Think of the earth as a living organism that is being attacked by billions of bacteria whose numbers double every forty years. Either the host dies, or the virus dies, or both die.

- Gore Vidal
Population and Settlement
Part I

- Where did all of these people come from?
- Population Distribution
- Population Density
- Population Concentrations
- Population Patterns
Where did all of these people come from?
Cultural Hearths of Civilization

If you need to, refer to the discussion of cultural hearths in the course Margin Notes.
Permanent Human Settlement by 5000 BC
Permanent Human Settlement by 1 AD
Permanent Human Settlement by 1500 AD

Map showing regions of intensive settlement, small-scale agriculture, hunting and gathering, and uninhabited areas.
Permanent Human Settlement by 1900 AD
World Population, 2016
POPULATION DISTRIBUTION:
the location and arrangement of a population across space
Why do we live where we live?

- plentiful water
- good land
- favorable climate
- religious significance
- government
- transportation center

It's 2025. Where Do Most People Live?
Describing Distributions

Density

Concentration

Pattern
World Population Distribution

- World population is unevenly distributed for several reasons.
  - Habitable vs. Uninhabitable Land
    - Habitable land is suitable to live on. Of Earth's 57.5 million square miles of land, approximately 12 million are habitable.
    - Uninhabitable land is too hot or cold, too wet or dry, or too mountainous to support humans.
World population is unevenly distributed for several reasons.

- Arable vs. Non-arable Land
  - Arable land can be used to grow crops. Of the earth's 57.5 million square miles of land, approximately 7.65 million are arable.
  - However, arable land can be lost to droughts, erosion, improper farming practices and urban sprawl.
Arable vs. Non-arable Land

% of Arable Land by Country
World Population Distribution

- Arable vs. Non-arable Land
  - Non-arable land usually has at least one of the following deficiencies: no source of fresh water, too rainy, too hot (desert) or too cold (Arctic), too rocky or mountainous, too salty or polluted, too nutrient poor.
  - Non-arable land can be converted to arable land by irrigation, desalination and fertilization but those techniques are expensive.
  - Exceptions: People can live on non-arable land if they have developed an alternative way to make a living (for example, mining).
A cartogram is a map used to present statistical information. Above, each state’s size is based on the size of its population, not its total mi$^2$. 

- = 20 million people
POPULATION DENSITY: the frequency with which population occurs in a given area
Density Types

- **arithmetic density**: the total number of people per area of land (measured in km$^2$ or miles$^2$)
- **physiological density**: the total population per area of arable land
- **agricultural density**: the total *rural* population per area of arable land
- **residential density**: the number of people living in an urban area or area of residential land
- **urban density**: the number of people inhabiting an urban area or total area of urban land
- **ecological optimum**: the density of population that can be supported by the natural resources
Most Often Used by Geographers

**arithmetic density** – the total number of people per a unit of land area

2016: US = 92/mi²; NYC = 27,000+/mi²; Australia = 8/mi²
Population Density

... a measure of how crowded a place is

Think of it this way.

Imagine a city block that is entirely taken up by a high-rise apartment building. Think of the number of people who live within that one-block area.

Now imagine an equivalently-size space out in the country – say, 2.5 acres – that is part of a family farm. How many people might live within that area?

Even though the two areas are roughly the same in size, they have very different numbers of people living within them. The city block has a much higher number of people living in it than does the 2.5 acres in the country.

That’s population density!
Population density can vary greatly from place to place and the variances are not necessarily due to “natural” factors such as habitability or arable land. Density is often a function of cultural factors, such as the definition of landownership or levels of taxation.
Population Density by Continent, 2016

- North America - 50 people / mi$^2$
- Latin America and the Caribbean - 82 people / mi$^2$
- Europe - 87 people / mi$^2$
- Asia - 370 people / mi$^2$
- Africa - 106 people / mi$^2$
- Oceania - 12 people / mi$^2$
- World excluding Antarctica - about 130 people / mi$^2$
Density of World Population, 2016
Population Density Estimates, 2100
High Density in Bangladesh

2016: 3,241 people per mi$^2$
High Density in Japan

2016: 897 people per mi²

- attendants or “pushers” on the Japanese train system
- Despite having a declining population, Japan has a very high population density.
High Density in India

2016: 1,156 people per mi²
POPULATION CONCENTRATIONS: areas in which greater numbers of population are gathered
Earth’s population concentrations are found in:

- East Asia: ¼ of world population, most from China, concentrated near the coast and in river valleys
- South Asia: ¼ of world population, most from India, concentrated along the plains of the Indus and Ganges rivers and the coastlines
Earth’s population concentrations are found in:

- Europe: one-ninth of world population, concentrated in cities
- North America: megalopolis - a chain of roughly adjacent metropolitan areas, along US eastern seaboard including Boston, New York City, Philadelphia, Baltimore, D.C. and southeast Canada
• Earth’s population concentrations are found in:
  – Southeast Asia: included by some experts rather than North America, most from Indonesia

• Earth’s sparsely populated regions are in areas that are dry, wet, high or cold, although there are exceptions. (Example: the Inca civilization was concentrated in the Andes mountains.)
Population Concentrations

There are more people living inside this circle than outside of it.
Population Concentrations
Population Estimate by Continent, 2050 and 2100

<table>
<thead>
<tr>
<th>year</th>
<th>Africa</th>
<th>Asia</th>
<th>Europe</th>
<th>Latin America and the Caribbean</th>
<th>North America</th>
<th>Oceania</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>2050 est. pop and world %</td>
<td>2,192 million 24%</td>
<td>5,142 million 55%</td>
<td>719 million 8%</td>
<td>750 million 8%</td>
<td>446 million 5%</td>
<td>55 million 0.6%</td>
<td>9,306 million 100%</td>
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<tr>
<td>2100 est. pop and world %</td>
<td>3,574 million 35%</td>
<td>4,596 million 45%</td>
<td>674 million 7%</td>
<td>687 million 7%</td>
<td>526 million 5%</td>
<td>65 million 0.6%</td>
<td>10,124 million 100%</td>
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</tbody>
</table>
Population Concentrations

Distribution and Structure:

More than half of Earth's population lives on less than 10% of its land area.

A striking feature of the world distribution of population is the disparity between the more developed and less developed states of the world. Over 80% of mankind resides in less developed states.
The magnitude of unevenness of world population can be summarized as follow.

- Almost 90% of the world’s population is found in the northern hemisphere, and two-thirds in the mid-latitudes between 20°N and 60°N.

- A large majority of the world’s people occupy only a small portion of its land surface. More than 50% lives on merely 5% of the land surface, two-thirds on 10% and almost 90% on less than 20%.
Population Concentrations

The magnitude of unevenness of world population can be summarized as follow.

- People tend to congregate in areas of low elevations. More than half of the world’s population occupies areas below 650 feet above sea level containing less than 30% of the land surface. Nearly 80% reside below 1600 feet.

- The margins of continents are more densely populated than interiors. Nearly two-thirds of the world’s population is concentrated within 30 miles of a coast, much of it on alluvial lowlands and river valleys.
World and State Population Totals, 2016

<table>
<thead>
<tr>
<th>region/state</th>
<th>% total world population</th>
<th>% total world land area</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Asia</td>
<td>24.8</td>
<td>3.3</td>
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<tr>
<td>East Asia</td>
<td>21.9</td>
<td>8.0</td>
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<td>China</td>
<td>18.6</td>
<td>6.5</td>
</tr>
<tr>
<td>India</td>
<td>17.9</td>
<td>2.2</td>
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<tr>
<td>Europe</td>
<td>10.1</td>
<td>6.9</td>
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<tr>
<td>Southeast Asia</td>
<td>8.6</td>
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<td>Latin America</td>
<td>8.6</td>
<td>14.0</td>
</tr>
<tr>
<td>United States</td>
<td>4.4</td>
<td>6.6</td>
</tr>
<tr>
<td>Indonesia</td>
<td>3.5</td>
<td>1.3</td>
</tr>
<tr>
<td>Brazil</td>
<td>2.8</td>
<td>5.7</td>
</tr>
<tr>
<td>Russia</td>
<td>1.9</td>
<td>11.5</td>
</tr>
</tbody>
</table>

Compare each country’s or region’s share of the world’s people with its share of the world’s land. Any surprises?
Population Concentrations: Nile River Valley, Luxor Egypt

Moving away from the river a few blocks, the land becomes sandy and wind-sculpted.

Egypt’s arable lands are along the Nile River Valley.
Population Concentrations: Railroads in Eastern Russia

[Map showing railroads in Russia with a focus on Omsk]
POPULATION PATTERNS:
physical arrangement of a population within an area ... usually a function of the population’s culture
Population Patterns: Rheris Valley, Atlas Mountains, Morocco
Population Patterns: Phoenix AZ
Population Patterns: Collegeville PA
Population Patterns: Hong Kong, China
Population Patterns: San Francisco CA
Population Patterns:
Farm Fields near Des Moines IA
Population Patterns:
Fields near Pullman WA

Photo by Yann Arthus-Bertrand
Population Patterns:
Marina Del Rey, Los Angeles CA
Population Patterns: Napa California
Continued in
Population and Settlement
Part II