Red Star to Red Lion: The Soviet Military Mapping of Oxford

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Abstract As part of its global military mapping project, the Soviet Union produced maps of many parts of the world at several scales from 1:1,000,000 to 1:5000. These include general maps designed for military planning and terrain evaluation and highly detailed street plans of towns and cities, including Oxford. The Soviet 1:10,000 plan of the city was compiled, designed and printed in secrecy within the Soviet Union during 1972–1973. It reveals that a high level of information was collected about the location and function of buildings, from the Morris Motors and Pressed Steel Fisher factories at Cowley to Oxford Prison and the Central Post Office in the city centre. Anomalies include the omission of Marston Ferry Road (which opened in 1971) and the inclusion of the two gas holders at St Ebbe's (which were demolished in 1968). Further afield, the depiction of RAF Upper Heyford on the Soviet 1:50,000 topographic map of 1981 includes details not shown on contemporaneous Ordnance Survey maps. Focusing on the Soviet mapping of Oxford and its vicinity, this chapter provides some new insights into the global project and reflects upon the achievements, methods and supposed purpose of this unprecedented cartographic enterprise.

1 An Introduction to the Soviet Military Global Mapping Project

It is impossible to underestimate the challenges of undertaking a systematic and comprehensive mapping of the globe. Creating a standard symbology for portraying the wide diversity of environmental information and gathering, classifying and presenting huge amounts of topographic data require substantial human and

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technological resources combined with effective management and organization. The task has eluded even the most determined attempts to map the globe through international collaboration. The idea of a 1:1,000,000-scale world map was proposed in 1891 at the Fifth International Geographical Congress in Berne, Switzerland, by Albrecht Penck, a German geomorphologist. His overall aim was to enable meaningful geographical comparisons to be made, solving supranational problems for the benefit of humanity. The resulting International Map of the World (IMW) relied on national mapping organizations to produce sheets at the fixed 'millionth' scale using a standard specification. However, the unavoidable problem of reaching international agreement on establishing cartographic conventions, the outbreak of World War I and subsequent global conflicts, and the rapid pace of industrialization in the twentieth century hindered progress and contributed to the increasing pursuit of national interests. By the early 1950s, only 400 sheets (of the 1000-plus sheets needed to cover the terrestrial surface of the globe) had been published, and after a UNESCO (United Nations Educational, Scientific and Cultural Organization) report declared the IMW no longer feasible in 1989, the United Nations stopped monitoring the project (Pearson et al. 2006).

Although the Soviet Union had withdrawn from the IMW (Russia had been involved in establishing the original specifications in 1909), the project's sheet lines and nomenclature were nevertheless adopted for the first detailed topographic mapping of the USSR (Union of Soviet Socialist Republics). Work commenced after the Bolshevik Revolution of 1917 and the first Soviet maps of Soviet territories at the scale of 1:1,000,000 were completed by 1918. In the following year, a decree from Lenin brought all mapping under the sole responsibility of the state and 1921 saw the introduction of a standard specification for military topographic maps for a range of scales (1:10,000, 1:25,000, 1:50,000, 1:100,000, 1:200,000, 1:500,000, 1:1,000,000). The nomenclature and grid lines for all these scales continued to follow the IMW model.

During World War II, greater levels of topographic detail, such as the types of forest and the widths of roads, were included on Soviet mapping to support military operations. As the focus shifted from conducting warfare to meeting domestic concerns such as advancing the national economy, Stalin issued a decree in 1945 that prioritized the production of a 1:100,000 map of the entire Soviet Union by the Military and Civil State Topographic Services. This substantial cartographic project was completed by 1954, by which time attention had been drawn to mapping the Soviet satellite states and other parts of the world (Cruickshank 2007: 24).

This new motivation gave rise to the most detailed topographic coverage that the world had yet seen. Under the authority of the Soviet General Staff, topographic maps and plans of foreign territories were produced at several scales (i.e. 1:5000, 1:10,000, 1:15,000, 1:25,000, 1:50,000, 1:100,000, 1:200,000, 1:500,000 and 1:1,000,000) according to standard specifications and by thousands of cartographers working within the USSR (Davies and Kent 2017). In addition to the topographic map series, larger scale maps and plans (mainly 1:10,000 or 1:25,000) are known to exist for over 2000 cities around the world (Davis and Kent 2017).

