DATA VISUALISATION

Visualising the Science of Cities

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Data visualisations of a city and its systems are essential for understanding a city and its challenges. These visualisations range from 19th Century sketches and drawings to today's 3D-modelling and dynamic mapping. Moving beyond the purposes of architecture and land-use planning, these visualisations provide a lens on social, health, economic and environmental challenges in cities, galvanising change in planning and policy.

1854 Broad Street Cholera Outbreak

This map, by Dr John Snow, is an early example of using data visualisation for analysis. It mapped the location of deaths from cholera during the 1854 Broad Street outbreak. Most of the deaths were found to have been clustered around the water pump on Broad Street, which led to the removal of the pump handle. The map was influential in the field of public health, and helped change the understanding of disease (before germ theory was well established).

Causes of Mortality in the Crimean War (1853–1856)

Florence Nightingale's 1858 data visualisation of the causes of death in the Crimean War revealed that the majority of deaths were due to disease from poor hospital conditions. These were presented by "red" for wounds, "blue" for disease and "black" for all other causes.

Nightingale used the data to report on and campaign for improved living conditions in the army.
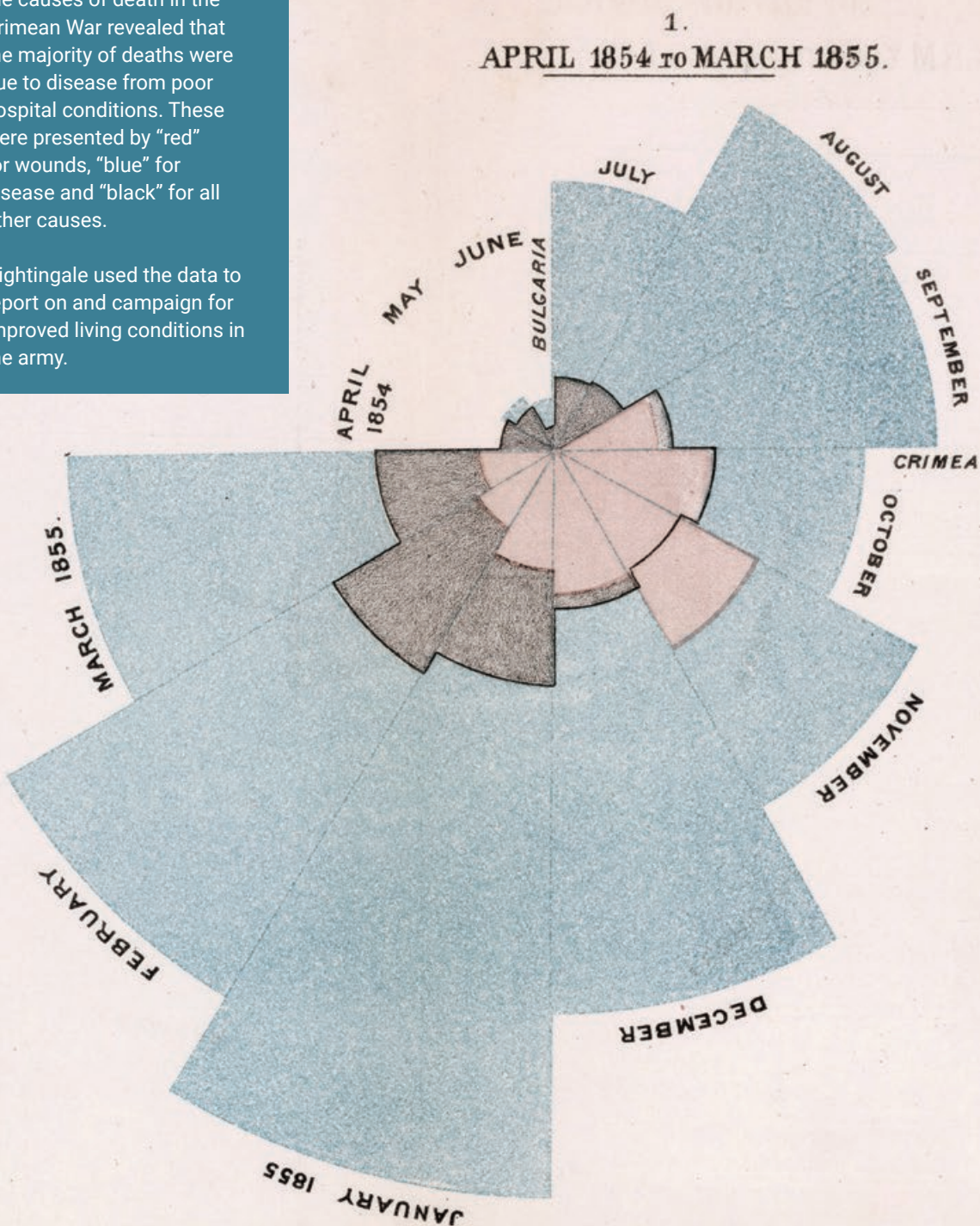
Image: Florence Nightingale / Wikimedia / Public Domain

