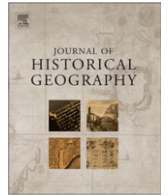




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Maps and the settlement of southern Palestine, 1799–1948: an historical/GIS analysis

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Abstract

Historical maps of the Negev Desert which comprises half of the total land area of Palestine can be viewed from several intersecting perspectives relating to aspects such as their contribution to tracing patterns of settlement and agricultural history, imperialism and mapping, and legal geography of land ownership and indigenous people. Here we focus mainly on the first theme, incorporate new methods and demonstrate their application to studies in historical geography.

Since the end of the 18th century the Negev has attracted considerable attention due to its strategic location straddling three continents, its history, and its archeology. After the European powers recognized the geopolitical importance of this area in the mid 19th century, numerous surveys and mapping efforts were conducted. In this study we reviewed 375 historical maps covering parts or all of the Negev between 1799 and 1948. These historical maps are crucial to the understanding of colonial developments, as well as landscape and settlement processes and the sedentarization of the Bedouin population. We scanned and rectified these maps using geographic information systems (GIS) to enable quantitative analysis of their accuracy, and to reveal new insights into settlement and sedentarization processes. Whereas the median error of maps that were based on explorers notes during most of the 19th century were at the order of several kilometers, the various Palestine Exploration Fund surveys (1872–1890) reduced these errors to the order of several hundred meters, and later maps produced by the British during World War I and by British Mandatory Survey of Palestine obtained errors well below 100 m. Careful analysis of these maps allows us to delineate the boundary between cultivated land and the desert, to follow the establishment of new settlements, and to quantify the sedentarization process of the nomadic Bedouin population. We conclude that analyzing historical maps with GIS provides a tool to determine their accuracy and hence potential usefulness for the study of topics such as settlement processes and legal disputes over land ownership.

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Keywords: Palestine; Negev; Historical maps; Geographic Information Systems; Colonialism and mapping; Bedouin; Sedentarization

Introduction

Maps have been defined as a 'symbolized image of geographic reality, representing selected features or characteristics'.¹ Most mapmaking has been undertaken by dominant groups that constructed maps to promote their interests and worldview, leading some to conclude that, 'maps are preeminently a language of power'.² The era of colonialism was dependent on exploration and mapping, and led to innovations in surveying and mapmaking. The colonial powers produced a vast wealth of maps and surveys.³ According to Benedict Anderson they created three integrated

institutions of power: the census, the map and the museum – which shaped the ways in which the colonial state imagined its dominion, the nature of the people it ruled, the geography of its domain, and the legitimacy of its ancestry.⁴ Following in this vein, Matthew Edney's study of Imperial British India demonstrated how mapmaking and imperialism intersected, and how mapmaking was used as a highly effective informational weapon, even as it pointed to a 'structure of feeling' that legitimated, justified, and defined imperialism.⁵ Beyond military applications, maps were used for purposes of government and control, to settle land ownership issues, to draw boundaries, to partition territories,

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¹ International Cartographic Association (1995), cited in Dorling and Fairbairn, *Mapping: Ways of Representing the World*, Harlow, 1997, 3.

² J.B. Harley, Maps, knowledge and power, in: D. Cosgrove and S. Daniels (Eds), *The Iconography of Landscape*, Cambridge, 1988, 277–312.

³ A.J. Christopher, *The British Empire at its Zenith*, London, New York and Sydney, 1988.

⁴ B. Anderson, *Imagined Communities, Reflections on the Origin and Spread of Nationalism*, London and New York, 1983.

⁵ M.H. Edney, *Mapping an Empire: the Geographical Construction of British India 1765–1843*, Chicago and London, 1997, 1 and 340.

and to rename places that made them more familiar to the colonizers.⁶

In the wake of this literature, historical maps of the Negev Desert in southern Palestine might be viewed from at least three different intersecting perspectives involving:

First, the application of GIS (*Geographic Information Systems*) techniques to incorporate historical maps in a *spatial analysis*. What was the accuracy of these maps, and what kind of spatial information can be extracted on historical settlement processes such as sedentarization of nomadic peoples?

Second, a focus on *Imperialism and mapping*. Considers maps as one of the means used by colonial powers to legitimize and justify imperialism, and settle border and land ownership issues.

