



# *Sheetlines*

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

“The British system & the modified British  
system of grid referencing, inversion of  
references & pinpointing”

*Mike Nolan*

*Sheetlines*, 107 (December 2016, pp 52-55)

Stable URL:

<http://www.charlesclosesociety.org/files/Issue107page52.pdf>

*This article is provided for personal, non-commercial use only.  
Please contact the Society regarding any other use of this work.*

Published by  
THE CHARLES CLOSE SOCIETY  
for the Study of Ordnance Survey Maps  
[www.CharlesCloseSociety.org](http://www.CharlesCloseSociety.org)

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

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

## ***The British system & the modified British system of grid referencing, inversion of references & pinpointing***

***Mike Nolan***

When, in 1977, 19 Topographic Squadron R.E. celebrated the 150th anniversary of its formation, contact was made with several veterans of the pre-war 'Survey Battalion' who had, while on duty at the Ordnance Survey at Southampton and elsewhere, also periodically carried out military training in the 'War Trades' at Fort Southwick (Portsmouth) or Fort Bembridge (Isle of Wight). Many of these men served later in the Field Survey Companies R.E. throughout the war in the BEF, Middle East, North West Africa, Sicily, Italy and North West Europe and they were the source of much anecdotal information and many photographs of that period towards the unit's history.

On planning to visit one of these men near Bournemouth I was given, over the phone, a six-figure grid reference of his house, as, say, 938746. Looking at the map, this reference made no sense to me. On calling back for clarification I was directed to look for square 9387, then to go to 46 within that square. His house was actually at grid reference 934876. At the time, I thought that this was actually quite a neat and natural way of locating a six-figure grid reference on the map by first finding the easting line of the kilometre square then the northing line and then the 100 metre easting and northing offsets within the square, but it was of course quite contrary to current military practice of giving the complete eastings before complete northings of a six-figure grid reference. Though I did not know it at the time, this was an example of 'inversion of references'.

The impulse, mistakenly to give references in this fashion is described in the *Manual of Map Reading Photo Reading & Field Sketching*, 1929, page 54, and it was one of the undesirable results of thinking of the grid as a set of squares rather than a combination of two sets of equally spaced parallel lines, eastings and northings:

*'iii. The inversion of references. Thus, in a square in which 31 appears (often called square 31) the impulse is often to refer to a point as 3106 instead of 3016'*

### ***The British system***

Plate X in that manual is an example of a large scale, 1:20,000 artillery map, showing the British system in which each 10km grid square contains 100 one-km squares whose south west corners are numbered 00 to 99 in red (*figure 1*).

As stated on page 51:

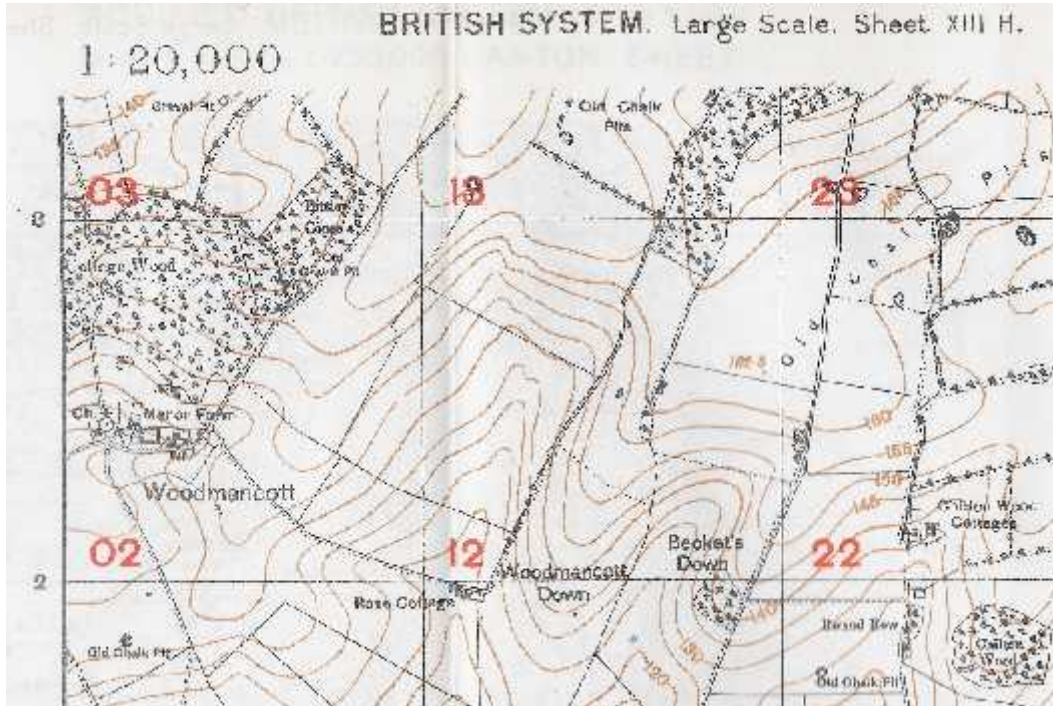
*'The British system was adopted in 1919 and was to continue in use on maps of Great Britain until a new Ordnance Survey edition appears'*

