Sheetlines

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

"One-inch engraved maps with hills: some notes on double printing"

Roger Hellyer

Sheetlines, 44 (December 1995), pp.11-19

Stable URL: http://www.charlesclosesociety.org/files/Issue44page11.pdf

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.

One-inch engraved maps with hills: some notes on double printing

by Roger Hellyer

I. *A curious act of vandalism*

One of the consequences of the cumulative delays in the preparation of hachure plates for the one-inch engraved sheets in England was that in some cases the "second edition" with hills (NS-2-H)[1] appeared so long after their outline editions (NS-2-O) that no sooner were they published than they were superseded by third edition printings (NS-3-H). The problem became more acute as the publishing programme moved north, reaching absurd proportions with NS-2-H: 7 and 11 which were announced in the Ordnance Survey Publication Report for January 1904 (OSPR 1/04), and had a life span of but four months before being superseded by NS-3-H issues announced in OSPR 5/04. More peculiar still is the case of sheets 1, 4, 5 and 6, none of which, apparently, were published in NS-2-H. But perhaps that is too pedantic a statement, because sheets 1, 4 and 5 are listed in OSPR, sheet 1 in 9/03, sheets 4 and 5 in 1/04, though no copies have been recorded. With sheet 6 the opposite is true: no NS-2-H version appeared in OSPR, but copies of it are known in the British Library (though not in the copyright set) and the Record Map Library of the Ordnance Survey at Southampton. If the publication reports are to be believed, sheet 6 led off publication of NS-3-H in the north with an appearance in OSPR 3/04, just a month after the initial block of Hampshire and Sussex sheets. Publication of NS-3-H:1-5 was announced at the end of the year, in OSPR 12/04.

Matters get "curiouser and curiouser" when one inspects embossed printing dates (EPD) on these sheets. It is strange that the earliest known copies of NS-3-H:1, 4 and 5 have EPD's coincident with the NS-2-H OSPR references, which makes sheets 4 and 5 one month and sheet 1 a full five months older than any NS-3-H sheet as measured by the announcements in OSPR. It is stranger still that both recorded copies of NS-2-H:6 should have an EPD of 4.04, actually a month later than the publication of the NS-3-H version, and while at least this may explain why it seems never to have been published, it does not explain why it was ever made.

The situation moved towards the incomprehensible when I acquired a part set of NS-2-H sheets, which apparently included copies of the supposedly unpublished sheets 1, 4 and 5, with EPD's 9.03, 1.04 and 3.04, dates obviously linked to NS-2-H references in OSPR. However, inspection of the printed publication dates - 1903, not 1897 (at this time hills editions carried the publication dates of their respective outline editions) - revealed them not to be NS-2-H at all but NS-3-H sheets on which someone had perpetrated a curious act of vandalism in scratching out the words "Third Edition" in the top left hand corner. Putting this down to a whim of the former owner, I thought no more of it until I discovered that copies of sheet 4 in the British Library, the Bodleian Library, National Library of Scotland and Trinity College, Dublin (I have not yet enquired at Cambridge) copyright sets of NS-2-H had received precisely the same treatment! One is inevitably led to the remarkable possibility that an employee of the Ordnance Survey itself was responsible. But why? Why go to such lengths to make a map look older than it actually was? It is hardly credible that there was so a great a demand from collectors of NS-2-H for the completion of their sets as to pass off NS-3-H sheets by deception. Furthermore, why announce them in OSPR as NS-2-H sheets when actually they were NS-3-H, and why then repeat their announcement as NS-3-H at the very end of 1904 when they had already been available for some months, and, in the case of sheet 1, for more than a year? And do further copies of NS-3-H:1 and 5, other than my own, exist with "Third Edition" scratched out? It is worth noting that none of the NS-2-H sets in

[1] Richard Oliver: What's what with the New Series, *Sheetlines* 5 (1982), 3-8. I have employed Richard Oliver's system of abbreviations for identifying map series which he first expounded in *Sheetlines* 5, p.3. The first element, NS, S or I stands for New Series, Scotland, Ireland; 1, 2 or 3 means first, second, or Third Edition; the third element O or H stands for outline or hills edition.