Prior to the collapse of the USSR in 1991, foreign access to Soviet topographic mapping was largely the preserve of the military. The US Department of the Army, for example, had been producing Soviet symbol recognition guides since at least the end of World War II. The steady flow of Soviet mapping from outlets in former Soviet republics and satellite states from the early 1990s led to Ordnance Survey issuing a statement by 1997 that declared Soviet mapping to be in breach of OS copyright and demanded an 'amnesty' of private stocks. The city plans seem to have become available since 1993, when a Latvian map dealer based in Riga began selling them at the International Cartographic Conference in Cologne, Germany. Today, digital copies of Soviet maps—including detailed city plans—may be freely accessed from the websites of several national libraries around the world, such as the US Library of Congress and the National Library of Australia (see Davis and Kent 2017 for a comprehensive listing).

Soviet military maps remain the most accurate and detailed form of topographic information available for many areas around the world, yet they have only recently become a topic for academic research (e.g. Postnikov 2002; Davies 2005a, b; Cruickshank 2008, 2015; Davies 2010; Kent and Davies 2013; Davies and Kent 2017, 2018; Kent et al. 2019). The acquisition of Soviet mapping by libraries is increasing, despite inconsistencies in how they are catalogued (Davis and Kent 2017), and there remains enormous scope for further research to contribute towards a fuller picture of Soviet military mapping. Indeed, with improving accessibility to this huge geospatial resource (e.g. downloads and prints from http://redatlasbook.com/), new applications of Soviet military mapping are being discovered and realized (e.g. Rondelli et al. 2013). In this chapter, we focus on the mapping of Oxford, including the 1:10,000-scale plan of the city that was printed in 1973. Our analysis provides some insights into the probable source material used and some reflections on the purpose of the mapping.

2 Soviet Map Formats

2.1 Topographic Maps

Topographic maps (or 'topos') were produced at seven scales, which were designated and classified as follows:

- 1:1,000,000—Small-scale/general terrain evaluation (unclassified)
- 1:500,000—Small-scale/operational (unclassified)
- 1:200,000—Medium-scale/operational-tactical and includes a description and schematic map of the surface geology on reverse of sheet ('For Official Use')
- 1:100,000—Medium-scale/tactical ('Secret' for USSR territories; 'For Official Use' if elsewhere)
- 1:50,000; 1:25,000 and 1:10,000—Large-scale/tactical ('Secret').

Also referred to as 'SK-42', Soviet topographic maps adopt a standard projection (Gauss-Krüger), datum (Pulkovo 1942), ellipsoid (Krassovsky 1940) and use similar symbology and labelling. This multi-scale approach facilitates interpretation and use between different scales. The sheets are non-rectangular; their sheet lines being defined by lines of latitude and longitude that conform to the nomenclature devised for the International Map of the World (IMW). Hence, the basic quadrangle of all Soviet topographic maps is the 1:1,000,000 sheet, which spans four degrees latitude by six degrees longitude. The quadrangles are identified by lettered bands north or south from the Equator and by numbered zones east from longitude 180°. The basic 1:1,000,000 IMW grid used in Soviet military mapping is shown in Fig. 1.

Although the IMW nomenclature adopts the Roman alphabet, Cyrillic letters are used on Soviet maps when sub-dividing sheets into larger scales. Each 1:1,000,000-scale sheet is divided into four sheets at 1:500,000, 36 sheets at 1:200,000 and 144 sheets at 1:100,000. Each 1:100,000 sheet is subsequently broken down into four 1:50,000 sheets, labelled А, Б, В, Г and each 1:50,000 sheet is divided into four 1:25,000 sheets, labelled а, б, в, г. The 1:25,000 sheets are further sub-divided into four 1:10,000 sheets, although coverage of this large-scale topographic series appears to have been limited to within the Soviet Union. The nomenclature can also be translated into a purely numerical sequence, where the letters are replaced with their position in the alphabet (e.g. the letter M becomes the number 13). Hence, Oxford appears on 1:50,000 sheets 13-30-010-3 and 13-30-010-4.

