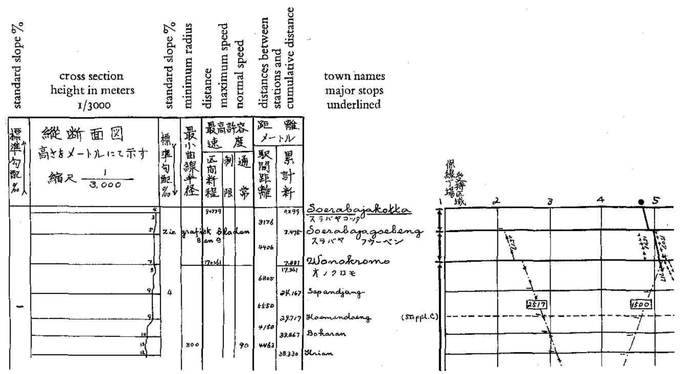
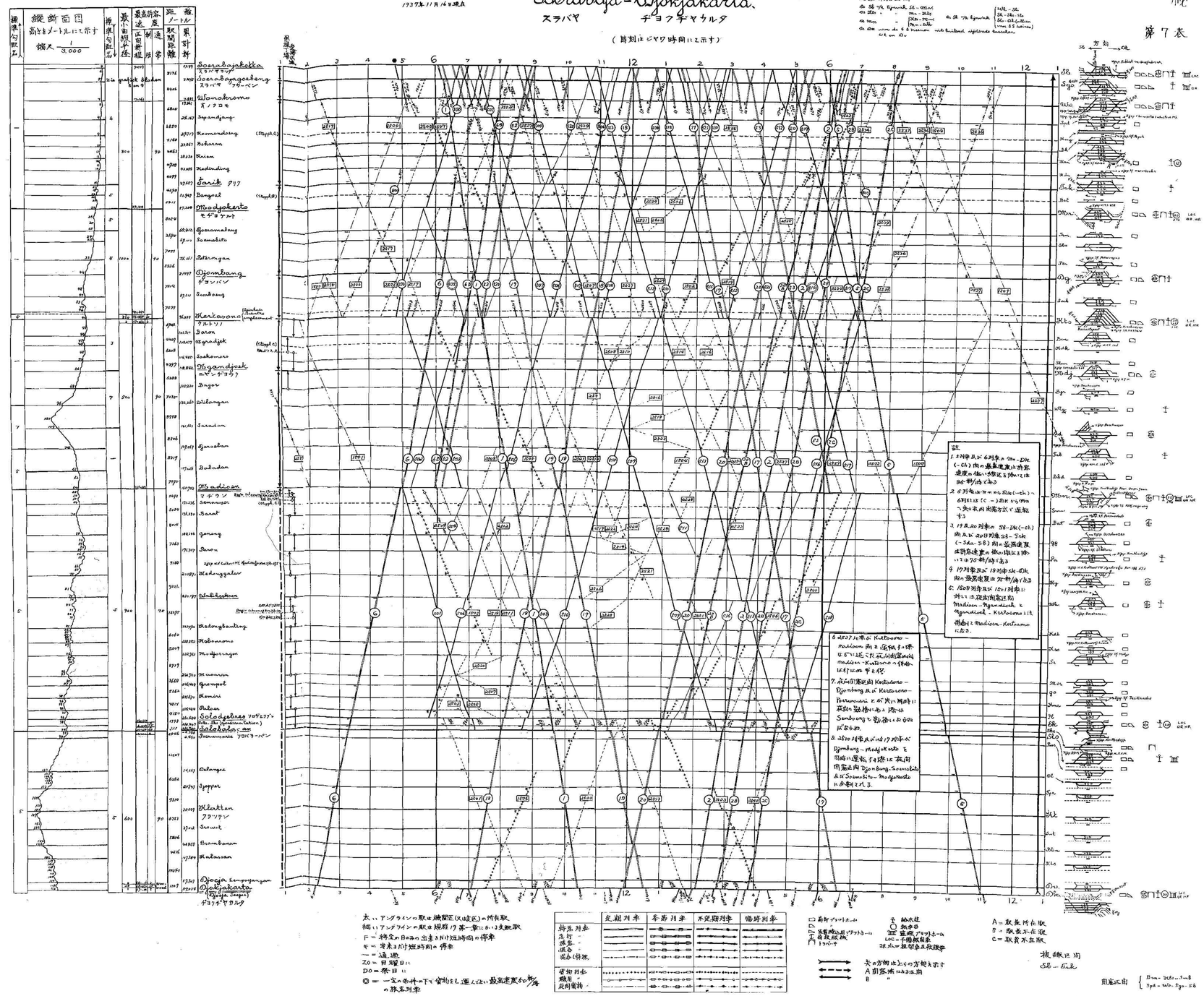
WONDROUSLY complex is this graphic timetable for a Java railroad line, Soerabaja-Djokjakarta, drawn in November 1937 (annotated in Dutch, then in Japanese). By smoothly suppressing a dimension first here and then several times there, finessing perspective treatments entirely, and changing the focus, this 24-hour railroad plan abstractly traces out multiple paths through three-space and time, in a four-dimensional tour with a dozen other variables carried along.

The time scale is read across the top; towns on the railroad route are indicated by names stacked down the column at left. Diagonal lines running from upper left to lower right show trains heading down \\ , return trains by diagonals going from lower left to upper right // . The first train from the top station, Soerabajakotta, leaves at about 4:50 in the morning (at the • dot), and then reaches the first stop just a few minutes later, and so on. Steeper lines are the faster trains. When trains going opposite directions pass by, an X appears. The arrangement repays meticulous study:

- Graphical timetables turn the three spatial dimensions of our daily world into one train-relevant dimension by measuring distance along the track itself. Horizontal grid lines, marking towns and station stops, are spaced approximately in proportion to their distance apart along the rails (yielding straight-line diagonals, assuming trains run more or less at constant speed over the entire route).
- The left margin of the timetable reflects another viewpoint, with a profile (at an enlarged vertical scale) of all the valleys and mountains crossed by rail. This visual depiction is accompanied by quantitative details, to the right of the profile, where columns of numbers describe the grade and path. Note how the vertical has been used repeatedly to



array parallel sequences of thoroughgoing data. In flatland, after all, every opportunity to spread additional information over an already-available dimension must be cherished.