away much of the potential market for the 1:25,000 sheets, which would explain why these sheets don't often seem to be met with. It is odd that the two-inch was retained once the 1:25,000 had been published; it suggests a lack of co-ordination within OS!

The reason why some 1:25,000 sheets dated 1951 have the old grid reference system and some the new is that the changeover from identifying 100 km squares by numbers to identifying them by letters took place during that year. It seems that from 1951 the usual practice when reprinting all maps carrying the National Grid, even when no other changes were made, was to modify the grid to the new system; as well as changing the 100 km square designations, this involved changing the figures in the top and bottom margins so that they were now 'right way up' rather than at right angles. Sometimes there is a footnote referring to this; sometimes the change was effected silently. There do seem to be quite a number of 1:25,000 sheets dated around 1950 which carry the later style of grid and which thus cannot be other than undated post-1951 reprints. The early history of 100 km square designations by the OS is somewhat

confused: in 1939 the 1:25,000 pilot sheets were identified by an all-number system, whereas the One-inch New Populars printed in 1940-1 used a system of letters (repeating every 500 km) for identifying 100 km grid squares. By 1945 the 100 km squares were being identified by numbers (as were the new 1:1250 National Grid maps), with a 'N' prefix for the squares above 1000 km north. The War Office would have none of identifying 100 km squares by numbers (except for sheet numbering), and after a brief period when the War Office editions of OS maps carried a War Office version of the grid using letters, effected by a purple overprint in which 'MILITARY SYSTEM' was conspicuous. The OS was persuaded to fall into line with the War Office, and adopt letters, though whereas the WO used single letters repeating every 500 km, the OS used pairs of letters which would only repeat far away from the British Isles! This difference of practice survived until at least the demise of the One-inch Seventh Series in the mid-1970s.

Mr Symons mentions the insert pasted into the covers of the eleven 1:25,000 Regular Edition sheets of 1956. There was an element of 'trial marketing' with these sheets, and sales were carefully monitored. I don't know how long the pasted-in inserts lasted, and whether they are to be found inside the covers of the 'B' editions of these sheets (published 1959-60), or whether they are only found inside the covers of the initial issue of the 'A' edition but, as adding such stickers is labour-intensive, I suspect the latter.

Did the Ordnance Survey only record what existed?

Rob Wheeler writes from Princes Risborough:

John King (*Sheetlines* 38) asks whether the Ordnance Survey ever showed proposed constructions, in particular proposed railways. I suggest that a more useful way of posing the question is to ask at what stage of completion the OS showed railways.

The extension was authorised on 28 March, 1893. It was opened for coal traffic on 25 July, 1898, for passengers on 15 March, 1899. Meanwhile the OS revised New Series One-inch sheets 156 and 170 covering its route through Leicestershire in 1897 (published 1898) and 1898 (published 1899) respectively.

Although work must have been well advanced by 1897, the new railway is not shown as such. However, on close inspection, indications of the work can be seen: a spit of land across Swithland Reservoir marking its future path, a mineral branch¹ to Mountsorrel granite quarries, a blank space where Leicester Central station was to be, swathes cut through 2 small woods, a couple of diverted streams, rather more minor diversions of roads (including the future A426 south of Lutterworth) and, on one such diversion NW of Ashby Magna, an under-bridge (though with nothing going over it).

There seem to be two possible explanations for this state of affairs:

a. the real date of survey (as opposed to final correction) was earlier than that stated and what were shown were the earliest construction works,

b. the OS categorised the whole construction as a temporary civil engineering works which (like temporary lines in quarries) it declined to show. However, a road that had moved to a new permanent course would be shown as such. Also, it would be wrong to show trees or water where they were no longer; but showing built-up area where a viaduct was in place or being built seems

to be acceptable — perhaps on the grounds that viaducts were only a series of industrial premises with an abnormally strong roof.

The problem with the first explanation is that completion of one quite ordinary bridge prior to any of the miles of cuttings and embankments to North and South seems inherently unlikely. One may also note that the line is carried across Swithland Reservoir on an embankment with a couple of short viaducts so that the two parts of the reservoir interconnected. At no time would there have been a flat spit extending unbroken across the reservoir.