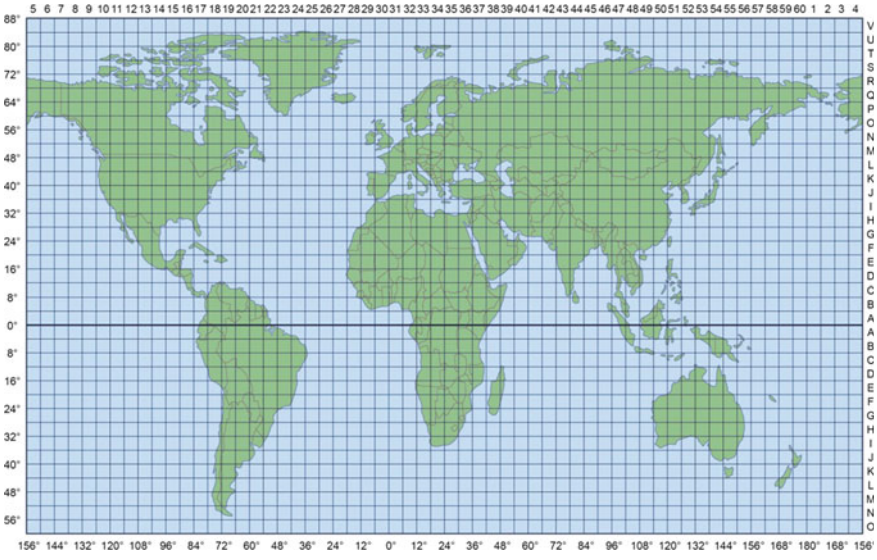

Fig. 1 A map of the world showing the grid adopted in Soviet military mapping, based on that of the 1:1,000,000 International Map of the World or IMW (Oxford lies on sheet M-30)

The exact coverage of Soviet topographic mapping has not yet been established, although Watt (2005) estimates the production of over one million sheets, including detailed topographic maps of the USSR at several scales from 1:25,000, plus maps of the rest of the world at 1:200,000 and larger, with coverage of Europe, the Middle East, North and Central America, large areas of South America, the Indian subcontinent, south-east Asia, China, and the populated areas of Africa at 1:50,000 and/or 1:100,000 scales. Even half this level of coverage would represent the most comprehensive systematic topographic mapping of the globe yet undertaken as a singular, coordinated enterprise.

2.2 City Plans

Towns and cities in over 130 countries outside the USSR were mapped in detail by the Soviet General Staff, many of which are concentrated in Europe, eastern USA, western China and Japan. The list of known plans includes the world's largest cities, such as Shanghai, Tokyo, London, New York, Paris, Istanbul and Cairo, in addition to hundreds of much smaller settlements with a population of just a few thousand. Although the rationale for their selection could include strategic functions (e.g. as major railway hubs and naval bases as mentioned by Psarev 2005: 49), there remain several large cities of which no Soviet plan is currently known, such as Rio de Janeiro, Bogotá, Melbourne and Lagos (Kent et al. 2019). Toponyms are spelt phonetically in Cyrillic (e.g. the Soviet plan of Leicester is titled 'ЛЕСТЕР'), presumably to aid and standardize the Soviet pronunciation of foreign place names.

The plans typically adopt the scales of 1:25,000 or 1:10,000, though some at 1:20,000, 1:15,000 and 1:5000 are known to exist. The corresponding 1:100,000 topographic map sheet is indicated on each plan, yet these sheets were produced independently of the topographic map series described above and were classified 'Secret'. They differ in content and appearance to the topographic maps at comparable scales, mostly through their inclusion of street names and a more comprehensive symbology, especially the colour-coding of important buildings. Most city plans appear to have been compiled during the 1970s and 1980s, reflecting the cartographers' increasing dependency on Soviet satellite imagery (specifically, the Zenit satellite programme) for acquiring topographic data, and therefore their move away from a reliance on indigenous mapping—some of which is explicitly stated as source material on earlier plans (Davies and Kent 2017).

Although the sheets use the standard projection, datum and ellipsoid as per the SK-42 maps described in the previous section, they were not designed to provide continuous or systematic coverage of an area according to a global grid. Instead, each city plan is centred on a specific settlement (or conurbation), which provides its title. The number of sheets used for each plan is therefore determined by the size of the area covered by the settlement (and its immediate surroundings) to be mapped at the chosen scale. Hence, smaller towns and cities fall onto a single sheet, while several sheets are required for larger settlements. The largest Soviet city plan

known to date is that of Los Angeles, which is covered by twelve sheets. Where cities are covered by multiple sheets, it is possible to remove the inner margins so that they form a unified and seamless composition.

