Chapter 8

Population Density:
a geographic "big idea"
and some consequences in East Asia

Population density is important,
because large numbers of people working together
can do things that are much harder with fewer people.
On the other hand, crowding can also create problems.

These facts have consequences that can be seen
when you look at many maps of East Asia -
maps that show ancient dynasties, Great Walls,
land uses, roads, bridges, architecture,
inventions, factories, pollution,
art, religions, and diseases.

High-rise apartments and polluted air in Shanghai, China. Photo by Catherine Roy

Imagine walking on a trail like this all day. Eliza Markham had been doing it for months. The only people around were her husband and son. Suddenly, she just stopped walking. Her son went back to check on her. A few minutes later she walked up to the wagon and told her husband that she had hit their son with a rock. He ran back and found the boy, badly hurt but still alive. When they got back to the wagon, they saw that Eliza had set it on fire and left.

This is just one story from the Oregon Trail. It is one of the most famous roads in American history. More than 350,000 people went west on this wagon road. Between 20,000 and 60,000 people died on the way. No one knows for sure how many.

Fact check: don't believe everything you see in movies or on television. Only 362 deaths on the Oregon Trail were recorded as due to Indian attacks. Some guesses go as high as 3,000. That is just a tiny fraction of total deaths.

So what happened to people like Eliza Markham? One theory is that she just went crazy after walking for months in an area that has very few people.

At the other extreme are places where many people are crowded together. Imagine what might happen if one person gets a really bad disease. This happened in a city called Constantinople in the year 541. A sick trader came to the city. Others soon caught the disease. Within a few months, half of the people in the city died. This changed the course of history, because it helped end the Byzantine Empire, which in turn helped the Islamic empire to expand faster.

Question: What do the Oregon Trail and Constantinople have in common?

Answer: They are both famous in history, and the events in both stories seem to be influenced by the number of people in the area. This is the big idea in this chapter:

Big Idea: The number of people in an area has an influence on what people can do there.

As you read on, keep the stories about the Constantinople disease and the Oregon Trail in mind. They are related to two key sections in this chapter. One is about the spread of disease in crowded places. The other is about traders and bandits in places where the famous Silk Road went through a desert.

But before we look more closely at these topics, we should make sure we understand the basic concept of *population density*.

Some background about population density

Imagine asking a young child this simple question:

"What would you most like to see right next to your school?"

One likely answer is a famous place to have fun. A movie theater, for example. Or a beach. A baseball stadium. Maybe even a Disneyland.

There are good geographic reasons why every school can't have a beach nearby. A beach needs an ocean, lake, or big river. Most schools are not near one. That is a geographic fact.

Population density is another kind of geographic fact.

Definition: **Population density** is the number of people in a unit of area (e.g. a square mile).

Knowing about population density can help us understand why every school can't be close to a baseball stadium. A major-league stadium is likely to succeed only in places that have a lot of customers living nearby. That, in turn, depends on population density.

Question: What does this have to do with global history and geography?
Answer: Many historical events were influenced by the population density in an area.

For example, it took a lot of workers to build the pyramids in ancient Egypt. You can find pictures in history books or websites. These books can also answer questions about pyramids. For example, when were the pyramids built? How did they lift the stones up to their places?

Geographers want the answers to some questions about the <u>place</u> where the pyramids were built. For example, what was the population density there? What kind of land was needed to grow enough food for the workers? Were there enemies nearby who might attack the pyramid builders? If so, were there enough people around to form an army to protect them?

We are NOT interested in these questions just because it's fun knowing about ancient civilizations. Knowing about pyramids can help us understand what kinds of jobs are likely to be successful today. For example, does a certain kind of business need more, about the same, or fewer workers than a pyramid? The answer to that question can tell us whether the business is likely to be more successful in a crowded city or in a nearly empty rural area.

In other words, the success of a business is often related to the big idea of this chapter:

Population density has an influence on many kinds of human activity.

Some things cannot be done without a lot people. Other things are easier to do in places that have very few people. Between those extremes, there are many things that work best in places with a medium population density.