The second explanation accounts for this in that the “spit” should not be interpreted as flat unbroken land at all but as a strip within which the OS declined to show anything. The road bridge at Ashby Magna is much more difficult to explain; perhaps it can be dismissed as an irregular concession to reality.

If the second explanation is indeed correct, a (passenger) railway would not have been shown until the permanent track had been laid. Or did the OS wait until trains were running? Has anyone looked at other instances of half-completed railways on New Series sheets?

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Roger Hellyer from Stratford upon Avon writes:

In response to John King’s question as to whether Ordnance Survey showed proposed constructions on any of its maps, I can report that this was certainly true in respect of some railways in the first half of the nineteenth century, when for a time it seems to have been OS practice to include railway lines on the One-inch map and Ten-mile map in accordance with the Acts granting Parliamentary sanction for those routes, rather than await the building the lines themselves. This resulted in the appearance of lines which either were not subsequently built, or appeared along different alignments. Cases which spring immediately to mind on the Ten-mile map were the Eastern Counties route from

¹ Can one have a *branch* from a non-existent railway?

Colchester to Norwich, to be replaced by the Eastern Union line; the Eastern Counties line from Norwich to Yarmouth, replaced by the Yarmouth and Norwich line; the alignment of the South Eastern route to Dover starting originally at Norwood rather than as built at Redhill; and the unrebuilt alignment of the Northern and Eastern going due north from Islington (as built it joined the Eastern Counties at Stratford). All these appear on State S-P8 (c. 1839).

On state S-1 (c. 1841) there appear the Birmingham and Derby Junction line from Whitacre to near where Stechford Junction now is, which as built became two routes, one to Hampton-in-Arden and the second into Birmingham itself; the Penarth branch of the Taff Vale Railway which was not built until much later, and then by another company; the Thames Haven Dock & Railway Company line from Romford to Shell Haven, which was never built; and an earlier alignment of the Great Western main line between Didcot and Goosey. Some, if not all, of these also reached certain printings of the One-Inch map as well.

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Richard Oliver writes that the position in short with Bartholomew mapping is that although the maps as first published were derived from OS sources, all revision was obtained independently, with railways, both open and projected, being supplied by the railway companies. (He hopes to write more on this in a future issue of *Sheetlines*.)

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Bill Henwood writes that the early 1:50,000 First and second Series sheets included a symbol for projected motorways, which the Ordnance Survey explained thus: ... *symbols have been introduced to show projected motorways with statutory approval, motorways under construction The two categories of incomplete motorways are depicted by a pecked blue line for a projected motorway (but without the deletion*

*of underlying detail) to which road casing can be added when construction begins.*²

Part or all of some two dozen projected motorways were so depicted between 1974 and about 1979³. Most were ultimately constructed, but in marking them before building commenced the Ordnance Survey apparently reckoned without public opposition to motorway schemes, and the vagaries of public expenditure plans.

Sheet 187 (*Dorking, Riegate and Crawley*) exemplifies the problems which arose. First Series Edition A, published in March 1974, shows the proposed route of the Leatherhead to Riegate section of the M25 following a line south of Tyrrells Wood and Nower Wood. Also marked is a proposed northward extension of the M23 from Hooley towards Croydon. The A/* reprint, published in September 1976, shows a quite different line for the M25, passing well north of Tyrrells Wood and Nower Wood. This latter route was eventually used, but this section did not open until 1985. In the meantime, the M23 extension was abandoned due to public opposition.

It may be that such uncertainties caused the OS to drop the symbol for projected motorways. In any event, a review of the 1:50,000 specification meant that by the end of 1979 it no longer appeared on the Conventional Sign sheets⁴, although it was still found in the legends of reprinted sheets as late as 1981⁵.

² *Ordnance Survey 1:50,000 Map Series of Great Britain*, Ordnance Survey Leaflet No. 50, March 1974.

³ The projected motorways shown include part or all of the M4, M8, M9, M11, M18, M20, M23, M25, M26, M27, M40, M42, M53, M54, M56, M58, M62, M66, M180, M181, M621, M876, A41(M) and A329(M)

⁴ *Symbols on Ordnance Survey Landranger Maps – 1:50,000 scale ... as at December 1979*. Ordnance Survey, 1979

⁵ For example, sheet 167, Second Series, A/*, published March 1981.