the copyright libraries mentioned above include copies of these sheets, though it is significant that the British Library and National Library of Scotland NS-3-H sets have two unmutilated copies of each with accession dates obviously coupled both to the December 1904 OSPR reference and to the earlier supposedly NS-2-H references. But perhaps the truth of the matter is that NS-2-H:1, 4, 5 and 6 actually were published? It would be most interesting if any collector or library assuming they have copies, with either black or brown hills, could inspect publication dates and EPD's, also the top left hand corners for any evidence of deletion, and report their findings to the author or the editor. We would especially like to know of any sheets 1, 4 or 5 which actually prove to be authentic NS-2-H issues.

Details of the above in tabular form:

				Vandalised					
	NS-2-O	NS-2-H		NS-3-H		NS-3-O	NS-3-H		
Sheet	Pub	EPD	OSPR	EPD	BL Accn	Pub	EPD	OSPR	BL Accn
1	1897	-	9/03	9.03		1903	9.03	12/04	11.03 2.05
2	1897	2.02	3/02	-		1903	3.04	12/04	2.05
3	1897	10.02	10/02	-		1903	3.04	12/04	2.05
4	1897	-	1/04	1.04	5.04	1903	1.04	12/04	2.05
5	1897	-	1/04	3.04		1903	1.04	12/04	5.04 2.05
6	1897	4.04	-	-		1903	2.04	3/04	6.04
7, 11	1897	1.04	1/04	-		1903	4.04	5/04	9.04

II. *The background*

With all Old Series one-inch maps it was Ordnance Survey practice to engrave hachures in the same copper plate as the topographical detail. When north of the Preston-Hull line additional plates for outline editions were also required, these were duplicated from the original plates before the engraving of the hachures: any contours were added to the duplicate plate, the hachures were engraved in the original.[2] 2 The same principles applied to the earliest New Series sheets, except that since contours now also appeared on the hachured edition, the duplication of the plates presumably followed their addition.

"The hills of course do not alter, and therefore.....require no revision".[3] It was perhaps inevitable that a process be developed whereby the necessary revision of topographical detail in copper plates would not continue to risk damage to features therein which were permanent and immutable, such as the hachures. By 1889 it had proved technically feasible to separate topography and hachures on to different plates and on printing achieve a perfect marriage in the registration between the two.[4] Richard Oliver has noted[5] a series of double printed experimental sheets made in 1890, one of which was NS-1-H:345, engraved in black with brown hachures, which was presented to the Royal Geographical Society in June. This is the earliest known sheet to have its hills engraved in a separate plate, though it was not until December 1892 that it formed one of the first batch of double printed maps actually to be made for sale to the public.

Engraving topography and hachures in separate plates had at least three advantages. The previous practice had necessitated that all topographical revision be entered twice, once in the outline duplicate, and once in the original outline plus hachures plate. The latter was a much more difficult task with the ever present danger of damaging the hachures. With the hachures safely on an independent plate, the job became straightforward and moreover only had to be done once. Secondly, the hills plate could be reused as a master for subsequent new editions, including the imminent coloured editions with hachures. The third principal advantage was to the user, since much improved clarity was the consequence of printing the hills in another colour, if required. In spite of these advantages, it evidently proved impractical to begin publication of engraved hachured maps by the double printing process until early in 1893, though the single printing of hills was not finally phased out until 1895.