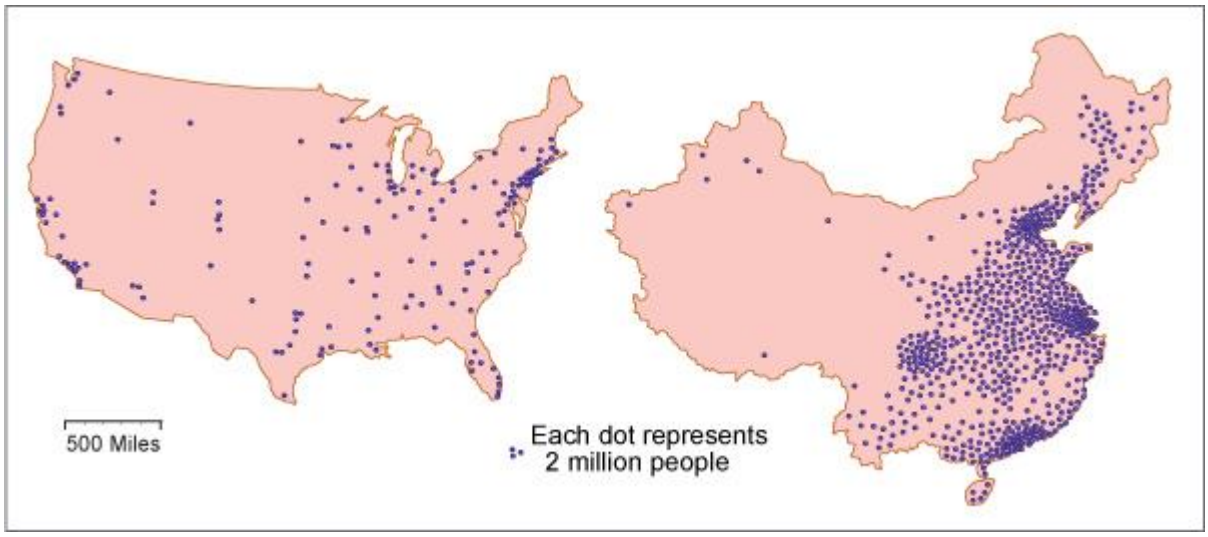
What kind of activities go in each category? Here are two short lists of things to think about. Write roughly how many people you think are needed nearby in order to support each item on these two lists. In each group of three statements, write "few" once, "a medium number of" once, and "many" once):

1. A high-school football field needs _____ people nearby.
2. A flat grassy area where kids can play football needs _____ people nearby.
3. A stadium for a professional football team needs _____ people nearby.

4. A furniture store that sells tables, chairs, and beds needs _____ people nearby.
5. A store that sells special tools for stained-glass artists needs _____ people nearby.
6. A convenience store that sells gas, bread, and milk needs _____ people nearby.

Picking a world region to use as a study area

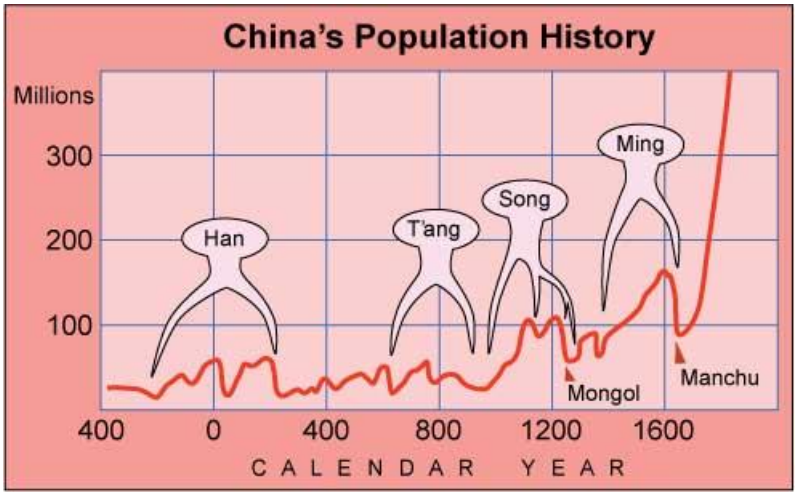
China is a good place to study the effects of population density. China is about the same size as the United States, but it has four times as many people. (In other words, its population density is four times as great.) Like the United States, China has some crowded cities near the ocean. It has rich farmland near major rivers. It has some nearly empty deserts. It also has some of the highest mountains in the world.



Here is the big difference. At the time of the Declaration of Independence in 1776, the American colonies had about three million people. It took until 1890 for the population of the United States to reach 50 million. That is a large number, but how does it compare? China had 50 million people during the Han Dynasty. That was two thousand years ago.