Third, an interest in *legal geography*, regarding maps as means to legitimize ownership claims by the dominant group to indigenous lands, and as sources that may be used in present land ownership disputes.

Here we focus mainly on the first approach. We analyze multiple historical maps of the Negev using the modern tools of GIS, to analyze their spatial accuracy, completeness and reliability as a quantitative source for the study of historical settlement processes at the margins of the Ottoman Empire and British Mandatory Palestine.

The area known as Palestine was under Ottoman control for four centuries from 1517 until 1917. However, modern land registration was only introduced in this area following the Ottoman Land Code of 1858.⁷ Detailed literal definitions of the geographical boundaries of each parcel of land appeared in many Ottoman surveys, and in some cases large scale maps of villages and their lands were also

drawn (at the scale of 1:10,000). However, very few of these maps survived and the Ottoman Empire had no systematic cadastral mapping within Palestine.⁸

The gradual entry of European nations into Palestine after the Napoleonic invasion of 1799, and their ultimate conquest of these territories in World War I, was accompanied by intensive mapping efforts. Systematic surveys of Palestine were performed in the 19th century by European organizations and individuals, mainly the French and the British, but also to a lesser extent by the Germans, Russians, Dutch, French, Americans and other nationalities.⁹

The first trigonometrically based topographic map of Palestine was produced in 1799 by the French cartographer Pierre Jacotin at the scale of 1:100,000 during Napoleon's military campaign that extended from Egypt to Acre. Six sheets of the *Carte topographique de l'Égypte* were dedicated to Palestine, but they have been heavily criticized by modern researchers such as Karmon and Gavish, because of the haste with which the survey was performed and the inclusion of fictitious information.¹⁰ During the 19th century there were repeated calls for an organized survey of Palestine, 'recognizing the ineffectiveness of the haphazard collection of data by a lone traveler working for a short time wherever he happened to be'.¹¹

Interest in the mapping of Palestine increased due to its biblical significance as well as for scientific reasons (such as determination of the altitudes along the Jordan valley). However, the mapping of the country was delayed because it was not especially important, either strategically or geo-politically, to the European nations until the last third of the 19th century.¹² The establishment of the British Research Society of the Palestine Exploration Fund (PEF) in 1865 led to several surveys and mapping projects, the most notable of them being The Survey of Western Palestine that was conducted by lieutenants Claude Reignier Conder and Horatio Herbert Kitchener in 1871–1877.¹³

⁶ D. Pinder, Mapping worlds: cartography and the politics of representation, in: A. Blunt, P. Gruffudd, J. May, M. Obgoron and D. Pinder (Eds), *Cultural Geography in Practice*, London, 2003, 172–187.

⁷ R. Kark and H. Gerber, Land registry maps in Palestine during the Ottoman period, *The Cartographic Journal* 21 (1984) 30–32; R. Kark, Land purchase and mapping in a mid-nineteenth-century Palestinian village, *Palestine Exploration Quarterly* 129 (1977) 150–161; R. Kark, Mamluk and Ottoman cadastral surveys and early mapping of landed properties in Palestine, *Agricultural History* 71 (1997) 46–70; R.S. Fischel and R. Kark, Sultan Abdülhamid II and Palestine: private lands and imperial policy, *New Perspectives on Turkey* 39 (2008) 129–166.

⁸ Kark and Gerber, Land registry maps in Palestine during the Ottoman period (note 7); D. Gavish and R. Kark, The cadastral mapping of Palestine, 1858–1928, *The Geographical Journal* 159 (1993) 70–80.

⁹ Y. Ben-Arieh, The geographical exploration of the Holy Land, *Palestine Exploration Quarterly* 104 (1972) 81–92; Y. Jones, British military surveys of Palestine and Syria, 1840–1841, *The Cartographic Journal* 10 (1973) 29–41; D. Gavish, *A Survey of Palestine under the British Mandate, 1920–1948*, London, 2005; B. Rosen, Mapping the coastline of Israel by the British navy, *Cathedra* 64 (1992) 59–78 (in Hebrew); H. Goren, Scientific organizations as agents of change: the Palestine Exploration Fund, the Deutsche Verein zur Erforschung Palästinas and nineteenth-century Palestine, *Journal of Historical Geography* 27 (2001) 153–165; H. Goren, Sacred, but not surveyed: nineteenth-century surveys of Palestine, *Imago Mundi* 54 (2002) 87–110; M. Frumin, R. Rubin and D. Gavish, A Russian Naval Officer's Chart of Haifa Bay (1772), *Imago Mundi* 54 (2002) 125–128; R. Kark, The lands of the Sultan – newly discovered Ottoman cadastral maps in Palestine, in: G. Tolia and D. Loupis (Eds), *Mediterranean Cartographies*, Athens: Institute for Neohellenic Research INR/NHRF 2004, 197–222.