A Map in My Collection – 1

Main Roads of London: Bill Henwood and Roger Hellyer have written to say that this particular map was actually produced to go into the rear pocket of the Ordnance Survey Book *Routes Through Towns*, published in 1935, although both dated 1934. (The book's print code is O.S.O.-9019-2,000.) The book contained "... 131 diagrams clearly showing the main roads into, through, and out of, the principal towns of Great Britain — with indexes and descriptions of the Ordnance Survey Small

Scale Maps". The diagrams were enlarged versions of the street plans which were attached to the covers of the Third and Fourth Editions Quarter-inch maps of the 1930s. One assumes that since there was no equivalent route plan of London (the 20 sheet Six inch map being aimed at a different market) the *Main Roads of London* map was produced to fill a gap in the book. The print run of this book was 2000, and that of the map 3000, which leads one to presume that 1000 copies of the map in the ubiquitous standard brown cover (Hellyer 8.3.b.3) were sold separately.

Map in My Collection – 3

Worcestershire: Roger Hall has written to say that Tim Nicholson's Worcestershire map came from the pocket in the back of The English Place-Name Society's publication *The Place-Names of Worcestershire* by A.Mawer and F.M.Stenton in collaboration with F.T.S.Houghton (Cambridge University Press, 1927)

The following paragraph appears on page *x* of the book's preface:

To the care and skill of the Ordnance Survey Office and especially of Captain Withycombe and Mr O.G.S.Crawford we owe many services, including the map which accompanies this volume.

Mr Hall does not know whether any of the English Place-Name Society's other publications incorporate any Ordnance Survey material

A Map in my Collection — 4

I acquired a copy of a rather strange road atlas *The Souvenir Coronation Motoring Map of England and Wales*, Scale 4 miles to 1 inch, dated 1937, a few years ago but have not seen another copy since. Its existence has not been mentioned in *Sheetlines* nor the other publications of the Society. The following is a simple description of the atlas. I would be very grateful for any information about it that anyone has.

The volume is 10 3/4" x 6 1/2" landscape format. There are 44 separate leaves plus 2 cover leaves. All are of the same stiff board printed on both sides and coated with a glossy surface. They are punched twice and the holes are reinforced with metal eyes. Two metal rings 1" in diameter, which can be opened, pass through the holes and form a loose leaf binding.

The front cover is bottle green with the above titles in black and orange within a decorative border. A large royal crown is over the date to the right of the main title. Inside the cover there is an advertisement for Prices Motorine Oil featuring a photograph of a Rolls-Royce radiator grille.

The first leaf carries an "Index to the all weather road map of England and Wales" in instantly recognisable OS style at 60 miles to an inch. 87 sheets are shown in an unusual numbering system that spirals outwards from London. Southern England is demarcated from Northern England by a line from Aberystwyth to Lowestoft for no specified reason. Below the map is a rubric that appears on each of the

following sheets: "PATENT NOS. 180475 (Prov.) 19628 Map prepared at the Ordnance Survey Office Southampton Crown Copyright Reserved."

Succeeding pages are 86 sections of the 1/4" third edition map (the 87th section covering Berwick on Tweed would have required a blank reverse and was omitted). Sections 1-9 (South-East England) have most A-roads in red, although some newer roads appear in very crudely applied solid black. The numbers are in red in the usual script but aligned with the margin of the map rather than along the road as in the standard style. B-roads are shown by a dashed black infill and are numbered in black italic type. Some projected roads and roads under construction are shown. Golf courses are shown with a prominent flag sign. Railways carry their post 1923 identifiers. Sections 7, 8 and 9 have lists of hotels printed in the margins and carry the rubric "Published by General Sales Promotion Ltd., 11-12 Pall Mall. London, SW1." in addition to the OS imprint.

Sections 10-86 are superficially similar but the road classification is the old OS one and MOT numbers do not appear. There are no revisions to the roads and no black infills. The railways carry their pre 1923 identifiers. No golf courses are shown.

The reverse of section 86 is a characteristic sheet based on that in the 1922 1/4" Atlas but reduced in size and modified. The scales are re-drawn and the road classification corresponds to

that of sections 1-9. The golf symbol is added to the same line as aerodromes.