This graph shows the population history of China. It also shows the times of four main *dynasties* (ruling families). Finally, the graph shows the dates of invasions by Mongol and Manchu nomads from the north.

(You'll learn about them in a little while).



The graph clearly shows many times when the population of China grew rapidly. There also were several times when the population went down. Compared to the United States, China had a much longer time to experience the effects of the big idea of this chapter:

The number of people in a place has many influences on what people do there.

So, what are some consequences of the big idea? Brainstorm awhile, then read on.

Consequence #1: Large populations can produce more than small populations.

"Two people can do twice as much as one." That sounds like simple math, but it's wrong.

Two people working together can usually do more than twice as much as one.

This extra production is possible for (at least) three reasons:

1. Some parts of a job might require more strength than one person has. For example, two people can carry a box that one person might not be able to lift.
2. Some jobs require several different skills. Working together, people can do the jobs they do best. For example, one person can make pizza while the other waits on customers.
3. Some jobs require people to be in different places at the same time. For example, one person can hold one end of a board while the other nails the other end into place. One person can fix a wire, while another stays near the control panel to test the connection.

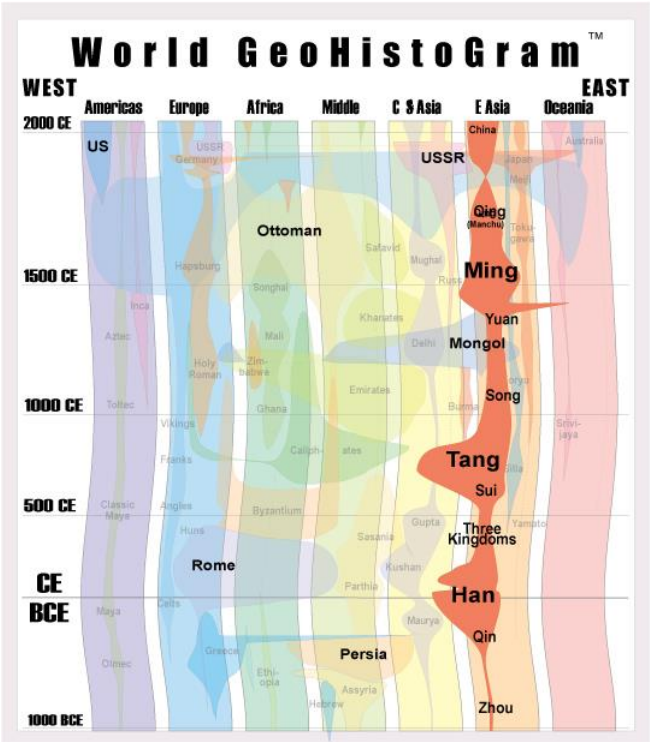
These three reasons become even more important with a really big project, like making a movie, giving a concert, or building a pyramid. These projects might require hundreds or thousands of workers, who can do many different jobs with different tools in different places.

Chinese rulers figured this out a long time ago. They wanted people who were good at doing certain jobs – farming, metalworking, trading, etc. They had a job-choosing system by the time of the T'ang Dynasty. (This dynasty lasted for about 300 years, from 618 to 907 CE).

> **Practical Note**: you do not need to remember the precise numbers 618 and 907. When you see numbers like this, think of a sentence to put them in perspective. For example, you could say the T'ang Dynasty started about 1400 years ago. Or you could say it was a few hundred years after the fall of the Roman Empire. The dynasty ended about the time the Vikings started to raid towns in Europe. It ended nearly 600 years before Columbus sailed to America. And so forth.

During the T'ang dynasty, people had to get a good score on a test in order to get a job in the government. As a result, the government had many skillful workers. Some of them made coins. Others helped people who were injured or sick. Still others served as judges, mail carriers, bridge fixers, soldiers, and so forth.

Specialized jobs like these did not exist in most other parts of the world at that time. Most places did not have enough people to support these jobs.



Part of a World GeoHistoGram, a graphic organizer that shows the time and general location of major events in world history. Your class packet has a large one to help you put thing in perspective.

Consequence #2: China had enough people to do large and complicated projects a long time ago.

China has some very good farmland. One very fertile area is called the North China Plain. As in Egypt and other ancient civilizations, each farmer on the North China Plain could produce enough food to feed many more people. All those other people could then do other jobs.

