

a distinct kind of structural system – or *constitution* – that lies beyond composition and configuration. This conceptualisation ties together the main structural concepts of the book into a single system.

The chapter provides new, constitutional interpretations of route type and network structure, to add to those developed previously on the basis of configuration or composition. These interpretations help to explain the ‘structure of car orientation’ and the ‘structure of disurban creation’ which lie at the heart of the challenge of streets and patterns.

### **HIERARCHICAL STRUCTURE**

Hierarchy implies more than just a spectrum from ‘major’ to ‘minor’ (Figure 7.1). As we saw earlier, in Chapter 3, hierarchy tends to bundle together a variety of elements or dimensions, some of which will have definite structural relations implied. For example, arterial roads and local roads are differentiated because arterial routes all connect up in a single national system, whereas local roads form a more fragmented set of sub-networks. In this section we can explore the nature of hierarchy in more detail, to unpick different aspects of hierarchical structuring.

#### *Structural conditions*

The quotation at the opening of this chapter relates the structure of the road network to the structure of a tree. This stimulates the question: in what sense – or senses – is the structure of the road network like the structure of a tree (Figure 7.2)? Although at first sight it is a simple analogy, it is open to more complex interpretation, and potentially harbours no less than six different connotations of tree structure.

These six connotations equate to different aspects of the meaning of ‘hierarchy’ that we can refer to as ‘structural conditions’. These structural conditions are worth exploring in detail, as they help to articulate fundamental aspects of structure that will be referred to throughout the rest of the book. These are interpreted with respect to the tree analogy in Figure 7.3.

The first structural condition is the *differentiation of components*: each component is a different type of thing – these could be ‘things’ as disparate as trees and roads themselves.

The second condition is the *ordered ranking of elements*, for example, a ranking from wide boulevard to narrow lane.

The third condition is the *necessary connections* between different types of element. In the case of a tree, ‘necessary connections’ means, for example, that a branch cannot ‘float alone’ in a matrix of twigs: it must