experience both well- and poorly-daylit areas during the shortest of walks. It is of course quite natural for people to associate a wide range of subjective environmental and social factors with the perceived solar access. Offices or apartments where the main windows see little of the sky may be considered gloomy and unattractive. Streets or zones with very restricted solar access may be perceived as squalid or dismal. In public spaces, poor solar access may even be associated with criminal and anti-social behaviour, such as muggings or vandalism. Whatever the realities of the situation, the perceived amenity of living or working spaces and the use that people make of the public spaces will depend in part on the perceptions that are related to solar access. This presents a formidable problem to planners and architects: How can the constantly changing daylight in urban environments be assessed in terms of some meaningful measure of solar access? In the sections that follow, the traditional methods used to estimate solar access are described and their shortcomings identified. A new schema to quantify urban solar access is proposed and the means to compute it are outlined. A series of examples demonstrating application of the new schema are presented.

Imagining solar access

A (non-exhaustive) list of factors relating to commonly perceived notions of solar access might read as follows:

- *Overall perception of the space (internal or external)*; Is the space 'bright/open' or 'gloomy/squalid'?
- *Direct exposure to sunlight*; Can the sun be 'seen', and, if so, for how long?
- *Availability of daylight*; How 'much' of the sky is visible? Is there a greater 'view' of sky for some directions than others, for example to the north or south?

Efforts to systematize these perceptions into a schema that can be applied to the evaluation of building designs or urban plans has not resulted in a consensus view: solar access means different things to different people. Two very different analytical techniques are commonly employed in an attempt to make some measure of solar access in urban environments. One of these is based on shadow patterns cast by the sun at various times of the year; for example, on the summer solstice. For this, a sequence of images is produced using either scale models with a heliodon

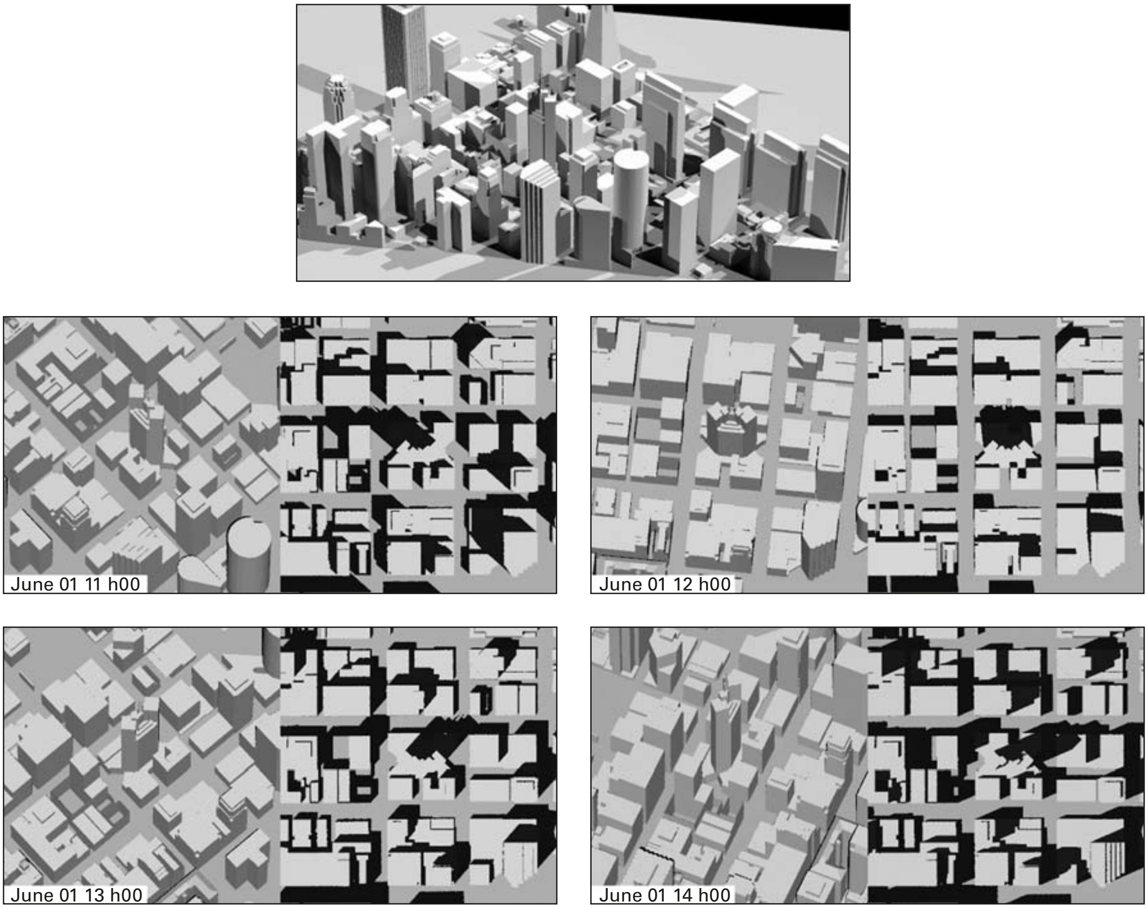

Figure 19.1
Shading patterns for San Francisco 3D model.

or by computer rendering (Figure 19.1). This approach is essentially qualitative: the brightness of the sun plays no part and the light from the sky is not considered. The other method is based on the illumination provided by a single (i.e. unchanging) standard overcast sky without sun. The brightness of the standard overcast sky increases gradually with altitude from the horizon to the zenith, but it does not vary with azimuth. In other words, the illumination received at any surface will not change if the building model is rotated about the vertical axis.[1] Although quantitative, the second approach is highly idealized because only one sky condition is considered: no account whatsoever is made of the sun or non-overcast skies (Figure 19.2). It may be that both methods are employed together. However it is not at all clear how, in an analysis, it is possible to weigh one (or more) shadow patterns against a measure of the illumination from a (sunless) overcast sky.