In ancient Egypt, people built pyramids. In China, people built a Grand Canal. This "artificial river" was more than a thousand miles long. Its "job" was to connect China's two main rivers. People could ship food from one valley to the other. That could prevent starvation if either area had a bad flood or drought.

Painting: Sunrise on the Grand Canal of China, by William Havell.

This painting was done in 1826. That was one year <u>after</u> the famous Erie Canal was finished across New York. By that time, the Grand Canal was already over a thousand years old!

The Grand Canal was also much larger than the Erie Canal. Note that it can hold large ships as well as small rowboats.

Bottom line: building a thousand-mile canal was a huge task. It required a lot of engineering and many people working together. The canal is one example of the kind of thing that could be built in a place that had a large number of people. That fact leads to the third consequence of the big idea about population. But first, here is a short note about China's rivers.

The Two Main Rivers of China

The Grand Canal linked the Huang He (Yellow River) and Yangtze Jiang (Clear-Blue River).

The Yangtze starts in the high country of Tibet. It flows southeast through tree-covered hills. The water in this river stays fairly clear until the river reaches the flat land in eastern China.

The Huang He starts close to the Yangtze. Then it goes north instead of southeast. It goes into a dry land with cold winters. In this dry and dusty environment, the river picks up a lot of dirt and mud. This mud gives the river a dirty yellow color (and its name). Still later, the Huang He turns east across a flat floodplain. Some of the oldest cities in the world were built here.

Interesting side fact: the Chinese language actually has two words that mean "river."
A He is a muddy river that floods some of the time and can get very low at other times.
A Jiang is a clear-water river that keeps getting larger as it flows through a rainy forest.

Look very closely at a detailed map of China.
You will see a lot of rivers named He in the northern part of the country.
You will also see a lot of rivers named Jiang in the southern part.
What does that tell you about the climate in the two regions?

Consequence #3: A large population, if well organized, can usually defend itself against attack.

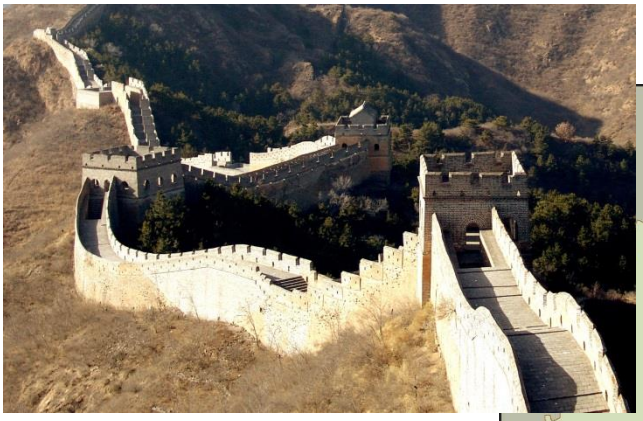
As we noted, China had millions of people during the Han Dynasty, 2000 years ago. Small populations of *nomads* lived in the colder and drier land north and west of China.

> Definition: **nomads** are people who often move, in order to follow the animals they hunt or the cattle they raise. Nomads often live in tents or portable houses.

The nomads from the cold north often attacked towns near the edge of the Chinese homeland.
(You can read more about nomads in the chapters on Africa and Russia.)

At first, the Chinese people tried to defend their towns. Unfortunately, small towns did not have enough soldiers to defend against a large attack. Then, they tried sending armies across the border to attack the nomads. That didn't work well either. When farmer-soldiers tried to chase the nomads, they were too slow to catch the enemy warriors, who were riding horses.