The most visually distinctive aspect of the plans' cartography is their colour-coding of important objects and other buildings according to their function. Industrial buildings (such as factories, foundries and railway stations) are shown in black, military or communications facilities (such as barracks, radar installations and major post offices) are coloured green, and administrative or governmental buildings (e.g. town halls and law courts) are shown in purple. All other buildings are coloured brown. The important buildings and objects are numbered and correspond to a listing that is given at the edge of the plan, or, occasionally, on a separate sheet or in a booklet where they number several hundred (see Davis and Kent 2018 for an illustrated description of Soviet map sheets and a guide to understanding their metadata).

The city plans are also notable for their synthesis of rich hydrographic information with a high level of topographic detail, which surpasses that of comparable plans produced by other military mapping agencies at the time. The depth, speed and flow direction of rivers are often included and a topographic contour interval of 2.5 m is not uncommon, while annotations indicate supplementary information such as the width of streets, the construction material and carrying capacity of bridges. In addition to the numbered list of important buildings and objects, each plan also includes an alphabetical street index with corresponding alphanumeric grid squares and a 'spravka'. This is a descriptive text that summarizes the physical geography of the city (including the local topography and climate of its surroundings) and provides an overview of its economic and political functions.

In addition to the maps and plans mentioned above, other types of mapping were also produced. This includes a version of topographic mapping introduced in 1963 for civic planning and other official purposes in the Soviet republics (the 'SK-63' series omits geographical coordinates and other information) and a range of military thematic maps that use existing Soviet topographic data as base mapping (e.g. aeronautical charts, geodetic maps, transportation maps and military engineering maps). Since the Soviet military maps were compiled, edited and created in secret, details of the exact global coverage of the mapping and how the cartographic project was organized and run are yet to emerge. For the time being, it is perhaps only through the examination of individual sheets and the sharing of these observations and findings that a fuller and more accurate picture of the wider Soviet mapping project can be attempted.

3 Oxford

3.1 Topographic Mapping

The city of Oxford appears on sheet M-30 on Soviet 1:1,000,000 scale mapping, which conforms to the standard projection, datum and ellipsoid of the SK-42 series. Grid square M-30 lies at the intersection of IMW band M (spanning latitudes 48°–52°N) and zone 30 (spanning longitudes 0°–6°W) (see Fig. 1). The earliest known M-30 sheet was printed in 1938 (and therefore predates World War II) and the latest was printed in 1985. The city also appears on Soviet topographic sheets at the scales of 1:500,000, 1:200,000, 1:100,000 and 1:50,000. At 1:50,000, the largest of these scales, the city lies between two sheets, M-30-010-В 'УИТНИ' (Witney) and M-30-010-Г 'ОКСФОРД' (Oxford). The two non-rectangular sheets abut at 1° 15′ W (east of the city centre) and together cover an area 1° 30′–1°W wide and 51° 40′–51° 50′ N tall. The print codes in the lower right-hand margin (Fig. 2) include the successive job numbers B2111 and B2112, indicating that the maps were printed consecutively, while the notation VIII-81 refers to August 1981 and the 'Д' reveals that they were printed at the Dunayev military cartographic factory in Moscow (more details on the interpretation of print codes are provided in Davies and Kent 2017). The maps are printed in five colours: black, dark blue, dark orange, light orange and green, although the range of colours used is extended to eight with the use of halftones to produce grey, light blue and light green. Regarding source material, a caption in the bottom right-hand corner of each sheet notes that the sheets were 'compiled using 1:50,000 maps dated 1974'—a clear reference to the Ordnance Survey 1:50,000 *Landranger* series that was introduced that year. The Soviet 1:50,000 topographic maps include Marston Ferry Road and bridge, which opened in 1971 and are shown on the OS mapping of that scale.

The classification and depiction of topographic features on the Soviet 1:50,000 mapping enables a very easy assessment of the characteristics of the landscape. Although hypsometric tinting (layer colouring) is not implemented at this scale, unlike the 1:1,000,000 and 1:500,000-scale mapping, the 10-m contour interval is sufficient for terrain evaluation, while the use of colour for depicting urban areas is

Fig. 2 The print code on 1:50,000 Soviet topographic map sheet M-30-010-Г 'ОКСФОРД' (Oxford). The caption below the margin indicates the source mapping used, i.e. Ordnance Survey 1:50,000 maps from 1974 (reproduced from a private collection)

