# Elementary processes governing the evolution of road networks – Supplementary Information

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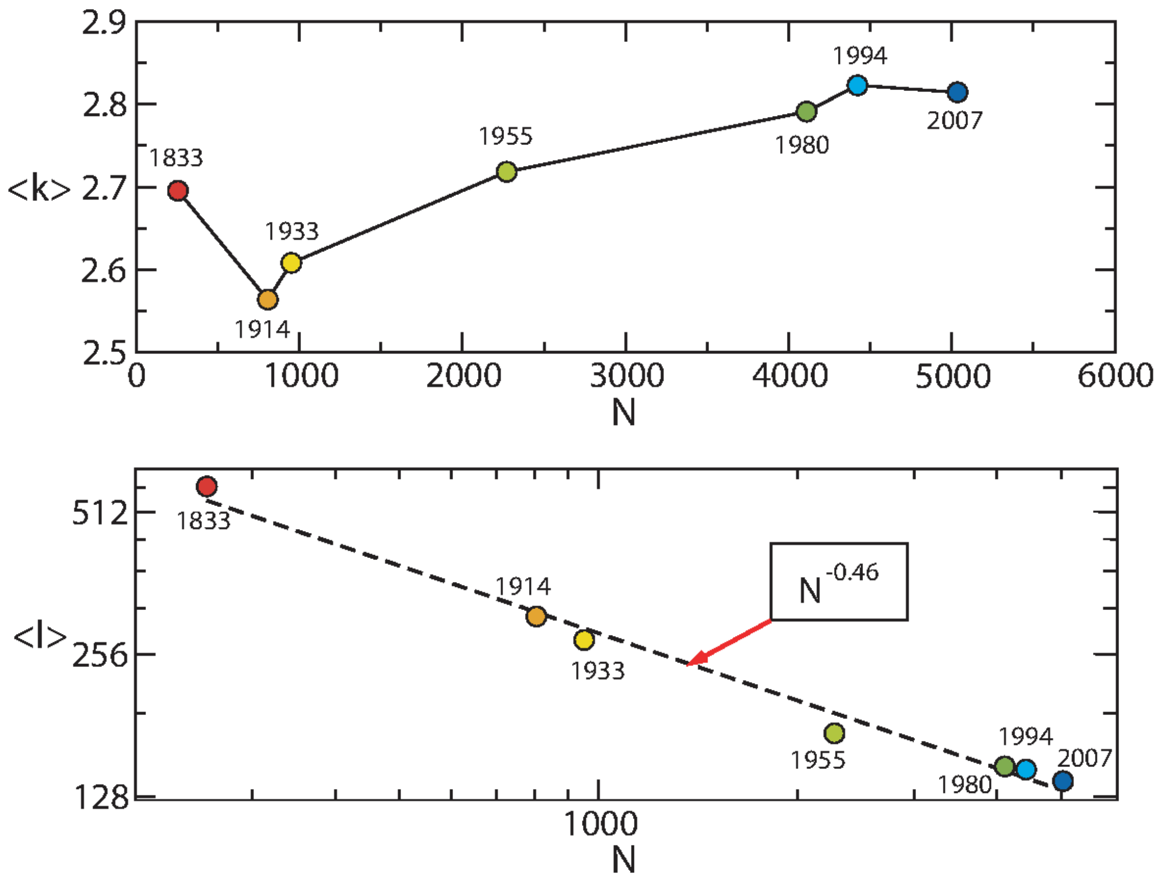
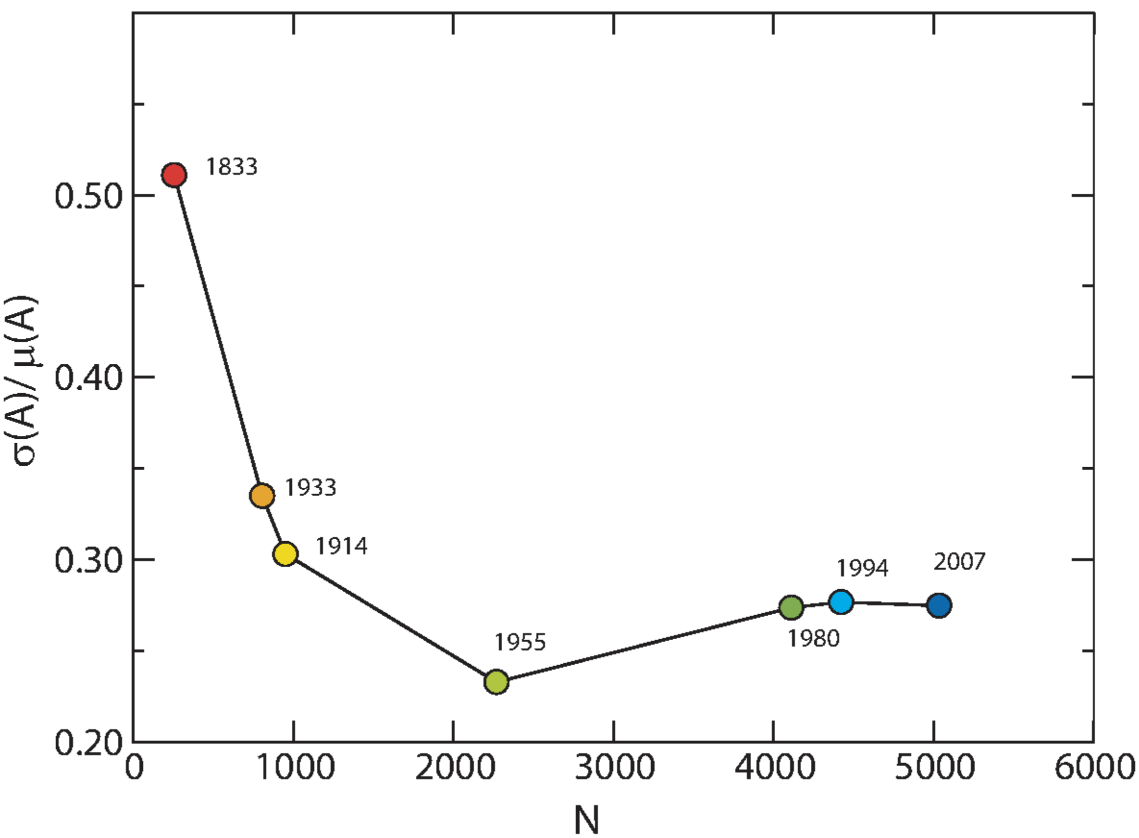
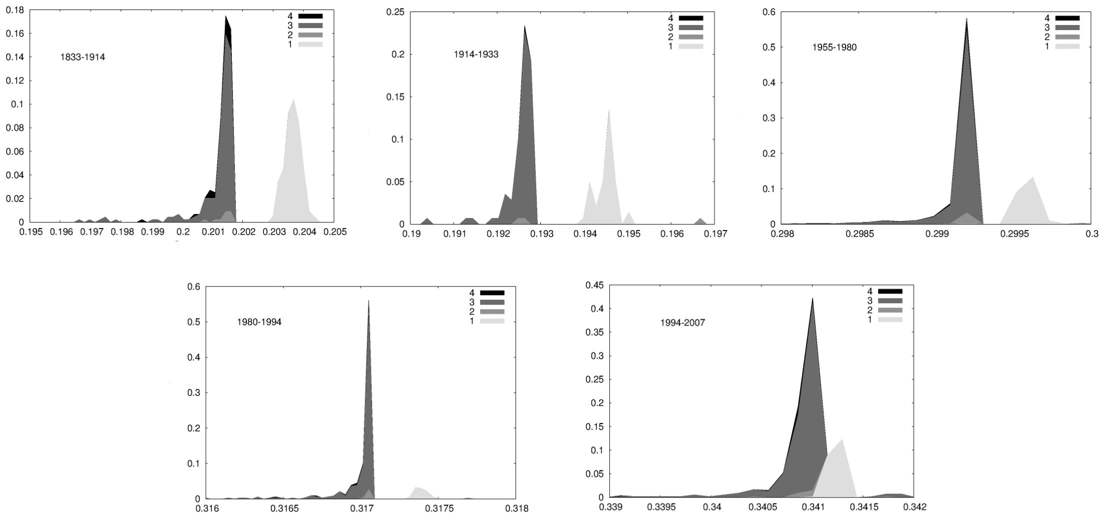