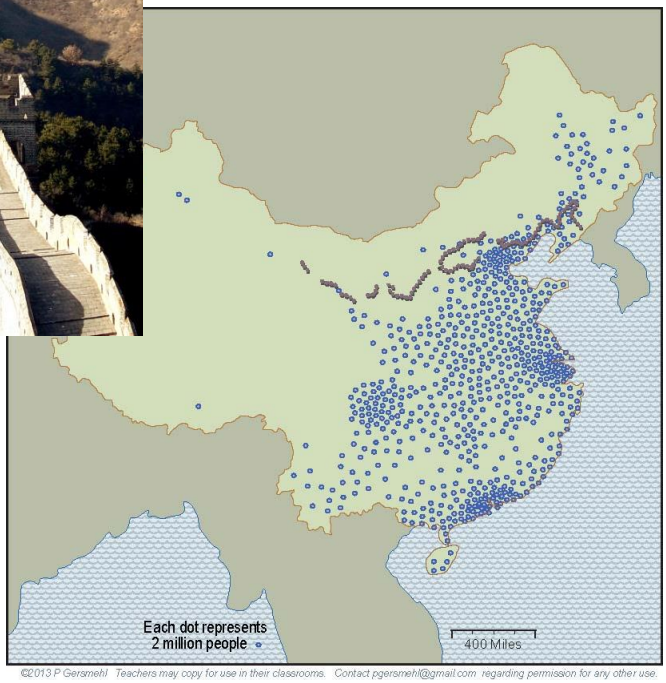
In time, Chinese leaders decided to build a wall along the border. The wall was at least 15 feet high with a road on top. As part of the wall, they built small forts where soldiers could sleep. These forts were close enough to each other that they could signal for help during an attack.



Great Wall of China.

As you can see on the map, the Great Wall was actually several short walls that protected different areas in the country.

Each blue dot represents 2 million people in 2010.



Side point: The spacing of forts is a good example of a practical geographic problem.
- You want the forts close enough to help each other during an attack.
- You do not want to spend too much money building a lot of forts.

Interesting fact: The Romans built a wall in England. They put their forts almost exactly the same distance apart as the Chinese did on the Great Wall.

Building the Great Wall was a huge job. It also cost a lot to pay soldiers to defend it. Chinese rulers thought it was worth doing – it was cheaper than letting the nomads steal things and kill people. The Wall is also proof that millions of people can build things that are impossible with fewer people. The Chinese people were also helped by the next consequence.

Consequence #4. Large populations are likely to have plenty of smart people.

This consequence is a result of simple *probability*.

Definition: **probability** is the mathematical study of luck.

Here is an example. Shuffle a deck of cards and pick one card. Is it likely to be an ace? Probably not. There is only a small chance that you will be lucky and get an ace with one draw. If you draw 20 cards, however, the probability of getting an ace is much higher. In fact, it would be surprising if you didn't get at least one ace.

Why is this idea important? Because a large population is like drawing a lot of cards – it has a greater probability of having people who are smart and can invent new things. A large country can also have ways to help creative people. For example, some people can teach in technical schools. These teachers help creative people get the skills needed to develop their inventions.

China has had a large population for a long time. It is not surprising that many important inventions came from China. This list shows the dates of some major Chinese inventions. The dates to the right show when things first appeared in Europe – by invention or by trade.

about 1060 CE	Self-leveling compass for ships	1190
about 1000 CE	Movable type for printing	1456
about 900 CE	Printing press	1420s
about 850 CE	Gunpowder	
about 300 CE	Porcelain pottery	
about 100 CE	Paper	1100s
about 100 BCE	Iron moldboard plows	900s
about 250 BCE	Wheelbarrow	1200s
about 400 BCE	Cast iron	1300s
about 1300 BCE	Silk cloth	about 100 BCE

Chinese history, however, has a big puzzle. Sometimes, the people seemed to lose the ability to invent things. In fact, several times, Chinese people even seemed to forget things that they knew a hundred years earlier. What else was happening at those times?

A good answer to that question would be important for Americans today. The United States has enjoyed two centuries of great inventions. Americans invented steamboats in the early 1800s. They invented television in the middle 1900s. They invented computers in the late 1900s. They invented electric lights, plastics, nylon cloth, smartphones, and so forth. Factories using these inventions made good jobs – inventions made a lot of people rich!

In the 21st century, however, things are changing. Many new inventions are coming out of other parts of the world, including China. These include robots, laser cutting machines, phone memories, brain scanners, and so forth. In the long sweep of history, this looks like the giant country of China is reclaiming its historic role as a major source of new inventions. At the same time, many American factories are closing. Jobs are moving across the Pacific Ocean.