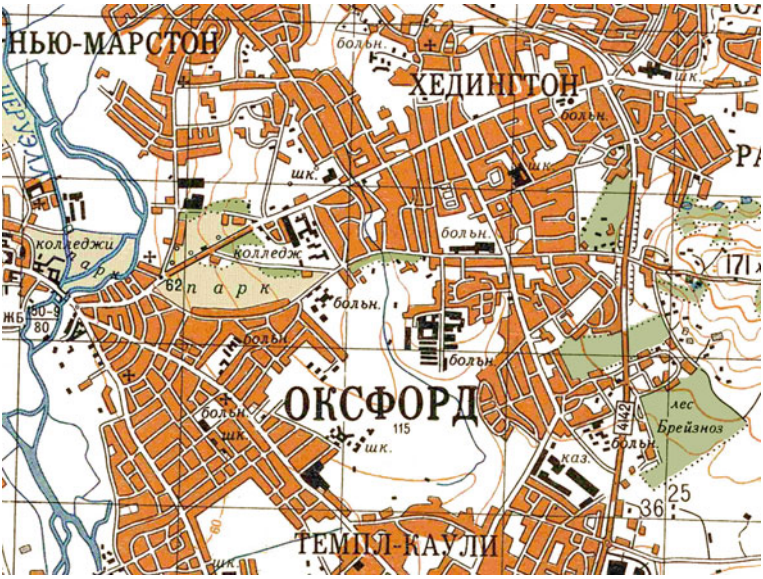

Fig. 3 Detail from 1:50,000 Soviet topographic map sheet M-30-010-Г 'ОКСФОРД' (Oxford) indicating the eastern half of the city, which includes the Morris car factories at Cowley to the southeast. Magdalen Bridge is annotated with details of its dimensions and carrying capacity (reproduced from a private collection)

especially useful. This allows a general distinction to be made between settlements with a population over 50,000 (in orange) and below (in grey), but also for significant industrial buildings (in black) to stand out, such as the car factories at Cowley to the southeast of the city (Fig. 3). In addition, the use of two shades of green allows vegetation to be distinguished between woodland (green) and parkland (light green), as per Headington Hill and South Park respectively.

The depiction of Oxford on these two 1:50,000 sheets is typical of the Soviet mapping of the UK at this scale. However, the eastern sheet includes a rare annotation beside Magdalen Bridge that indicates its construction material ('ЖБ', which denotes reinforced concrete), dimensions (150 m long by 9 m wide), and load capacity (80 metric tonnes) (Fig. 3). There are few other examples of these annotations on Soviet topographic mapping of the UK and given that the data are not readily found on OS maps or by reconnaissance imagery, it is possible that such information was derived from eyewitness accounts on the ground.

Further afield, sheet M-30-010-3 'ВУДСТОК' (Woodstock) includes the US Air Force Base at Upper Heyford in Oxfordshire, showing the runways and assorted buildings that were omitted as 'security deletions' from OS maps at the time. However, on a road adjacent to the perimeter of the airfield, the Soviet map includes an arrow symbol that is not part of Soviet symbology but indicates a steep hill on OS maps (Fig. 4). This suggests that the Soviet cartographers had copied Ordnance Survey mapping to the extent of introducing symbols where their meaning was

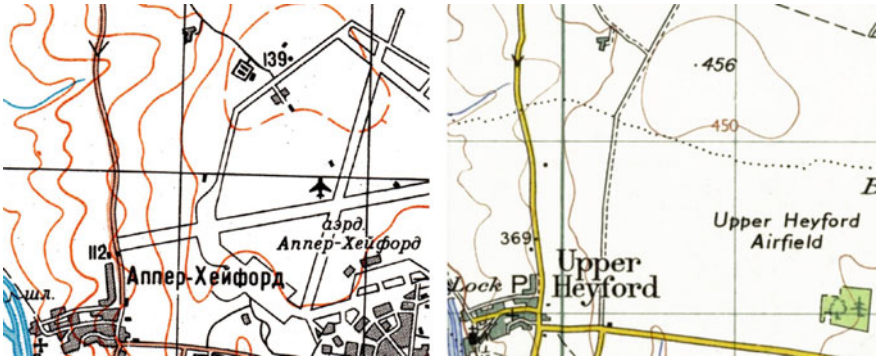

Fig. 4 Detail from 1:50,000 Soviet topographic map sheet M-30-010-B 'ВУДСТОК' (Woodstock) (left) showing Upper Heyford USAF Base and the area depicted on Ordnance Survey 1:63,360 'One-inch' sheet 145 (right). The arrow symbol at the top left of the OS extract on the steep road to Upper Heyford has been copied directly onto the Soviet sheet, yet it is not part of Soviet symbology (reproduced from a private collection)

unknown, as well as adding other features (such as military airfields) that had been omitted from OS maps. If this was not uncommon practice, it is likely that some of the characteristics of this and other indigenous topographic mapping from around the world, such as the cartographic generalization of urban areas, will have found their way onto Soviet topographic maps.