### ***The Modified British system***

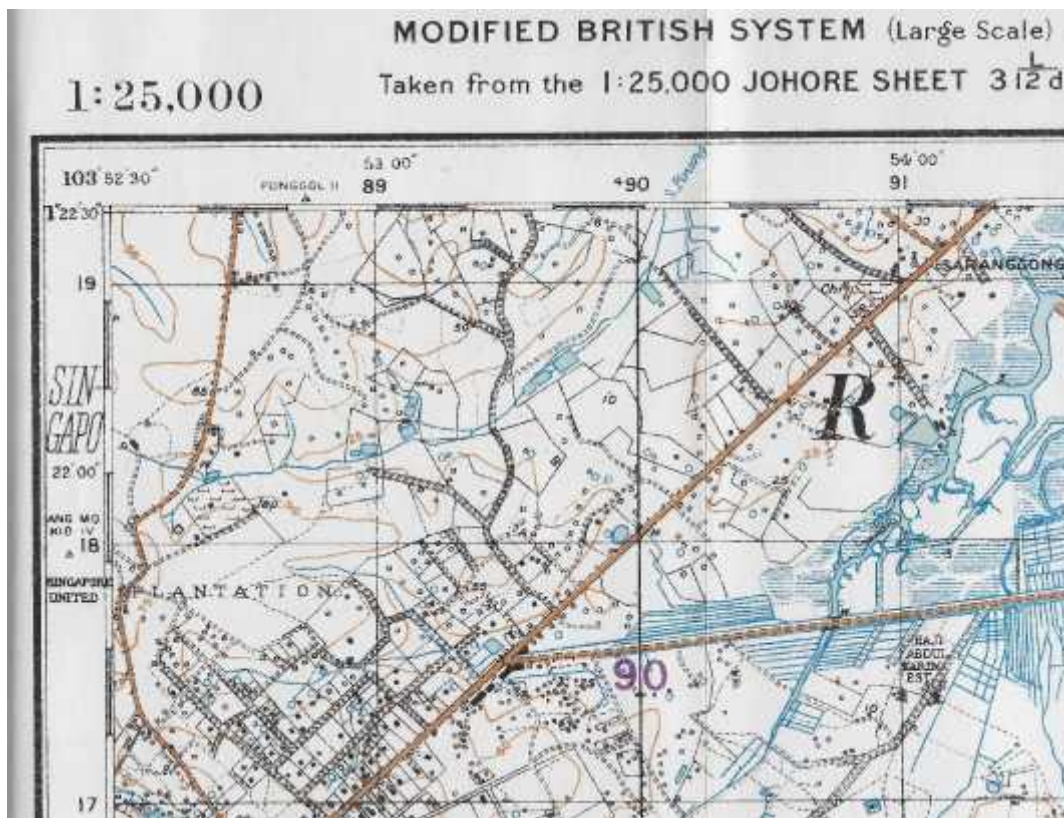
The British system was not suitable for maps at medium scales. On a 1:250,000 scale map a 10km square is only 4cms square on the map and a kilometre square is only 4mm square on the map. A kilometre grid of 4mm squares was simply too dense to be shown on the map. For this scale, (and also for 1:243,440), the Modified British system was introduced whereby only 10km squares were shown.

In addition to marginal square values, a 'ladder' of bold 5km and 10km values was to be shown on the face of the map.

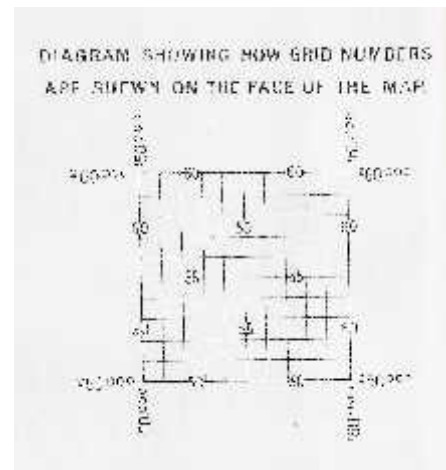
This 'ladder' of values on the face was also shown on large scale series, in lieu of the older system of numbers 00 to 99, as shown on an extract of a 1:25,000 scale map of Singapore at Plate XII of the 1929 Manual (*figures 2 and 3*).