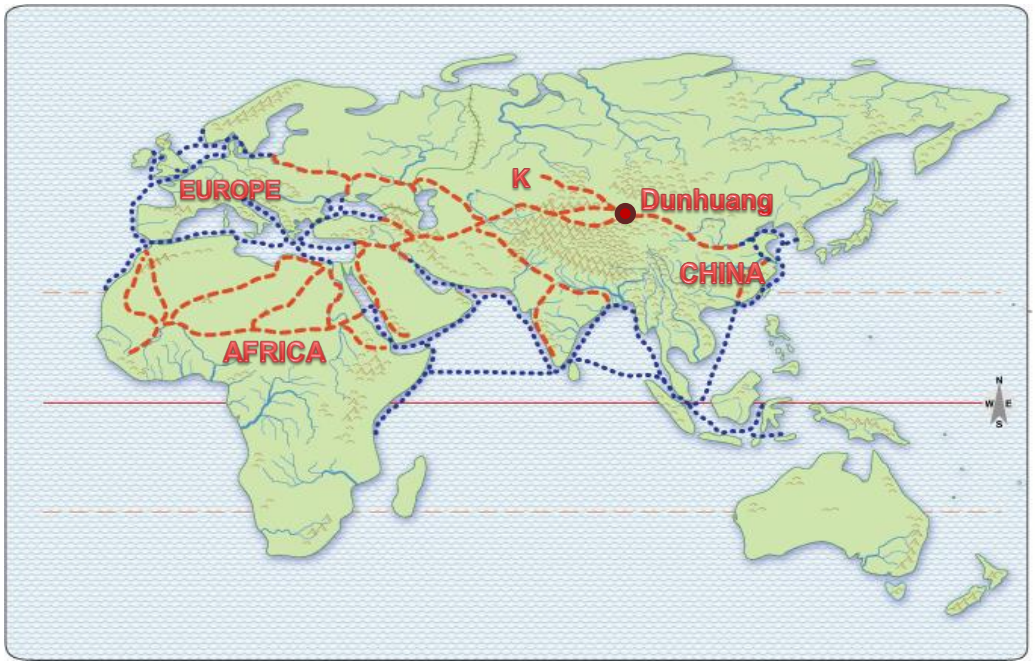
It is important to have a clear idea of what is happening and what can be done about it. No matter what politicians say in speeches, they cannot just pass a law to make jobs. The only way to promote inventions is to make sure that your community has many skillful people. To do that, you have to understand where inventions come from – how they depend on population size, resources, and education.

Figuring that out is much harder than making a speech or passing a law!

Consequence #5: A large population is more likely to trade with other people.

Chinese people started long-distance trading many thousands of years ago. By the time of the Han Dynasty, Chinese trading networks went all the way to Europe and Africa. (Remember, that was 2000 years ago.) Part of this trade route is called the Silk Road. It got that name because traders took silk (a high-value cloth) from China all the way to Rome and Egypt.

The name – Silk Road – is misleading. For one thing, silk was not the only thing the traders carried. They also carried gold, spices, tools, and other light but valuable items. Moreover, it was not a single road. Inside China, traders used many roads to go from the crowded eastern areas to a place called Dunhuang. At Dunhuang, the "road" split into three main branches. One went northwest into the horse-producing area of Kazakhstan ("K" on the map). Two went around the Takla Makan desert ("Takla Makan means "Go in, and you will not come out").



Here is the reason for the split in the road. Population density is low in the dry western part of China. In this nearly empty desert, robbers often tried to attack traders. It was safer to go in groups. It was even safer if the robbers did not know which road a group was going to use.

The traders also had to know another important fact: Environmental conditions are different in different parts of the Silk Road.

- Some places have forests, with tall trees that shade the ground.
- Some places are dry, with sandstorms rather than rain. Food and water are hard to find.
- In other places, the road goes over high mountains. These mountains are the highest in the world. In fact, the gaps between mountains in Asia are higher than most of the peaks in the United States. As a result, this part of the Silk Road was really cold.

Traders needed different clothing and travel equipment to go through forests, deserts, and mountains. As a result, a single trader rarely went far along the Silk Road. It was just too hard to carry all the clothing and other supplies needed to survive in many different environments. Traders would go a short distance, then trade with people who did the next part of the road.