It is pertinent to outline what had been achieved by the earlier process. The situation is most clearcut in Scotland, where between 1856 and 1894 all 132 S-1-H one-inch sheets were produced with hachures and outline on single plates. In Ireland, 200 of the 204 I-1-H sheets (there are no hills in sheet 50) had been single printed between 1855 and 1895, sheet 157 being the last single printed hachured map to be made anywhere in Great Britain or Ireland, in October 1895. Separate hill plates were engraved in 1895 for the four remaining sheets, 136, 145, 146, 156. Both outline and hachures of these sheets were printed from transfers to zinc rather than the copper plates.[6] In England and Wales the situation was more complex. The New Series nominally comprised 360 sheets. Through the non-appearance of sheets 243 and 260, and the combinations of 36/45/46/56/57, 81/82, 117/133, 192/209, 261/262, 291/275, 357/360 this total was reduced by twelve. The requirement for hachured editions was further reduced by six thanks to the lack of land high enough on sheets 91, 144, 226, 259, 321 and 354. In England single printing of hachured sheets ceased in 1892, by which time there were one contoured and 68 uncontoured sheets in the range 1 to 73

[2] . For a description of the process, see Henry James (ed.) *Account of the Methods and Processes.....of the Ordnance Survey* (London H.M.S.O., 1875), also quoted in J.B.Harley and R.R.Oliver *The Old Series Ordnance Survey Maps of England and Wales*, Volume VIII, xvi (Lympne Castle, 1991).

[3] . Col. Duncan A. Johnston (rev.) *Account of the Methods and Processes.....of the Ordnance Survey, Second Edition* (London H.M.S.O., 1902), p.198.

[4] A description of the making of separate hill plates is given in the Appendix.

[5] Richard Oliver: New Light on the New Series, *Sheetlines* 12 (1985), 7-11. See p.8.

[6] John Andrews: A record copy of the one-inch Irish hill map, *Sheetlines* 30 (1991), 4-5.

(reprints of the "Old Series"), made between 1847 and 1874, and 12 others, with contours, made since 1878: 273, 274, 284-286, 289, 290, 300, 301, 304-306. In sum, therefore, it had taken 38 years to produce 132 Scottish sheets, 40 years 200 Irish sheets, and 45 years to produce 81 English sheets out of a grand total of 678 overall.

The task that lay ahead did not entail the loss of hachures from any of these 413 sheets, since the hachures could be separated out from each existing plate. A matrix was taken by electrotyping, from which all detail except the hachures was removed by scraping with a graver. A duplicate was taken from the scraped matrix to be kept for record purposes, and from it a printing plate made by the usual methods. This process was used in England, but it was still time consuming, and replacement NS-2-H versions of the 12 single engraved sheets south of the Preston-Hull line were not announced in OSPR before June 1899, and publication of the 68 north of it (the Isle of Man sheet was never done) was only completed in 1904, the last few apparently in NS-3-H, as was discussed in section I. Meanwhile production of NS-1-H sheets continued, from December 1892 with separate hill plates, and at most a further 28 sheets were made before April 1895 when the first NS-2-H sheet (315) was announced, a mere ten months following the NS-1-H issue of that sheet. Eventually 60 NS-1-H double printed sheets were to be produced by the end of 1898,[7] by which time the first revision of England and Wales was sufficiently advanced everywhere to permit work on NS-2 sheets to supersede NS-1 and for the residual NS-1-H work therefore to be abandoned.

In many cases the same compression of the time scale between NS-1-H and NS-2-H production occurred as between NS-2-H and NS-3-H. NS-1-H:93, 162, 200, 264 were all listed in OSPR in the latter half of 1898, less than a year before OSPR 6/99 announced the replacement by NS-2-H of all but one of the 72 NS-1-H sheets made south of the Preston-Hull line, though palpably several had been replaced earlier. The exception was NS-1-H:313, of which a copy exists in the Record Map Library with EPD 7.98. This sheet appears not to have been issued, being superseded by NS-2-H in OSPR 9/98.

The engraving of separate hachure plates clearly speeded up production of hills sheets, though demonstrably the increase was from *adagio* to perhaps *moderato*. I wrote to *Sheetlines* in 1989[8] to remark upon a marginal note from the hills engraver C.S. Fuidge which survived to appear on NS-2-H:265, that it had taken him 346 days to engrave its hills at a cost of £350, and there is no evidence to suggest that this may in any way have been atypical. Fuidge's name after all appears often enough on engraved sheets to suggest his was a much practised hand.