3.2 The 1:10,000 City Plan (1973)

The city plan of Oxford comprises two 1:10,000 sheets, which are divided into eastern and western halves abutting approximately 1° 14′ east of the city centre. These were compiled in 1972 and printed in Moscow in March 1973 using 10 colours (black, brown, tan, green, light green, blue, light blue, orange, purple and grey, plus a lighter shade of green as a halftone). The contour interval is 2 m and forty-one strategically important buildings and objects are included in the listing at the top right-hand corner of the eastern sheet. Removing the inner margins allows the whole composition of the plan to be appreciated (Fig. 5).

The most visually prominent feature on the Soviet plan is the huge industrial complex at Cowley, whose individual factories are correctly labelled in the accompanying listing as 'Morris Motors' and 'Pressed Steel Fisher'. These are rendered in black, as strategically important industrial objects. Their numerous buildings and warehouses are shown in detail (Fig. 6), together with the adjacent railway and Morris Cowley station on Garsington Road. Publishers are also identified and represented, with Alden Press on Binsey Lane and the historic buildings of Oxford University Press on Walton Street. Curiously, the premises of the former are classified as a governmental/administrative site (shown in purple) and the latter

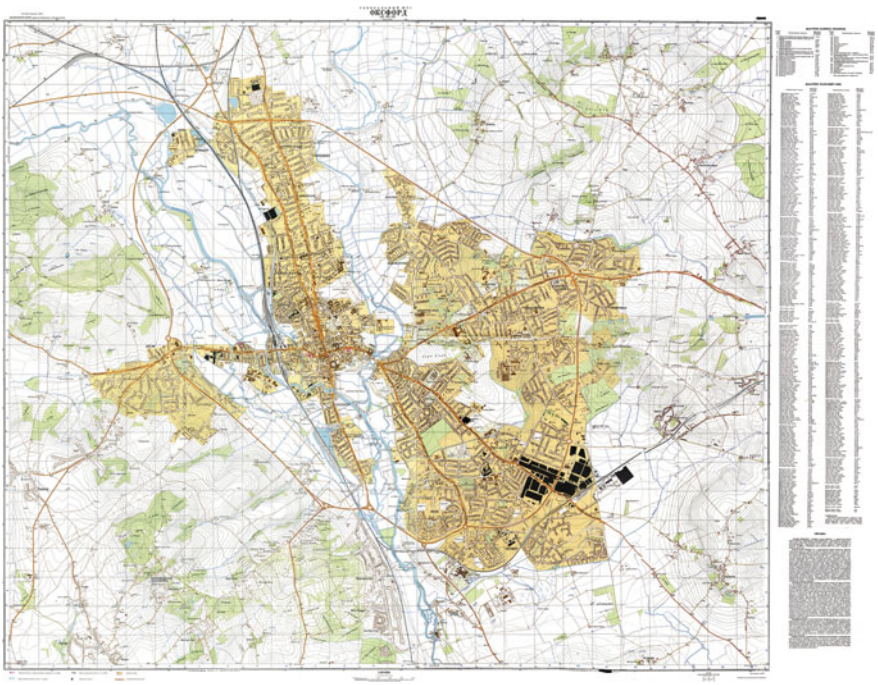

Fig. 5 The Soviet city plan of Oxford (1:10,000) that was compiled in 1972 and printed in 1973, shown here as a single composition by joining together the eastern and western sheets (reproduced from a private collection)

Fig. 6 Detail from the Soviet 1:10,000 city plan of Oxford showing the industrial complex at Cowley, with the Morris and Pressed Steel Fisher factories coloured black and labelled 1 and 2 respectively (reproduced from a private collection)

as industrial, possibly because of the more substantial printing presses and machinery in use at Walton Street. The buildings of Oxford Prison are depicted clearly, as are the Police Station, Town Hall, and the main Post Office on St Aldate's.