Supplementary Figure 1: **Node degree and edge length.** Top panel: the average node degree, i.e. the average number of roads that intersect in a crossing (top panel), slightly increases from $\langle k \rangle \simeq 2.57$ to $2.8$ as the network grows. Bottom panel: in agreement with the scaling of the total length of the network $L_{tot} \sim N^{0.54}$ (see Figure 2 in the main text), the average length of an edge decreases as $N^{-0.46}$.




Supplementary Figure 2: **Homogenisation of cell areas.** We show here, as a function of $N$, the relative dispersion of the distribution of the area of cells $P(A)$, defined as the ratio between the standard deviation $\sigma(A)$ and the average value $\mu(A)$ of the cell size. The decrease of the relative dispersion indicates that the distribution $P(A)$ becomes more and more homogeneous as the network grows.




Supplementary Figure 3: **Minimum of the degrees of the two end–nodes of a new link.** Each stacked chart shows, for each value of BC impact $\delta_b$, the proportion of new links having $k_{min}$ equal to $1$ (light grey), $2$ (grey), $3$ (dark grey) and $4$ (black), respectively. The rightmost peak corresponds to links having high impact on betweenness centrality, and is almost entirely due to new links for which $k_{min} = 1$. These links are the result of the exploration process: dead–end roads that branch out of existing edges and create a new 3-ways or 4-ways crossing. Conversely, links having smaller impact on centrality (leftmost peak) always have $k_{min}$ strictly larger than $1$, and the majority of them have $k_{min} = 3$. These links are due to the densification process: they connect existing roads, splitting a cell into two smaller sub-cells and creating two new crossings. The five panels correspond to the network at year 1914, 1933, 1980, 1994 and 2007, respectively. The plot at year 1955 has been included in Fig.5 of the main text.