In parallel with the engraving programme, and in order to widen the coverage of the hills edition by faster if temporary methods, the Ordnance Survey turned in 1892 to zincography. The process called for the transfer of the outline plate to zinc: hachures were independently drawn, initially rather crudely, but later with much greater refinement, and were coupled with the zinc outline, first by photozincography, from 1893 by heliozincography. All the examples seen have these hachures in a second colour. Richard Oliver made reference to this,[9] adding the remark that production of hills sheets by zincography had been envisaged for military use when the New Series was authorised in 1872. In 1886 some of the North Kent sheets had been zincographed, probably for military use, and there is a copy of sheet 273 in the Record Map Library, with the hills depicted by horizontal hachures in grey. Sheets 271 and 272 were probably also made, with conventional vertical hachures, and respectively 1892 and 1893 reprints are known, 271 in private hands, 272 in the RCHME collection now at Swindon, both with hachures in brown.

In 1892 the Ordnance Survey began publication of the "Advance Edition with Hills",

[7] The 60 sheets are 92-95, 162, 200, 224, 237-239, 241, 242, 247, 254-258, 261/262, 263, 264, 268-272, 276, 280-282, 287, 288, 296-298, 302, 312, 313, 315-320, 327, 328, 330-334, 339-345, 350, 356.

[8] Roger Hellyer: Ordnance Survey Engraving Times, *Sheetlines* 26 (1989), 14.

[9] Richard Oliver 1985, p.9.

which, after one sheet made in June 1892 (343), became the "Temporary Advance Edition with Hills", and it is quite conceivable that these reprints of sheets 271 and 272 were made to supplement this edition, though if so they were quickly superseded by engraved NS-1-H editions late in 1893. They also never carried the edition title. We were offered in *Sheetlines*[10] an illustration of sheet 161 in an "Advance Edition with Hills photozincographed", with an issue date of 1892. In the event the illustrated map would appear to have been a prototype, because the published version of sheet 161 did not appear before 1894. The interested student here has perhaps a unique opportunity for detailed study, because not only were the hachures in the published version produced by helio-, not photo-zincography, but also they were redrawn. By 1897 the Ordnance Survey had gone on to make 74 England and Wales sheets by these processes.[11]

The Temporary Advance Edition with Hills was only intended as a stop-gap and its sheets went out of print as engraved editions gradually superseded them. The first to disappear was sheet 242 which went late in 1894, almost as soon as it was made. By the end of 1898 nine sheets, 162, 224, 241, 242, 327, 328, 341-343, had appeared in NS-1-H form. The remainder would be replaced by NS-2-H editions starting in 1896 with sheets 223 and 240, and ending with the announcement in OSPR 2/03 of NS-2-H:127, as it happens one of the batch of six sheets (76, 77, 105, 119, 127, 150) which completed the programme of drawing and engraving the 678 one-inch plates with hachures required to cover the British Isles.

Zincography remained a tool in the making of hill sheets in England and Wales until 1897. Two years later it was again called upon to expedite the production of a hills edition based on the first revision in Scotland (S-2-H) where, it will be recalled, all 132 sheets had hills and outline engraved on the same plate in S-1-H. Experience with the English sheets had taught the Ordnance Survey that dividing outline and hills into separate engraved plates for so many sheets could take a decade or more, and the S-2-H edition was required much sooner than that. Thus the newly revised outline editions (S-2-O) were transferred first to zinc, later on to stone. The hills were transferred from the S-1-H copper plates to a second zinc or stone via an impression in ink on paper from which all unwanted detail was removed by scraping.[12] Such was the speed of production that the whole S-2-H edition was published by zincography or lithography between 1899 and 1902. The use of lithography permitted the combination of sheets 57 and 57A, so the edition appeared in 130 sheets, including the already combined 42 and 50, and the unrevised sheet 123.[13] An acceptable, though temporary solution having been achieved, the permanent work of transferring the S-1-H hachures to independent copper plates began almost immediately, presumably by the same methods as in England. But only sheets 1-3 had appeared in engraved S-2-H editions beginning late in

[10] Attached to Richard Oliver 1982, p.8.

