**Supplementary Material**

**Appendix 1**

**Research data**

# Historical street maps of Manhattan and Barcelona

**New York City 1642** [Map overlays streets as of 1880] From Report on the Social Statistics of Cities, Compiled by George E. Waring, Jr., United States. Census Office, Part I, 1886.

**New York City 1661** [Map overlays streets as of 1880] From Report on the Social Statistics of Cities, Compiled by George E. Waring, Jr., United States. Census Office, Part I, 1886.

**New York City 1695** From Manual of the Corporation of the City of New York for 1852 by D.T. Valentine, 1852

**New York City 1728** [Map overlays streets as of 1880] From Report on the Social Statistics of Cities, Compiled by George E. Waring, Jr., United States. Census Office, Part I, 1886.

**New York City 1755** [Map overlays streets as of 1880] From Report on the Social Statistics of Cities, Compiled by George E. Waring, Jr., United States. Census Office, Part I, 1886.

**New York City 1767** From A History of the American People, Woodrow Wilson, Harper and Brothers Publishers, New York and London, (c)1902, Vol II

**New York City 1775** A plan of the city of New-York & its environs : to Greenwich, on the North or Hudsons River, and to Crown Point, on the East or Sound River, showing the several streets, public buildings, docks, fort & battery, with the true form & course of the commanding grounds, with and without the town : From John Montresor, engineer ; P. Andrews, sculp

**New York City 1782** [Map overlays streets as of 1880] From Report on the Social Statistics of Cities, Compiled by George E. Waring, Jr., United States. Census Office, Part I, 1886.

**New York City 1808** From D. Longworth's map of 1808 for D.T. Valentine's Manual for 1852, by G. Hayward, lithr.

**New York City 1817** From Thos. H. Poppleton, city surveyor ; P. Maverick sc. Newark. Topographical map of the city and county of New-York, and the adjacent country 1836: Published by J.H. Colton & Co., No. 4 Spruce St., 1836 (New-York : Engraved & printed by S. Stiles & Co.)

**New York City 1842** "New-York" From Tanner, H.S. The American Traveller; or Guide Through the United States. Eighth Edition. New York, 1842.

**New York City 1850** From Mitchell Sr., S. A., A New Universal Atlas Containing Maps of the various Empires, Kingdoms, States and Republics Of The World.

**New York City 1880** [Map overlays streets as of 1880] "The Original Topography of Manhattan Island from the Battery to 155th Street" From Report on the Social Statistics of Cities, Compiled by George E. Waring, Jr., United States. Census Office, Part I, 1886.

**New York City 1891** From Bromley, G. W. and Bromley, W. S., Atlas of the city of New York / Manhattan island from actual surveys and official plans. Philadelphia: G. W. Bromley & Co., 1891. [web: rumsey]

**New York City (Lower Manhattan) 1920** "Chief Points of Interest in Lower Manhattan" From Automobile Blue Book 1920

**New York City (Upper Manhattan) 1920** "Chief Points of Interest in Upper Manhattan" From Automobile Blue Book 1920

**Barcelona 1200-1300** From Bensch, S. P. (1995) Barcelona and Its Rulers, 1096-1291. Cambridge \ New York \ Melbourne: Cambridge University Press. pp. 27

**Barcelona 1260** From Planta de la ciutat romana amb l’hipòtesi de situació dels elements distribuïdors d’aigua, From segons C. Miró i H. Orengo

**Barcelona 1494-1495** From Hieronymus Münzer account

**Barcelona 1698** French map from 1698 of the city of Barcelona with indications for a siege. Title: Plan du Siège de la ville de Barcelonne : Avec la Carte de la côte de la Mer depuis le Cap de Cervera jusqu'aux environs de Llobregat.

**Barcelona 1706** Plan de la Ville de Barcelone et Chateau de Mont Iuy (Plan of the City of Barcelona and Castle of Montjuic) From Anna Beeck

**Barcelona 1711** From Nicholas De Fer, published in 1711 in Paris.

**Barcelona 1745** From I. BASIRE 1745. prepared for Mr Tindal’s continuation of Mr Rapin’s History of England.

**Barcelona 1751** From Bodenehr's Curioses Staats und Kriegs Theatrum.

**Barcelona 1806** The walled city of Barcelona and the Citadel 1806. Plan of the City and Port of Barcelona. From: "Voyage de l'Espagne" by Alexandre de Laborde. - Paris, 1806-1820 arrow oriented with the north to the northeast of the map.

**Barcelona 1851** From G Heck

**Barcelona 1860** published by J & C Walker for the British Admiralty.

**Barcelona 1862** From Coronel, Teniente-Coronel de Ingenieros D. Francisco Coello. Aided by D. Pascual Madoz author of the statistics and historical notes Madrid 1862.

**Barcelona 1890** Plano de Barcelona y sus Alrededores en 1890. From D. J. M. Serra. by Gerona; S. by the Mediterranean Sea; S.W. by Tarragona; and W. and N.W. by Lrida.

**Barcelona 1914** From Plànol general de Barcelona. La febre tifoide a Barcelona: gràfic de l’epidèmia de l’any 1914

**Barcelona 1929** From Wagner & Debes, Leipzig,

**Barcelona 1943** From [http://www.lib.utexas.edu/maps/ams/spain\_city\_plans/txu-pclmaps-oclc-6478271-barcelona.jpg]

**Barcelona 1970** From the David Williams collection

Barcelona Field Studies Centre. Source: De Barcino a Barcelona 1992 Barcelona Contemporary Culture Centre [online] Available from <http://geographyfieldwork.com/Poll2.htm> [Date accessed: 14 October ‎2012]

**Appendix 2**

**Box Counting method**

The fractal *D* dimension might be obtained using the following method. A square mesh of various sizes *s* is laid over an image (containing the object that we want to compute its fractal dimension). The range of fractal dimension is relative to the image size of the two street structures. The number of mesh boxes *N(s)* that contain part of the image are counted. The fractal (box) dimension *D* is given by the slope of the linear portion of a log(*N(s)*) vs log(1/*s*) graph.

|  |  |
| --- | --- |
|  | (2) |

Since there is no preferred origin for the boxes with respect to the pixels in the image, multiple measures *N(s)* can be computed for different mesh origins. The graphed value of *N(s)* is usually the average of *N(s)* from different mesh origins.

The range of box sizes used here are; 2,3,4,6,8,12,16,32,64.