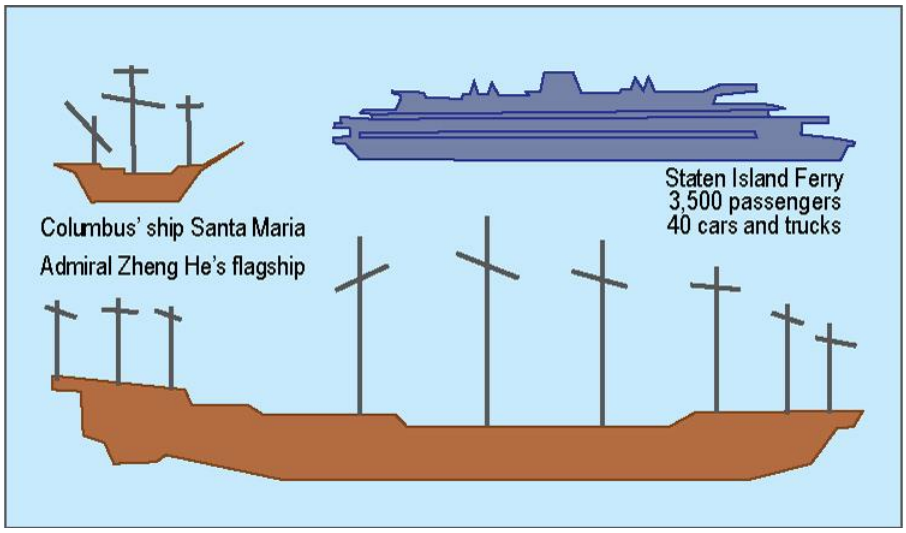
The idea of trade, however, leads logically to the next consequence of population density.

Consequence #6: A large population might look for places where some people can move.

Question: What happens when you put consequence #2 (building) and #5 (trade) together?
Answer: In China's case, what you get are people who knew how to build giant ships.

Here, a simple comparison is useful. We all know that Columbus sailed across the Atlantic Ocean in 1492. Columbus was a typical European explorer in the 1400s. His fleet had three small ships. His largest ship, the Santa Maria, was about 60 feet long.

Meanwhile, nearly a hundred years before Columbus, Chinese emperors sent fleets of ships across the Indian Ocean to Africa. The most famous Chinese explorer was Admiral Zheng He. He had a fleet of more than 200 ships. Zheng He's main ship was more than 300 feet long.



For 30 years, Admiral Zheng He and others led expeditions in many directions. They traveled to India and Africa. They explored many islands in the Pacific Ocean. Some people think that at least one Chinese fleet crossed the Pacific Ocean and landed in South America.

Some Chinese traders chose to move to different places across the oceans. They set up trading posts where they could store and sell Chinese goods. Meanwhile, people from India and Arabia were moving to Chinese cities like Guangzhou.

Side note: Guangzhou is called "Canton" on some maps. It is located near Hong Kong. Many people work in factories there today. In fact, I'll bet that at least one thing that you are wearing or carrying in your backpack today was made near Guangzhou.

Guangzhou was a major trading city more than a thousand years ago. That was long before the United States became a country. Then, about 50 years before Columbus left Spain, Chinese exploration and overseas trade nearly stopped. After a really bad attack by the northern nomads, Chinese leaders made a sudden change. They stopped paying for ships and sailors. They hired soldiers and started to rebuild the Great Wall along the northern border. That took a lot of money. It also took workers away from other jobs. This new policy started a long period of *isolation* as China turned inward.

Definition: To be **isolated** is to be alone, all by yourself, with no contact with others.

New rules made it hard for people to travel. They emphasized *conformity* (everybody acting alike). The situation was made even worse by the next consequence of population density.

Consequence #7: A large population is more likely to have diseases that spread rapidly.

Most human diseases are caused when bacteria or viruses get in your body and cause damage.

Brief scientific summary (you can get more explanation in a science book or website).
1. People have billions of bacteria inside them. These bacteria and viruses are always changing. Sometimes, one of them changes and becomes dangerous. Perhaps it can survive a little longer after being sneezed out of one person's nose. That makes it easier for the disease to spread. Or perhaps the bacteria can grow a little faster. Or it can make some kind of poison that overcomes a body's natural defenses.
2. People also change. Some develop resistance to new bacteria or viruses. Others get weaker because of lack of food or safe water.

In other words, life is like a race between tiny disease germs and human resistance.

