Chapter 8
Conclusion

As initially outlined in the Introduction, the overall aim of this thesis is threefold; firstly, to comprehensively set out the scope of the Soviet military city plan series in detail; secondly, to frame the series within an epistemological context within cartography, and; thirdly, to understand the nature and application of its symbology through an empirical analysis, helping to facilitate future applications of the maps. These components serve to evidence the enduring relevance and value of the maps in current and future mapping initiatives. More specifically, this aim was to be explored by conducting an analysis based on addressing two principal objectives:

- **To examine the extent to which the symbology of Soviet military city plans was successfully implemented across a variety of socio-cultural and physical environments across the globe.**
- **To explore the extent to which the symbology of Soviet military city plans can inform and supplement the global, standardised symbology of OpenStreetMap (OSM); successfully transcending socio-cultural, political and physical boundaries.**

This final chapter summarises the work that has been carried out to this end and outlines the major findings which have consequently emerged. It then sets out potential directions in which future research may proceed, using these findings as the point of departure.

8.1 An Outline of the Research

Chapter 1 traced the history of cartography in Russia and, in doing so, identified three historical traits which were inherited by the Soviet mapping programme; state control, censorship of public information and a continual drive towards producing more accurate and precise geographical data. These characteristics remained apparent in Chap. 2 which concentrated its focus on the Soviet military city plan series. The

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compilation of a list of the plans which are known to exist and have been acquired by libraries and research institutions across the globe provided an initial insight into the scope and coverage of the series, as well as highlighting key production trends; in particular the substantial growth in production after the launch of Zenit-4MT in 1971—the USSR's first of two satellites designed to provide data for military cartography. It is hoped that the detailed explanations of the content and layout of city plan sheets will serve as a practical aid to future users of these maps [2, 3]. An original translation of material from the 1978 compilation manual for city plans provided the basis for an outline of the maps' production process, shedding light on their originally intended purpose and the potential nature of the source materials used.

Chapter 3 used Brian Harley's landmark paper, 'Deconstructing the Map' [6], as a springboard for discussing the potential of the post-structuralist deconstruction tactics of Jacques Derrida to challenge the way in which we view maps as texts which hold meaning. The conclusions drawn hold much in common with the post-representational paradigm adopted by Kitchin and Dodge [9] in that maps are 're-made' each time they are engaged with and therefore cannot refer directly to the landscape which they purport to represent. However, heeding the warning of Pacione [10: 6] that 'in terms of real-world problems, postmodern thought would condemn us to inaction while we reflect on the nature of the issue', Chap. 3 concluded that a total severance of the map-reality link would be unhelpful in practical contexts, given the enduring perception of this link by map users. A 'pseudo-representational' stance was therefore adopted, with Soviet city plans providing an ideal illustration of how Derrida's concepts of *différance* [4] and absolute absence [5] allow maps to be re-contextualised and reused for new practical purposes, despite the total dissolution of their original purpose and author.

Based on this epistemology, Chaps. 4 and 5 construct a methodology which re-contextualises the uniquely extensive symbology of Soviet military city plans in order that it may inform modern cartographic practices. Given the series' success in implementing a standardised symbology across diverse socio-cultural and physical environments, exploring the extent of this application in more detail was the focus given to the research objectives, which progressed from a solely historical focus in order to highlight potential parallels between the Soviet mapping programme and *OpenStreetMap* (OSM) which, despite its very different function, mode of production and medium of dissemination, is similar in terms of its aspiration for global coverage and completeness.

Building on a small number of previous methodologies for analysing topographic symbologies, notably [1, 7, 11], Chap. 6 presents the Soviet city plan symbology, according to *Conventional Signs* specifications in a typology which is then compared with the actual application of the symbology on 19 geographically-diverse city plans. The analysis highlights the uneven and inconsistent application of symbology across the sample, in addition to a slight tendency for plans of temperate cities in highly-developed countries (according to HDI data) to exhibit a greater proportion of the symbology (0.341 positive correlation between HDI and 1:10,000 symbology). In total, 630 graphical symbols were identified across the symbology, with 252 for

use at 1:10,000 only, 104 for use at 1:25,000 only and 274 for use at either scale. At both scales, natural features comprised the largest elements of the symbology, with 'Hydrography and Coasts' emerging as the largest First-Level feature class at 1:10,000 (84 symbols) and 'Vegetation and Soils' the largest at 1:25,000 (66 symbols). However, the analysis also revealed key differences between the relative prominence of particular feature classes in the symbology specifications and in the sample of maps itself. For example, while 'Hydrography and Coasts' is the largest First-Level feature class in the 1:25,000 specification, 'Industry and Communications' is the larger in the sample of 1:25,000 plans included in the analysis. The use of only 47.9% of the total symbols in the specifications on the 19 plans analysed suggests that, while the plans are undoubtedly rich in topographic detail, their symbology was designed with an even greater degree of comprehensiveness in mind; only five symbols (0.79%) are used on every plan in the sample, highlighting the importance of distinguishing methodologies which analyse either specifications or maps. The comparison of the symbology with OSM, both in the context of specification documents and in their coverage of Frankfurt am Main, Germany, highlighted the Soviet plans' unparalleled inclusion of relief (50 1:10,000 Soviet specification symbols to eight OSM symbols) and hydrographic data (84 1:10,000 Soviet specification symbols to four OSM symbols), whereas the largest OSM specification feature classes concern service sector facilities—'Retail and Restaurants' (64 symbols) and 'Leisure, Tourism and Public Services' (54 symbols)—reflecting the diverse purposes of the maps.

