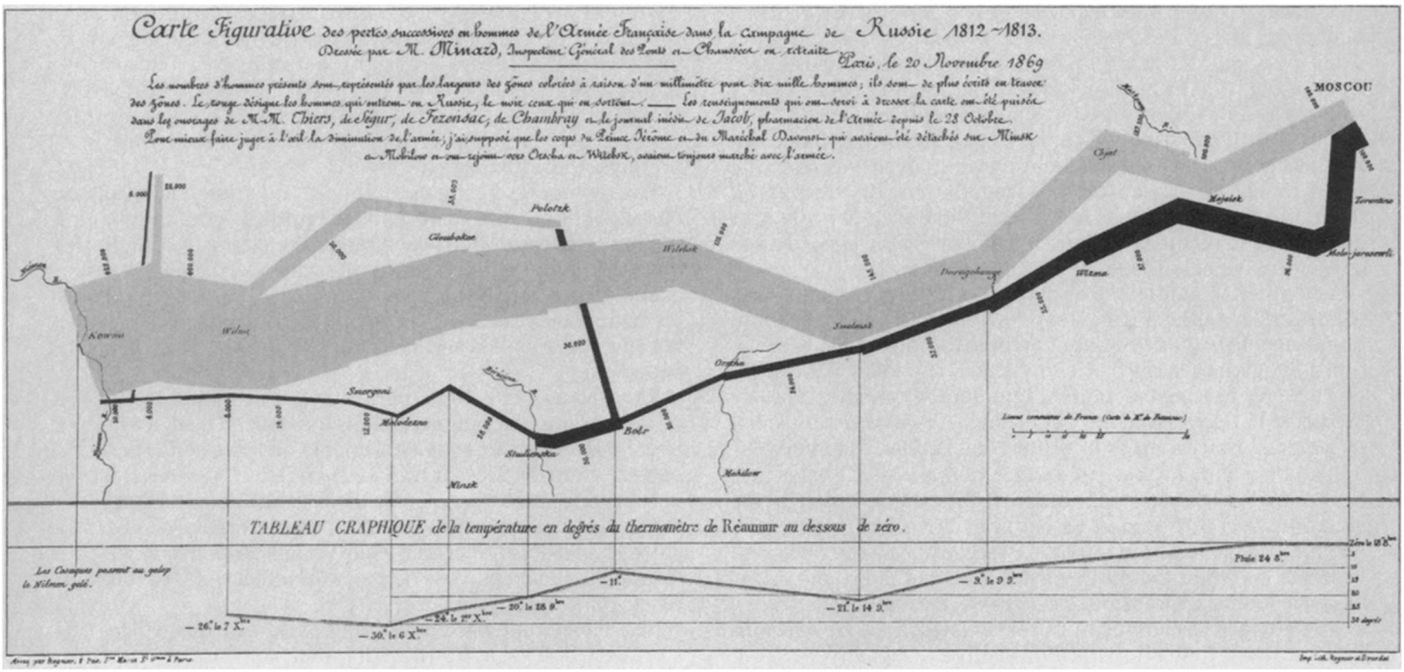
The Visual Display of Quantitative Information

EDWARD R. TUFTE



This map, drawn by the French engineer Charles Joseph Minard in 1869, portrays the losses suffered by Napoleon's army in the Russian campaign of 1812. Beginning at the left on the Polish-Russian border near the Niemen, the thick band at the top shows the size of the army (422,000 men) as it invaded Russia in June 1812. The width of the band indicates the size of the army at each position. In September, the army reached Moscow, which was by then sacked and deserted, with 100,000 men. The path of Napoleon's retreat from Moscow in the bitterly cold winter is depicted by the dark lower band, which is tied to a temperature scale (note how the path of retreating army and the temperature line move in parallel). The remains of the Grande Armée struggled out of Russia with only 10,000 men. Minard displayed *six* dimensions of data on the two-dimensional surface of the paper. It may well be the best statistical graphic ever drawn.