The back cover is bottle green with the same border and crown as the front but no writing. Inside is an invitation to write to Prices Lubricants Technical Advisory Bureau for help and guidance.

What is this atlas? Is this an attempt at full cost recovery in 1937? What was the relationship

of the OS with General Sales Promotions Ltd.? Why are the maps from two different superseded editions? Did the OS really allow Maps with such crude revisions to be issued? Was this an advertising giveaway for Prices Lubricants? Was it ever on sale? What are the Patents? Was there ever anything like it? If anyone has any answers please let me know!

General Roy's Base Line

Brian Adam writes that he thinks that this subject is one where "back to basics" really is the correct approach to calculating the accurate length of General Roy's Base line. We need to start with the positions of the base terminals taken from the old Principal Triangulation, which are:

Kings Arbour:

Lat 51° 28' 45"-489 N, Long 0° 26' 55"-454 W

Hampton Poor House⁶:

Lat 51° 25' 33"-435 N, Long 0° 21' 50"-975 W

It is then necessary to apply corrections of +0"-015 latitude and -0"-118 west longitude to bring these positions into sympathy with the Retriangulation positions in the area. Conversion of the amended positions into National Grid co-ordinates gives the results:-

King's Arbour:

507 715.15 metres E, 176 789.34 metres N

Hampton Poor House:

513 719.99 metres E, 170 985.21 metres N

These provide grid references of TQ 077 768 and TQ 137 710 respectively, but it should be noted that these apply to the true positions of the two terminals, which may not be exactly where drawn on a particular map! However, David Archer's readings from the map differ in one place only from the calculated references.

Calculation of the true distance (*not* the grid distance) between the above positions results in a figure of 8353.48 metres, or 27,406.37 feet, which compares favourably with the length

determined by Clarke in 1858 of 27,406.19 feet. This was one of the three lengths recorded on the tablets mounted on the gun barrels marking the base terminal stations in 1926. A transcription of the wording on the plate on the Hampton Poor House terminal in Roy Grove, Hampton, accompanies this note. It seems very probable that it was the bicentenary referred to on the tablets which prompted the addition of the base line and its terminals to the Popular Edition sheet 114, on which they first appeared in a 1929 printing.

⁶ In some OS sources *Poor House* is rendered as one word.

David Watt writes that the following co-ordinates were supplied to a colleague by an Ordnance Survey surveyor involved in the original calculation of the British National Grid co-ordinates of the ends:

	Kings Arbour (Block under cannon)	Hampton Poorhouse
British National Grid	507714·26 m E 176789·03 m N	513719·4 m E 170985·2 m N
Geographicals (OSGB36 datum, Airy Spheroid)	51° 28' 45"·4945 N 00° 26' 55"·3826 W	51° 25' 33"·450 N 00° 21' 50"·888 W

For those pre-empting OS conversion to the UTM grid system used in Europe, the UTM co-ordinates are:

UTM (main zone 30)	677048·57 m E 5706266·97 m N	683133·78 m E 5700544·39 m N
UTM (Adjoining zone 31)	260433·62 m E 5708830·45 m N	266031·71 m E 5702627·25 m N
Geographicals (WGS84 datum and spheroid)	51° 28' 47"·3201 N 00° 27' 00"·9872 W	51° 25' 35"·2998 N 00° 21' 56"·5186 W

The British National figure for Hampton is only accurate to 1 decimal place; nonetheless, this still gives an accuracy of +/- 10 cm and the computed geodesic distance between the points comes to 8353·482 m, or 27,406·10375 ft +/- 0·32808 ft, which is to within 0·08 ft of the retriangulated value quoted in Seymour's *History of the Ordnance Survey*, page 142.

A second General Roy's Base Line

Les Watson writes that following his query in *Sheetlines 39*, he has found that General Roy's triangulation of south east England from 1783–7 included measurement of a second baseline to verify the results of the work. Col. Sir Charles Close in *The Early Years of the Ordnance Survey* (p22) describes work carried out in the Romney Marsh in 1787. He gives this baseline length as 28,535·7 feet, but not the position of the terminals, saying "we need not go into details of this measurement".