In order to more holistically assess what the empirical results of Chap. 6 allow us to understand about Soviet military city plans, Chap. 7 juxtaposed map extracts from the sample against examples of maps which may have been used as the base map for compiling the plans (during the process outlined in Chap. 2). The significantly smaller symbology employed on these pre-existing maps, together with the likelihood that Zenit-4MT imagery was available during the production of all of the plans in the sample, led to the conclusion that the secondary, supplementary materials available for each city are likely to most significantly influence the extent of the symbology used on the final city plan. The supposition that such materials would have been more plentiful for developed cities provides an explanation for the trends regarding symbol counts, HDI and climate identified in Chap. 6; a slight tendency for higher symbol counts in more-developed cities (correlation of 0.341) and temperate climates. Chapter 7 also uses the detailed analysis presented in Chap. 6, particularly the commonalities and differences between the Soviet and OSM symbologies, as a basis for suggesting potential applications of Soviet mapping as a supplementary resource. In the particular context of humanitarian crisis mapping, it was firstly suggested that Soviet city plans and topographic maps have potential to be used as an additional source of topographic data, especially in parts of the world where few alternative sources of topographic data are available. The maps may be a particularly useful source of data on natural features, as these features represent the largest proportion of the symbology. Secondly, the maps have potential to be used as a model for presenting large amounts of topographic data in a static paper format. In crisis response situations, paper maps are often favoured due to their continued usability in

areas without electricity or internet connections and their ease of annotation with field data and notes. An adapted Soviet city plan symbology may provide a useful balance between including comprehensive topographic data while able to be presented in this format.

Overall, these findings support the notion that the Soviet military city plan series was a remarkably extensive project, both in terms of geographic coverage and symbology. Nonetheless, it has become apparent that the series' symbology, as found in various editions of *Conventional Signs*, is incompletely and inconsistently applied to the plans, and therefore represents an ideal which was not fully achievable using the source data which was most often available. Notwithstanding this, this research has shed light on the scope of these maps' content and symbology which, facilitated by its epistemological discourse, have potential to be applied to countless future applications; some of which have been considered here.

8.2 Directions of Future Research

Given the theoretical stance adopted by this study, it would be counter-intuitive to highlight a finite selection of potential avenues of future research. Rather, this section gives examples building on the work carried out here, recognising that, as the maps continue to be re-contextualised, new applications will emerge. The historical narrative presented in Chap. 1 focuses on cartographic endeavours throughout Russian and Soviet history. It should not be overlooked that the cartographic history of the world's largest country may illumine broader historical and political discussions, which have yet to recognise the unprecedented nature of Russia's cartographic efforts and the scale of the resources required to bring these to fruition. Within the more specific context of Soviet military city plans, it is recognised that this study focusses largely on those maps which were produced at the zenith of the Soviet global mapping programme, in the age of satellite imagery. A broader analysis incorporating a wider temporal range may reveal more about the evolution of the programme over time and, from a more technological perspective, the more specific impacts of the advent of satellite imagery on cartographic practices during the second half of the twentieth century. A broader temporal context would also pave the way for further analyses of symbology, although it may also be possible to focus research on a particular symbol or group of symbols, akin to the work of Bignell [1], in order to trace the development and socio-cultural influences on the portrayal of particular features. While the present study has been primarily concerned with the content and scope of the maps, a more acute focus on design, both at the level of the individual symbol and the application of design principles across the maps as a whole, may yield interesting insights into the cultural influences on such aesthetic judgements, as Kent and Vujakovic [8] explored in the context of smaller-scale European topographic maps. Methodologically, this study's distinction between an analysis of documentary symbology and symbology as presented in the context of a map would be usefully considered in future detailed analyses of cartographic symbology.

8.3 Concluding Remarks: Access and Application

In addition to these avenues of research, Soviet military city plans remain valuable—along with the vast quantities of other Soviet maps, undiscussed in this study—as a source of topographic data in their own right. In many cases, the plans still represent some of the most detailed data available for some geographical locations but, in any case, are a rich resource of data for use in historical geography or archaeological settings. With only a few exceptions, the maps remain a resource which is yet to be utilised in this way. Use of the maps as a model for legibly visualising large quantities of topographic data, particularly in contexts in which static paper maps are the most suitable format, is also an avenue in which there is scope for further exploration. However, application of Soviet maps, such as these, will remain scarce if accessibility to the maps does not improve [2, 3]. A lack of understanding of the maps' metadata, common cataloguing errors and the distribution of the maps across institutions around the globe, mostly in analogue formats, are barriers which must be overcome if the maps are to be used in the ways suggested here.

With its global, multi-scale coverage, detailed symbology and ability to be easily updated, OSM in some ways exemplifies many of the traits which were deemed desirable by the General Staff of the Soviet Union as it embarked on its unprecedented global mapping programme. Exhibiting the themes of Russian cartography identified in Chap. 1—centralised state control, censorship and increasing precision and accuracy—the Soviet mapping of the world differs from OSM on two of these counts, although if online VGI technologies had been available to the Soviet Union during the Cold War, there may have been merit in it pursuing this model. While Chap. 6 highlighted feature classes in which one symbology provides more detail than the other, the digital medium and open source nature of OSM makes it far more accessible to a myriad of uses, while VGI data has far more currency than some of the sources used by Soviet cartographers, which sometimes predated the maps by several decades—in some ways rendering OSM the 'ideal' Soviet map. In the twenty-first century, when the technological limitations and motivations for centralised control and censorship no longer exist, perhaps a fusion of OSM and Soviet mapping may yet yield an ideal standardised map of the world, some 130 years after Albrecht Penck first envisaged the idea of creating one. It is hoped that this initial analysis of Soviet military city plans goes some way towards providing the information and stimuli necessary to facilitate the fulfilment of their untapped potential.

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