

UNST 124g winter 2012  
*Cities: what are they good for?*

## 1 introduction

Stated most simply, cities are about organization. The residents of a city, together with their labor, resources, work products, waste, and interactions with outsiders, are all organized in some way. From the most orderly planned city to the most densely packed favela, all cities and their neighborhoods have an organizational scheme related to the flow of people, materials, and energy. The scheme may or may not be centrally planned. Recognizing these attributes, urban scholars often think about cities as *systems*, sometimes drawing analogies to biological systems, either in the context of ecology or metabolic processes (Kennedy, 2007).

Systems may be described according to their structure, behavior, and degree of internal and external connectedness. In physics, systems are said to be closed if no matter is exchanged between the system and its surroundings (as is nearly the case for Earth) or open if material is exchanged across the boundaries of the system. Cities are all open systems, although the flow and transformation of material—and energy—varies widely among cities. The flow of material and energy depends on the structure of the city system—its street and land use patterns, transportation technology, and population density—and choices made by the city’s residents regarding individual and collective behavior. The structure of and processes operating within a city at any particular time are the result of choices made throughout its history.

Cities all have characteristic morphologies that reveal something (if we know how to read the patterns) about their history and geographic context. Viewed from above, most cities are arranged in grid-like patterns, perhaps as mosaics of more or less regular grids in which different details representing different epochs of development and local technology. What makes a grid a grid is the degree of connectedness among its streets—there are frequent intersections and infrequent dead ends. City patterns may be planned or may develop over time as a result of individual and local-scale decisions (Hélie, 2009). The organization scheme of a planned urban system like Portland’s is easy to recognize, but the spontaneous development of a Brazilian favela also results in a system with an organizational structure.

Centralized governments have planned regular (orthogonal) urban grids since at least the 27th century BCE founding of Harrapa and Mohenjo-daro in the Indus River Valley (Stanislawski, 1946). A millennium later, Hammurabi rebuilt Babylon following a grid scheme. Grid plans developed in China in the 15th century BCE and have been the design of choice there ever since. Grids are efficient organizational schemes, extend easily as the population grows, and facilitate real estate transactions. Civic leaders and planners throughout history have found long, orderly vistas of the regular grid elegant statements of power. Grids offer advantages to city users as well. The continuity and frequent intersections characteristic of regular grids simplify local transit, particularly for pedestrians.

Regular grids are not without their critics. In his treatise *Politics*, Aristotle expressed concern that streets arranged in a regular-grid plan were fine in times of peace,

but for safety in time of war, on the contrary, they should be built as they formerly were; for they were such that strangers could not easily find their way out of them, and the method of access to them such as an enemy could with difficulty find out if he proposed to besiege them. A city therefore should have both these sorts of buildings, which may easily be contrived if any one will so regulate them as the planters do their rows of vines; not that the buildings throughout the city should be detached from each other, only in some parts of it; thus elegance and safety will be equally consulted.

(Chapter XI, Ellis , 1912). Seen from another perspective, regular grids simplify the maintenance of civic order. Aristotle was also in favor of a strong—and attractive—city wall, “for those who are well prepared are seldom first attacked.” A perhaps more practical consideration is the greater cost of road construction associated with continuous rather than discontinuous (for example, branching) street patterns.

The integrated effects of the processes operating within the city system and the process that connect the city with other regions determine its ecological footprint. Cities with relatively high population density and mixed-use planning tend to have relatively small ecological footprints relative to cities with low population density and relatively separate centers for commercial and residential activities. In general, attributes that tend to shorten transit times and reduce overall energy use result in smaller ecological footprints (Dodman, 2009). Adaptation to regional climate also influences ecological footprint, primarily via the energy associated with heating and cooling indoor space. The environmental effects of demand on ecosystem services water management may also be important.