Visualising the Effects of Sea Level Rise on Singapore

A rise of 1 m in sea levels would heavily impact Singapore. This visualisation was used by the Prime Minister Lee Hsien Loong at the 2019 National Day Rally as a call for collective and urgent action to address climate change.

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Image: Prime Minister's Office, Singapore

Image: 15-Minute City / Sony Computer Science Laboratory, Paris

Avg_Acc foot [min]
- 0.0 - 2.0
- 2.0 - 4.0
- 4.0 - 6.0
- 6.0 - 8.0
- 8.0 - 10.0
- 10.0 - 12.0
- 12.0 - 14.0
- 14.0 - 16.0
- 16.0 - 18.0
- 18.0 - 20.0
- 20.0 - 22.0
- 22.0 - 24.0
- 24.0 - 26.0
- 26.0 - 28.0
- 28.0 - 30.0

15-Minute Cities

The 15-minute city, first proposed by Carlos Moreno and popularised in Paris, describes an urban layout of liveable dense cities by decentralising a city and making all of a resident's needs accessible within a 15-minute walk or bike ride. The map rates different areas of Paris on how well they fare based on this ideal. Blue zones have more amenities that are within a 15-minute walk, while red zones have less.

This concept of designing cities and neighbourhoods centred on walking and biking has caught on and is being implemented around the world, in cities like Singapore, Shanghai, and Melbourne, with varying parameters of time.