It appears that the baseline ran from High Nook, half a mile south of Dymchurch (TR 098287), to the village of Ruckinge. (Ruckinge

falls neatly into the National Grid kilometre square TR 0233). Once again, using 'O' level trigonometry and 1:50,000 sheet 189, I have tried to approximate a six figure grid reference for the terminal at Ruckinge.

The village church at Ruckinge happens (conveniently) to be at TR 025335. The distance between this point and the grid reference given above for High Nook is 8,736·70 m. The measurement quoted by Col Close is equal to 8,697·65 m, a difference of 39·05 m. Looking at the layout of Ruckinge village on the 1:50,000 sheet, my guess is that the terminal may have been in the 'space' south of the church and to the

north of the Royal Military Canal. If the grid reference is changed to TR 025334, then the distance computed between the terminals becomes 8,682.17 m — a difference of 15.49m.

It is possible that General Roy cared not to chain over the Royal Military Canal. If so, the terminal would of course be on an arc from High Nook but still not far from Ruckinge village centre (e.g. somewhere near TR 023331).

The accuracy of using Map References

It is interesting to read Mr Watson's comments on the length of General Roy's base lines, but it would seem to me that in using a six-figure National Grid map reference he is implying an accuracy of measurement for the position of various symbols on the map which is un-warranted. The use of a six figure reference implies an accuracy of ± 50 metres (approx. 164 feet), and in the calculation of distances, the maximum error *can be as much as* 70.71 metres (232 feet!) when the compass direction between the ends is NE-SW or SE-NW.

I know from when I used to motor rally (Navigation Trials) a lot in the 1950s and '60s we relied on the accuracy of a given map reference (and we used to work to the nearest $\frac{1}{4}$!) as shown on the map, and relative to the

map. For example, the place we were trying to locate (as given by a map reference) might be in a wood. We would then determine from the map the distance from some obvious item on the road side to the nearest point to the place, and then the distance in from the road. By the nature of the need to show the width of the road on the map as finite (which by necessity is exaggerated by about a factor of two), the real grid reference of the place was undoubtedly different; and anyway the rally organiser probably did it the same way as we did. If we had difficulty, we made some small allowance for the width of the road; and we usually found what we were looking for!

Lionel Hooper

Part of the One-inch Old Series sheet 4 (mostly sea!) showing Ruckinge and High Nook

It is interesting to note that almost due west of Ruckinge is *Ham Street*, which was featured on the set of the Post Office commemorative stamps at the time of the Ordnance Survey Bi-centenary.

At that time (but off this section of the map) Dungeness was written "Denge Ness".

...And Finally

You will have noticed that in this issue of *Sheetlines*, after consultation with the Publications Committee, I have experimented with presenting the majority of articles in double column format, which in itself has produced its own problems —like page endings. If *you* have any comments on such presentation, please let me know, either at the Annual General Meeting, or by a weekend 10p telephone call. Otherwise, please forgive me the usual crop of spelling errors, and mis-spelling of *Bartholomew*, if it has occurred.

Small Advertisements

Wanted: 1:25,000 Pathfinder Series (with either card covers or 1:625,000 integral map extract covers)

Sheets:- SD 29/39; SD 49/59; SD 89/99; SE 09/19;
 NX 90/NY 00; NX 91/NY 01; NY 10; NY 11; NY 12;
 NY 00/10; NY 01/11; NY 20/30; NY 21/31; NY 22/32; NY 40/50;
 NY 41/51; NY 42/52; NY 62/72; NY 63/73; NY 80/90; NY 83/93;
 NZ 02/12; NZ 03/13.

Also any other sheets in 100 km squares SD, SE, TA, NX, and NY with covers as above.

Steve Simpson, Shap Wells Hotel, Shap, Penrith, Cumbria, CA10 3QU (tel. 0931 716628)

Wanted: Cornwall 1:25,000 Provisional Sheets SW 64, SS20 and SX 39
 One-inch, 5th Edition, sheets 136 and 137, Relief
 GSGS 127, 136 and 144
 One-inch, Old Series, particularly pre-electrotype, and New Series
 1:50,000, all Second Series metric
 All Six-inch, particularly West Cornwall

John Symons, The Gables, Hanley Road, Malvern Wells, WR 14 4 PH (tel. 0684 573618)