The plan also includes some anomalies. Marston Ferry Road, which has linked Marston to Summertown since it opened in 1971 (and is depicted on the Soviet topographic maps mentioned in the previous section), does not appear on the plan despite its compilation date of 1972. The Marston ferry across the River Cherwell is shown (that was superseded by the bridge), implying that older maps were used as source material. The plan also shows the gasworks at St Ebbe's, which were closed in 1960, and the two gas holders that were demolished in 1968. As for the University, although described in the accompanying spravka as comprising sixteen departments and twenty-five autonomous colleges, the only site to be identified and labelled as 'The University' is University College (indicated by a single building, number 39 and coloured purple). This interpretation was clearly borne out of confusion, but one which would make perfect sense to those unfamiliar with the University's multi-institutional structure. Several other colleges (but by no means all) are generically labelled *колледж* (college), while very few are specifically named (such as Merton, St Hilda's, and Worcester) (Fig. 7).

Railways, stations and their associated infrastructure such as sidings and turntables, are shown in detail on the plan. This detail includes, for example, the location of station buildings relative to the platforms. Some stations which closed long before the compilation date of the plan (1972) are included and named, for example Abingdon Road, which was closed in 1915. Similarly, Kennington Junction, which is named and appears on the plan as a station, had only ever been a signal box (Fig. 8). As the city plan also includes areas surrounding the city, it incorporates rural areas and villages several kilometres to the east and west of Oxford. At Boars Hill, five kilometres to the west, an area of land owned and managed by The Oxford Preservation Trust is labelled 'ЗАПОВЕДНИК ОКСФОРД' (Oxford Nature Reserve). This demonstrates that this Soviet city plan (and perhaps all Soviet military mapping) was principally an endeavour to collect and present geospatial data for a wide range of potential applications, rather than for meeting a specific military objective. That the plan depicts disused and misclassified infrastructure, such as the examples connected with railways as mentioned above, supports this view.

In the right-hand margin, the plan includes a spravka of almost 1000 words. This describes the topography, economy, industry, population, civil infrastructure, utilities, transport and communications of the city and its surroundings. Much of this information would have been derived from non-cartographic sources, such as directories and gazetteers. Translated from the Russian, it reads as follows:

GENERAL INFORMATION. Oxford is a county town and the administrative centre of Oxfordshire in the UK, a significant industrial centre, a famous university centre and a transport junction (6 railways and 9 highways), located on the river Thames,

Fig. 7 Detail from the Soviet 1:10,000 city plan of Oxford showing the city centre and North Oxford. University College is coloured purple and labelled '39', and is described erroneously in the numbered list as 'The University' (reproduced from a private collection)

80 km north-west of London. In 1969, there were 109.7 thousand inhabitants in Oxford; area of the city approx. 35 square km.

SURROUNDINGS OF THE CITY The city lies on a hilly plain, with the bottoms of the valleys of the river Thames and its tributary Cherwell having an almost flat surface, intersected by a network of rivers and drainage canals and ditches. Hills (height 70–170 m) have rounded peaks and predominantly gentle (less than 10°) slopes. Soils in the valleys, as a rule, are sandy, in the rest of the region they are sandy loamy, sometimes clayey. The main part of the locality consists of meadows

Fig. 8 Details from the Soviet 1:10,000 city plan of Oxford showing Abingdon Road (left), a railway station that closed in 1915, and Kennington Junction (right), a signal box that is depicted as a railway station (reproduced from a private collection)

and arable land; woody vegetation is found only in the form of small sections of forest saplings (park type), alongside roads, rivers, canals, and also as hedges along the boundaries of land. The largest water barrier is the river Thames (below the city, available for ships with a draft of 1.2 m; above, 0.9 m); its width is 20–60 m, the depth is 1.6–2 m, the current velocity is 0.8 m/s. The banks are dominated by low, shallow slopes. The other rivers are up to 20 m wide, up to 1 m deep. The largest canal, Oxford Canal, (accessible for vessels up to 21 m in length and 4.3 m deep) has a width of 13.3 m; it connects the tidal Thames with the Birmingham canal system. Highways are surfaced with asphalt and concrete. Oxford is partially visible from its surrounding heights. From the air, it is identified by its location at the confluence of the rivers of the Thames and Cherwell.