## 2 assignment

You have been assigned two readings about the history and function of cities. In the first, environmental historian Anthony Penna (2010) presents a short history of urbanization, emphasizing the role of cities as centers for innovation and trade while highlighting the environmental costs associated with their scale. In the second, ecologist Nancy Grimm and colleagues (2008) review current scholarly understanding of cities as ecosystem elements. The article by Grimm and colleagues is written for a scientifically literate audience and assumes familiarity with terminology from ecology and related fields. As you read the paper for the first time, note words with which you are not familiar and investigate their meanings.

Two reference websites that may be very useful for these readings and throughout the term are the education website <http://www.nature.com/scitable> maintained by the journal *Nature* and the online *Encyclopedia of Earth* <http://www.eoearth.org/> maintained by the University of Boston and the National Council for Science and the Environment.

1. Cities are described in various ways, from centers of innovation and expression to voracious, soulless consumers of land and resources. Penna and Grimm present attributes of cities that fit both descriptions. Identify and describe attributes of cities that fit both categories, citing your sources appropriately.
2. In asserting that “Urbanization leads to increased patch fragmentation and diversity,” Grimm and colleagues use terminology from the study of landscape ecology to make a point about urban environments. Use the science education website <http://www.nature.com/scitable>, developed

by the scientific journal *Nature*, to research the technical terms and then explain, in your own words, the point the authors are making.

3. In an installment of his series *Sketches by Boz*, published together in 1836, Charles Dickens described the Dials, a neighborhood of London

The peculiar character of these streets, and the close resemblance each one bears to its neighbour, by no means tends to decrease the bewilderment in which the unexperienced wayfarer through ‘the Dials’ finds himself involved. He traverses streets of dirty, straggling houses, with now and then an unexpected court composed of buildings as ill-proportioned and deformed as the half-naked children that wallow in the kennels. Here and there, a little dark chandler’s shop, with a cracked bell hung up behind the door to announce the entrance of a customer, or betray the presence of some young gentleman in whom a passion for shop tills has developed itself at an early age: others, as if for support, against some handsome lofty building, which usurps the place of a low dingy public-house; long rows of broken and patched windows expose plants that may have flourished when ‘the Dials’ were built, in vessels as dirty as ‘the Dials’ themselves; and shops for the purchase of rags, bones, old iron, and kitchen-stuff, vie in cleanliness with the bird-fanciers and rabbit-dealers, which one might fancy so many arks, but for the irresistible conviction that no bird in its proper senses, who was permitted to leave one of them, would ever come back again. Brokers’ shops, which would seem to have been established by humane individuals, as refuges for destitute bugs, interspersed with announcements of day-schools, penny theatres, petition-writers, mangles, and music for balls or routs, complete the ‘still life’ of the subject; and dirty men, filthy women, squalid children, fluttering shuttlecocks, noisy battledores, reeking pipes, bad fruit, more than doubtful oysters, attenuated cats, depressed dogs, and anatomical fowls, are its cheerful accompaniments.

- (a) Were the problems identified by Dickens unique to the 19th century city? Please explain your answer, citing your sources appropriately.
  - (b) At the time this was written, London was the largest city in the world and its population was growing every day. More than a third of the city’s population were immigrants. Why might people continue to migrate to the city, given the challenges of urban life? As always, cite your sources appropriately.
4. As discussed in the introduction to this assignment, cities differ in their development history and geographic context and, as a result, have different structures, behaviors, and ecological footprints. Use the Vulcan Project’s (<http://vulcan.project.asu.edu/>) Google Earth application to examine CO<sub>2</sub> emissions from fossil fuels, a major contributor to the urban ecological footprint, for different regions of the United States.
  - (a) Are regions (counties) with the largest absolute emissions also also characterized by the largest *per capita* emissions? You may wish to compare maps with the source icons on and off (left hand column).
  - (b) Compare the *per capita* CO<sub>2</sub> emissions of New York City (New York County), Denver, Colorado (Denver County), and Portland, Oregon (Multnomah County). Why do you think the different cities have different emissions patterns?

### 3 references

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