*Figure 1 (left)  
Extract from Plate X  
showing British System,  
with grid numbers in  
red on map face*



*Figures 2 and 3 (below)  
Extract from Plate XII  
showing Modified  
British System, with  
grid numbers in purple  
on map face*



### ***Pinpointing & rounding-off references***

Some time ago there was correspondence in *Sheetlines* on the rounding-off of grid references. At the time, I responded by saying that the question never arises since all grid references refer to grid 'squares', whether 10km, 1km or 100m in size, the figures being the S.W. corner of a square. That was, and is still, I believe, current military practice. Grid references are distinct from survey co-ordinates which are quoted to the nearest significant figure, commonly the nearest centimetre. Pages 64-65 of the 1921 Manual refers to co-ordinates and 'pinpoints':

*'If we want to describe P more accurately we take hundredths of the square side instead of tenths, and use 6-figure co-ordinates. Thus, supposing P to be 410 metres east and 620 metres north, its 'pinpoint' co-ordinates are A.5,41-3,62'*

In 1921:

*'a comma should always be put after the figure denoting kilometres, and a line or dash between the east and north co-ordinates; so that references would be written in any of the following forms: 5,4-3,6; 4.57-6.83; 3.21/5.42'*

Survey Co-ordinates were described in the 1921 Manual thus:

*'The above description shows how map references are given. When exact co-ordinates are required for calculations, the full figures must be given. Thus for the same point P the co-ordinates to the nearest metre might be: 155.412 East; 443.623 North'*

Fortunately, this system of using commas, hyphens and slashes seems to have been discarded by the time the 1929 Manual was produced.

Winterbotham, in his review of the 1921 Manual in the R.E. Journal, objected to the inclusion of the small square number in each kilometre square which:

*may seriously interfere with the map detail, and is an undeserved reflection on the average intelligence.*

On referencing he stated:

*A much more serious point, however, is the insertion of commas and dashes in the co-ordinates themselves. A reference such as A 5473 is all-sufficient (within a 10-km square). To make it into A5, 4-7, 3 will imply such cumulative troubles in telegrams, reports, letters, and printed and typed orders that the rule will, inevitably, be honoured more in the breach than the observance.*

On pages 55-56 of the 1929 Manual an example is given of the use of a reference card, or 'romer' for giving accurate references. The six-figure reference given is 934486 but it then explains that the point being referenced is actually 41/100ths east and 59/100ths north of square 9348. Modern usage would still give a six-figure reference of 934485 but the manual refers to the position, implicitly an eight-figure reference of 93414859, as a 'Pin Point' reference '*seldom required except by technical troops.*' in which the nearest unit has been accepted, perversely, by 'rounding up'.

### ***History of the British Modified grid***

The history of, and reasons for, the Modified British Grid were described by McLeod in a short note dated 1927:

1. The British grid as used at present on our 1-inch maps was evolved during the latter stages of the war, but was not brought into operation in France. On its introduction in 1919, there were a good many complaints which have since died out completely. The one occasion on which it was used during the war was in Italy. There, too, certain complaints were made in the first fortnight, after which it was universally admitted to be better than the system employed on the Western Front.

2. Like almost all the methods inherited from the war, the British grid suffers from being suitable to trench warfare and not to mobile warfare. The British system depends upon having, upon every map which is used, squares – the sides of which are equal to one kilometre. Originally it was designed for the 1:20,000 maps in France. When put upon the 1-inch maps the squares became very small and upon ¼-inch maps they became so small as to become absolutely impossible. In manoeuvres in Hampshire in 1924 an endeavour was made to use this grid on the ¼-inch, which resulted in 16 similar references on the same ¼-inch sheet. Confusion was bound to result and the Staff College commented upon that confusion.

3. In 1926, when things began to look unpleasant in China it was necessary to prepare maps for possible eventualities. Much of the country for which maps had to be prepared was very little known and the ¼-inch was the largest scale which could be undertaken. In order that the maps might be gridded (an essential factor in a country in which the place names are of no use), a new system had to be devised. The modified British system was evolved after considerable discussion. It was nothing more than the old British system enlarged 10 times so as to make it available at small scales as well as on large scales.

4. In the spring exercises at Winchester in 1927, the C.I.G.S. made it clear that we must practice writing orders upon the ¼-inch scale. It has further been determined that our map policy is to issue to each arm and to each individual as far as possible, that scale of map which is most convenient for his work. The various scales (from 3-inches to the mile to ¼-inch to the mile) are linked up by this common grid on the modified British system.

5. Those who have tried the modified British system find it perfectly easy to use so long as they make up their minds that it is something they have to learn. It is only by the employment of a system of this sort that we can enable the Army at large to use different scale maps, and yet to understand reports and orders.

War Office, December, 1927.

**Footnote**

In the manuals, emphasis is placed on the use of either yards or metric units for grid squares and examples of each are given. For simplicity, generally, only metric units are referred to in this note.