[11] The 74 sheets are 107-112, 121-132, 139-143, 145-148, 151, 153-162, 164, 165, 167-169, 171-176, 178, 179, 186-191, 205-208, 223-225, 240-242, 314, 327-329, 341-343.

[12] I quote the official record as in Johnston 1902, p.187: An impression is pulled with the copper-to-stone ink and paper; this is kept flat and fastened to a drawing board with pins; all the outlines, detail, and ornament are removed from its surface by scraping, cleaning the dust off immediately with a camel hair brush. The transfer is then damped to the set expansion and transferred to stone, washed clean, and the stone prepared with citric acid and dusted over with chalk; a draftsman then goes over the whole, and carefully makes good with tusch, the erased patches, at the same time assimilating the hill features, where necessary, to make them agree with the revised detail plate. When this is done the stone is returned to the printer and proved. At the same time a transfer is pulled from the revised detail plate, with the same ink and paper as the above, which is laid down and transferred to stone in the usual way. Great care is necessary in damping and transferring these transfers in order to get them on the two stones exactly to the same measurement. The hill plate is first printed in a tint composed of sepia and a touch of crimson; the outline or detail is then registered to this, in black, from the detail plate.

[13] This method was also adopted for those sheets in NS-2-C, S-3-C and almost the entire I-2-C for which independent hill plates did not as the time of their making exist, many of which carry the legend "Printed from transfers to stone". Where an independent hill plate already existed, the transfer was, of course, taken direct from it.

1903 before the application of engraved hills to S-2 sheets was abandoned in favour of S-3 issues.

So again we reach a watershed, in 1904. A year earlier the coverage of the entire United Kingdom by hill plates where necessary had been achieved. Work on the last of the English "Old Series" hachure plates to be separated from the outline, sheet 6, was completed, and published in NS-3-H in March 1904, and, remarkably, apparently printed in NS-2-H one month later. Separate hill plates for sheets 1, 4 and 5 had been made and printed a few months earlier in NS-3-H (almost certainly never NS-2-H) even though not formally announced until the end of 1904. In Scotland three engraved sheets (1-3) had been double printed in S-2-H, leaving 129 still to do (assuming the theoretical intention of making sheet 50, the land areas of which even in S-1-H had also been coupled with sheet 42). S-3-H sheets with double printed hills would be announced from February 1905. In Ireland, after the publication of the four I-1-H sheets 136, 145, 146, 156 in 1895, there seems to have been no further work done on independent hills plates, though three of these plates were anachronistically combined in 1903 with I-2-O uncontoured originals in the making of the OSI Office Record set.[14] The hill engravers' energies were obviously being concentrated first on England and Wales, then Scotland.

But the programme of making independent hills plates was destined never to be completed: sometime in 1911 the decision was made to discontinue publication of engraved maps with hills, presumably for lack of public support. The last hills sheets in Great Britain were announced in OSPR 10/11: they continued in Ireland until March 1912. Publication was unfinished in all three countries, and the reason was in essence the same, though there were different parameters in each case. In England and Wales the programme of making separate hills plates had at least been completed, and as NS-3-0 and NS-4-0 sheets were published, it was possible immediately to supply a hills edition. That no more than 329 sheets with hills (four of them NS-4-H) were published was simply because issue of NS-3-0 was not completed until 1913 and NS-4-0 was only in its infancy. In Scotland, S-3-0 was not complete before 1912. But there was here an additional factor in that there were in existence independent hills plates of only three sheets when S-3 publication started. It is perhaps remarkable to report, therefore, that as many as 104 sheets were published with hills before cessation in 1911, leaving only 28 outstanding.