¹⁰ As detailed in Gavish (see note 9). A detailed analysis of the geometric, thematic and toponymic errors in Jacotin's map is given by Y. Karmon, An analysis of Jacotin's map of Palestine, *Israel Exploration Journal* 10 (1960) 155–173. The map itself was published as part of: P. Jacotin, *Memoire de la Construction de la Carte de l'Égypte, Description de l'Égypte* XVII, Paris, 1824.

¹¹ Goren (2002) 92 (see note 9). R. Kark and H. Goren, *Pioneering British-Holy Land Exploration: the Palestine Association, The RGS and the PEF*, ASTENE Association for the Study of Travelers to Egypt and the Near East, International Conference, Manchester, UK, July 2005, mention an earlier attempt of the British Palestine Association established in 1804 to investigate and map Palestine which failed after a few years of activity.

¹² J.J. Moscrop, *Measuring Jerusalem, The Palestine Exploration Fund and British Interests in the Holy Land*, London and New York, 2000; J.J. Moscrop, Strangers within the gates: the Royal Engineers and the Palestine Exploration Fund 1865–1870, *Cathedra* 103 (2002) 53–68 (in Hebrew); Interest in the region grew at the last quarter of the 19th century following the Crimean War (1856), and especially with the building of the Suez Canal by France, and its opening in 1869. The British and the French were then colonial rivals, and as the French began mapping the Galilee in 1870, and with a pending war between Russia and the Ottoman Empire (which indeed erupted in 1876), the British came to understand that it was in their interest to have good maps of Palestine (Goren, Sacred, but not surveyed (note 9)). As in other areas around the globe, the colonial era gave rise to a vast wealth of maps and mapping activities. In fact, British imperialism was highly dependent on maps (see notes 3 and 5).

¹³ This series of 26 sheets at 1:63,360 (inch to the mile scale) was considered the best map of the Holy Land/Palestine for at least 50 years, serving as a basis for updated and new maps, e.g. in the time of World War I and for archaeological surveys. Claude Reignier Conder and Horatio Herbert Kitchener, *Map of Western Palestine*, in 26 Sheets, from surveys conducted for the Committee of the Palestine Exploration Fund, London, The Palestine Exploration Fund, 1880; C.R. Conder and H.H. Kitchener, in: E.H. Palmer and W. Besant (Eds), *The Survey of Western Palestine, Memoirs of the Topography, Orography, Hydrography and Archaeology*, 3 Vols., London, 1881–1883 (Originally 7 Vols., 3 Vols. in the facsimile Edition of Kedem publishing house, 1970); Y. Shatner, *The Map of the Land of Israel (Eretz-Yisrael) and its History*, Israel, 1951 (in Hebrew); J. Elster, The British Palestine Exploration Fund map, in: J. Elster, M. Gilead, D. Amiran, N. Rosenan, M. Girdon, M. Zidon and N. Kadmon (Eds), *Atlas of Israel*, Jerusalem, Israel, 1956, 1/6 (in Hebrew); I.W.J. Hopkins, Nineteenth-century maps of Palestine: dual-purpose historical evidence, *Imago Mundi* 22 (1968) 30–36; R. Frankel, Some notes on the work of the survey of Western Palestine in Western Galilee, *Palestine Exploration Quarterly* 130 (1998) 99–105; Gavish (2005); Gavish, *A Survey of Palestine under the British Mandate, 1920–1948* (note 9); Y. Hodson, An introduction to the publication of the map and memoirs, in: D.M. Jacobson and Y. Hodson (Eds), *Survey of Western Palestine, including a Survey of Eastern Palestine: Introductory Essays*, The United Kingdom, 1999, 33–71; N. Levin, The Palestine Exploration Fund map (1871–1877) of the Holy Land as a tool for analyzing landscape changes: the coastal dunes of Israel as a case study, *The Cartographic Journal* 43 (2006) 45–67.

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