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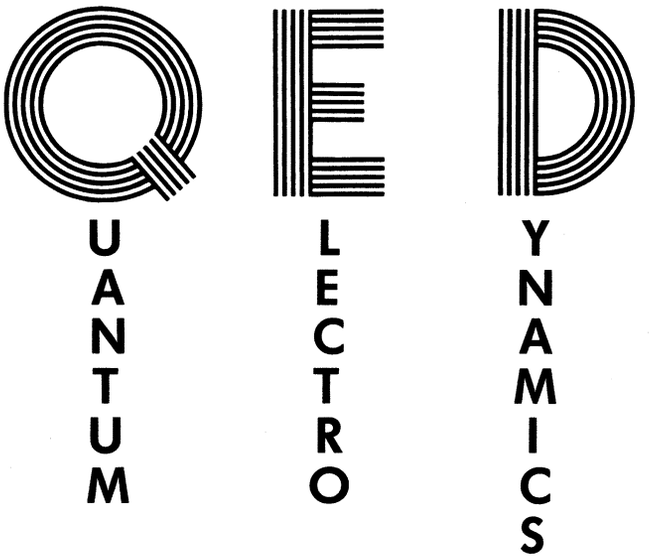

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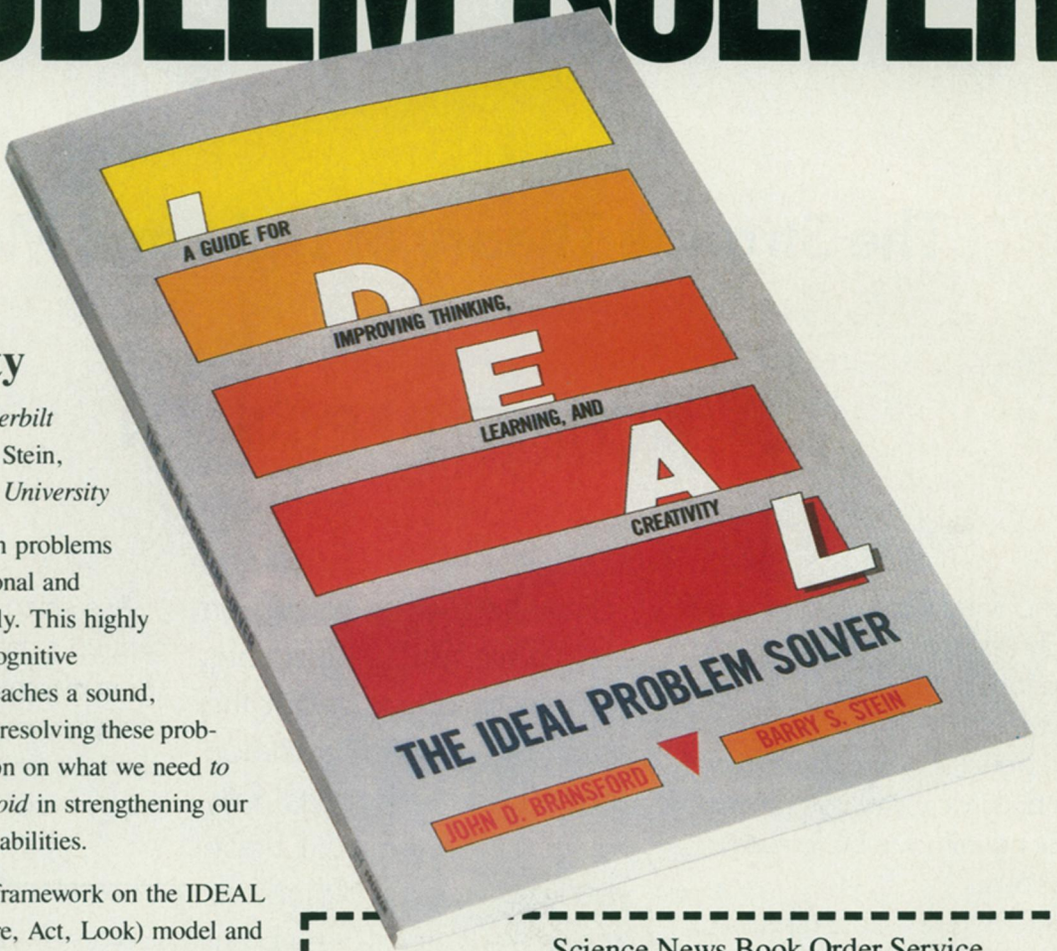

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