In Ireland it was not until 1909 that the publication of double engraved hill editions could even be begun. I-2-0 had been published between 1899 and 1902 without contours, and rather than proceed directly to a hills edition, it was evidently considered essential to add contours to the outline edition first. Contoured I-2-O sheets began to appear in 1908, but it proved impossible to complete the edition until after the war in 1919. Following hard upon its heels in 1910 was the contoured I-3-O, only to be abandoned in 1917 after the printing of some 131 sheets.[15] The leeway that separated the publication of an I-2-O sheet from an I-3-O was again often merely a matter of months, and forming an integral part of the consequent publication complex were the new double printed hachured editions, I-2-H and I-3-H, now of course benefitting from the contours in the outline plates. Oddly, of the four sheets already double printed in I-1-H, 136, 145, 146, 156, only the last was to make another appearance, and that only in I-3-H in the final batch of all in March 1912. Altogether 66 further separate hills plates were made for the Irish one-inch map, presumably as in England by separating the

[14] John Andrews 1991.

[15] Following a visit to Ireland, I am happy to be able to revise my footnote 7 in *Sheetlines* 43, p6. 131 Third Edition sheets are now known: 1-31, 33-38, 45-50, 57-61, 70, 71/72, 101, 125, 127-205. Sheets 33, 36, 45, 101 thus do exist, but are so far recorded only in lithographic, not engraved, issues, 101 being an OSI imprint.

hachures of the I-1-H edition from its unwanted topography: 49 of these would be issued in I-2-H between 1909 and 1911[16], 50 I-3-H (including sheet 156) between 1910 and 1912;[17] 32 appeared in both versions. Perhaps the most concentrated publication sequence was that of sheet 171, with I-2-0 in OSPR 3/09, I-2-H in OSPR 9/09, I-3-0 in OSPR 8/10 and I-3-H in OSPR 9/10. One feels compelled to conclude by asking the question why it seems to have been so important to publish so much "second edition" material based on the first revision in the knowledge that a "Third Edition" second revision map might be only months away? We have noted the apparent duplication of effort three times in this paper, so evidently it was a constant part of Ordnance Survey practice. It occurred in 1898-99 between NS-1-H and NS-2-H, in 1903-04 between NS-2-H and NS-3-H, and now again in 1909-11 with both Irish I-2 and I-3 editions. The author would welcome an explanation for what superficially appears to be a wholly unnecessary duplication of resources.

[16] . The sheets are 2, 6-8, 12-14, 18-21, 28, 142, 149-152, 159-166, 170-177, 183-188, 190-192, 194-196, 200-202, 205. Sheets 182, 197-99, 203, 204 are listed in OSPR 9/09 but have not been recorded.

[17] . The sheets are 2, 156-176, 178-205.

Appendix: The making of separate hill plates

The making of separate hill plates is summarised in two paragraphs in *Precis of the Methods & Processes of the Ordnance Survey* (1895):

p.13: The hill features are engraved as a separate plate in the following manner:- A photograph of the six-inch map is made on the one-inch or two-inch scale. This is taken to the field and the hill features are inserted on it. (In some portions of England the hill sketching is done on the six-inch scale). A finished brush drawing is then made from the field sketch, the former serving as a guide to the engraver. The hills are put on the plate partly by a graver and partly by etching, and a matrix and duplicate are then made. The great difficulty in engraving the hill features is to keep the different ranges of hills in proper subordination. Great clearness can now be attained by printing the hills in a different colour to the outline, and this is effected by double printing from copper.

p.15: For the hill engraving, the plate is first waxed over and a transfer from the outline plate is rubbed down on it. From this outline the engraver selects guiding lines and cuts them lightly on the copper. The wax is then removed and the plate covered with an etching ground, the engraver then makes a tracing on gelatine of the general shape of the hill features, this tracing is rubbed down on to the plate with red chalk, leaving a trace on the etching ground which guides the engraver in laying down the lines representing the hills. He draws in these lines with a fine etching needle, and as soon as he completes a portion of the plate, he proceeds with the "biting in". A wall of wax is placed round this portion of the plate, and dilute "aqua fortis" is poured in and kept there until the lines have been sufficiently bitten. After each "biting up" the lines that have reached the necessary depths of shading are covered with varnish and thus protected from further action by the acid. This process is repeated until the deepest shades have been obtained. The whole plate is last of all gone over carefully with the dry point to bring the whole work into proper order, and the detail lines which were cut to guide the engraver are burnished out. The plate is used by double printing in conjunction with the outline plate to add the hills to the rest of the work.