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Foot
Bike
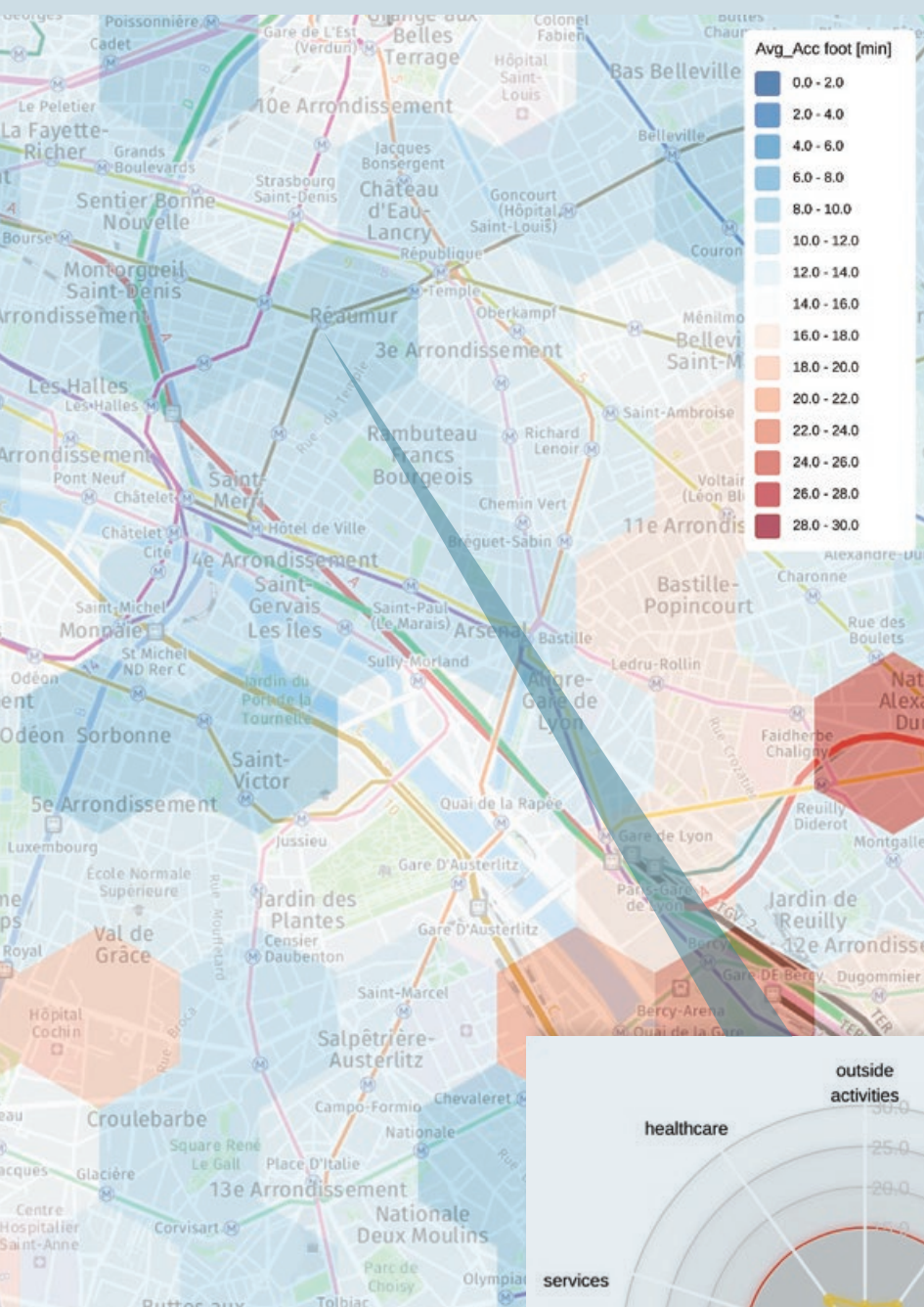
Poverty Map of London

Charles Booth's poverty map of London in 1889 highlighted that the poor were not solely responsible for the conditions they were in: poverty in cities had a spatial and environmental context, beyond the traditional health context. The maps offered a manageable way of dealing with clusters of poverty when no other forms of visualisations were available.

His findings also led to increased campaigning for social policies such as the introduction of old-age pensions and formal structures of labour, as most of the poor had inconsistent incomes leading to their constant state of poverty.