CITY TERRITORY. Oxford does not have a single system of planning. Its western part, located in the valley of the river Thames, is the historical core of the city. Here, the wide straight streets are combined with narrow and curved ones, the building is solid or dense, stone houses, 3–5-storey buildings; many ancient buildings of the Gothic style with numerous towers and spires. In this part of the city there are a number of administrative institutions, including the town hall (object 28), the post office (object 26), and the famous Oxford University (object 39), which unites 16 faculties and 25 autonomous colleges. At the university there are a number of scientific institutes, laboratories, museums, observatories, a botanical garden, a large library, sports grounds, etc. The eastern, newer part of the city is located mainly on the right slope of the valley of the Thames and the hills adjoining the valley. The streets here are predominantly wide, mostly straight. The building in the central part (adjacent to the Cherwell River near the Magdalen Bridge) is dense, the houses are 3–5 storeys. In the rest of the territory, as well as on the northern and southern outskirts of the old part of the city, the building is predominantly sparse 1–3-storey houses. In the eastern part of the countryside are the residential quarters of Oxford. Industrial enterprises are concentrated mainly in the southeastern and western suburbs. The city is well landscaped, there is a significant number (especially in the eastern part) of parks, gardens, squares.

INDUSTRIAL AND TRANSPORT OBJECTS. The leading industries of the city are machine building (including automobile, aviation and electrical engineering) and metalworking. The most important military-industrial objects are automobile plants (objects 1, 2) and iron foundry (object 9). The Oxford railway network includes several railway stations and passenger platforms, including the Oxford goods and passenger station (object 35) with well-developed track and storage facilities, a depot and a railway station.

UTILITIES AND MEDICAL AND SANITARY INSTITUTIONS. Oxford receives electricity from a local thermal power station (object 41), which is included in the country's integrated energy system. The city has a gas supply; there are three gas plants operating (objects 3, 4, 5). There is water supply and sewage. Oxford is provided with all kinds of modern communications. Within the city, transport is by bus. The city has 16 hospitals and a number of other health facilities.

The spravka is remarkably succinct, with a deft combination of a wide variety of information (e.g. from the city's general location and its major functions to the predominant style of architecture) with specific details (e.g. from the flow velocity of the River Thames to the number of hospitals). Some of the more practical information—especially relating to the soils and slopes of the surrounding terrain—would clearly be of use to military planners, but most of the text provides an almost charming account of the city that would not seem out of place in a tourist's guidebook. Indeed, it is plausible that at least one guidebook from the early 1970s was used as a source that perhaps mentioned the 1969 population as 109,700 ahead of the next census of 1971. It is possible that earlier sources were also used, including maps. For example, evidence of the use of Ordnance Survey mapping is provided by spot heights on the plan, which appear to have been copied from the OS 1:10,560 'Six-inch County Series' of 1922. The OS benchmarks on the northern bank of the Thames of 197.7, 196.4, 195 and 195.8 feet correspond exactly to spot heights at the same locations on the Soviet plan when converted to the respective metric values of 60.3, 59.9, 59.4 and 59.7 m. This perhaps becomes more surprising when considering that additional details that do appear on Soviet topographic mapping, such as the annotation associated with Magdalen Bridge on the 1:50,000 sheet, are not included on the larger-scale city plan.

4 Conclusion

The Soviet global military mapping project was the most comprehensive cartographic endeavour of the twentieth century. Like other towns and cities around the world, Oxford appears on Soviet topographic maps of a range of scales from 1:1,000,000 to 1:50,000 and was also the subject of a city plan at the larger scale of 1:10,000. Observations from a comparative analysis based on these sheets suggests the following:

- Although the topographic maps and city plans were produced by the Soviet General Staff and used the same projection, datum, ellipsoid and similar symbology, there is little evidence to suggest that the sources or resulting geospatial or topographic data were shared in the compilation and production of the maps;
- Comparisons with contemporaneous Ordnance Survey mapping of similar scales suggests that OS mapping was used as source material, yet a number of striking anomalies (particularly the absence or misclassification of features) suggest that this was far from systematic; and
- The intended purpose of the maps, and particularly the city plans, is ambiguous. The inclusion of a wide range of topographic information that extends to the function of buildings suggests that the primary objective was to collect and portray a comprehensive level of geospatial intelligence with clarity, therefore lending to the maps a breadth and versatility of application as opposed to a specific and more limited functionality.

Clearly, further research and investigation into the comparative quality and quantity of information included and presented on Soviet mapping is required in order to draw wider and more meaningful conclusions regarding its strategic value. Nevertheless, as availability of this substantial resource increases, it is likely that more studies will be conducted and therefore more possible that this goal will be realized in future.

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