THE STREETS ARE COLOURED ACCORDING TO THE G
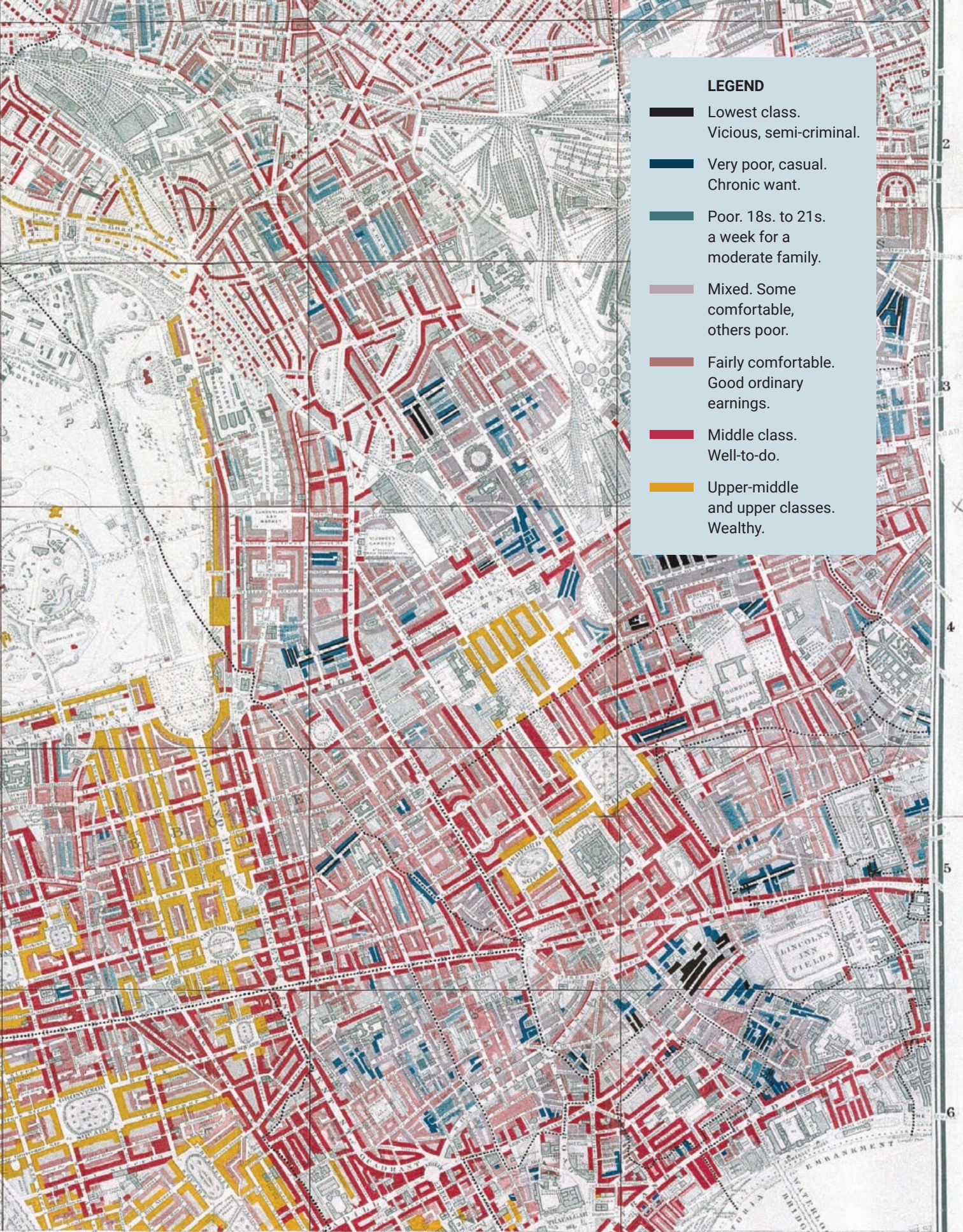
LEGEND

Lowest class. Vicious, semi-criminal.

Very poor, casual. Chronic want.

Poor. 18s. to 21s. a week for a moderate family.

Mixed. Some comfortable, others poor.

Fairly comfortable. Good ordinary earnings.

Middle class. Well-to-do.

Upper-middle and upper classes. Wealthy.

Treepedia–MIT Senseable City Lab

Treepedia visualises the green canopy of cities, using panoramic views of Google Street View and mapping them as an index, allowing efforts of greenery intensification to be compared across cities.

Increasing green canopy in cities is one of the priorities in urban cities due to rapid urbanisation and the consequent increase of urban-heat.

Images: MIT Senseable City Lab

Johannesburg

Green View Index	23.6%
Population Density	2,900/km²

Singapore

Green View Index	29.3%
Population Density	7,797/km²

New York

Green View Index	13.5%
Population Density	10,831/km²

Amsterdam

Green View Index	20.6%
Population Density	4,908/km²

Singapore

New York

Amsterdam