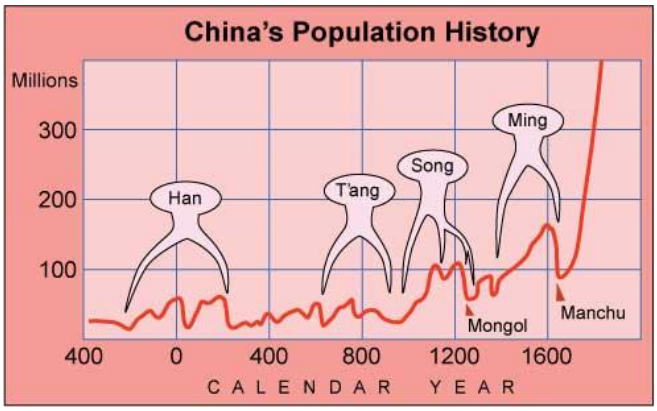
Question: What is the geography part of this story?
Answer: Places with a lot of people can develop more new kinds of disease germs.

This is just another example of the probability principle that we described back in part #4. (Remember? – if you take one card out of a deck, you probably will not get an ace; take 25 cards, and you are almost certain to get an ace.) In a small population, a new disease might appear only once in a hundred years. A large population might get a new disease every month.

Some new diseases can be really scary. Several times in history, serious *plagues* started in China. For example, about 150 years before Columbus, a disease from China spread around the world. Millions died. Others got so sick that they could not plant or harvest crops. People were afraid to travel. They didn't even want to buy things from other places. They thought the plague might come with the traders. As a result, many people starved to death. Riots broke out. Governments tried to stop the riots by ordering soldiers to arrest or even kill people.

More than one third of all people died.

Unfortunately, this was not the only time the population of China went way down. Look at this graph again. This time, notice all the times when the population went down by at least one third.



For example, many ruling dynasties ended when a lot of people died from disease or starvation. The rest of the people often blamed the government. The resulting riots and civil wars made the population to go down even more.

We will leave it to historians to trace the complex causes and effects in the population history of China. Here, we just note that a loss of population has two geographical consequences:

First, China became less able to defend against attackers. Unfortunately, one big drop in population happened just when European countries were claiming colonies in other parts of the world. (The Europe chapter has more about this time, the *colonial era*.)

Second, China became less productive and inventive. The standard of living went down. Lack of money made it harder for people to invest in new farms or other businesses.

This discussion about disease leads to an even more complicated effect of population density.

Consequence #8: Population density can affect freedom, crime, and human rights.

If I am all alone on a big island, I am free to do just about anything. I can play my trombone at midnight. I can run around naked. I can burn old shoes and bicycle tires in an open fire.

None of that is allowed in New York City, where I am writing this chapter. This crowded city has many rules about things like noise, clothing, and air quality.

In the real world, the tradeoff between population and freedom is not simple. For example, should skateboards be banned on a sidewalk where ten people are walking? How about a hundred? How crowded can a beach be before people pass a law making it illegal to play a radio as loud as you want to?

Here is a generalization: *more people in an area means less freedom for each individual.*

To complicate things further, remember Consequences #2 and #4. I may have a lot of freedom on an empty island, but I cannot go to a movie there. I can't play a football game or sing in a choir. I can't enjoy a dinner at a famous restaurant. These things all require a lot more people!

China has four times as many people as the United States. This has an influence on the amount of personal freedom each person has.

Warning: comparisons of whole countries are always generalizations.
Local differences within each country can be greater than the average differences between them.

- China has some areas where people have more individual freedom than most Americans.
- China also has places where international agencies have found serious abuses of human rights. People in many parts of China do not have a right to free speech. Some have been put in jail (and some even killed) because they spoke or wrote against the government.

Here is the geographical point that we should remember when we read about China:

There is a tradeoff between population density and individual freedom.
If there are more people in an area, each person usually has less freedom.

Think about the things you like to do:

What things would be easier if your community had ten times as many people? Which ones would be harder to do?

What things would be easier if there your community had only one tenth as many people? Which ones would be harder to do?

There is one more reason why China is a good place to study the effects of population density.

Some scholars say that China's religious tradition helps people deal with a large population. The main religion of ancient China was Confucianism. Confucius was a teacher about 500 BCE. Even that long ago, China already had many millions of people. Confucius said people should respect older people and cooperate with other people around them.

China has a Communist government today. Even though Communists do not support religions like Confucianism, many people in China still follow the ancient Confucian ideas.

A history book or website can give you more information about religions and their influence on people. In this book, we just want to make it clear that the cause-and-effect links between population density and individual freedom are important but very complicated.

This leads logically to the last item on our list of major effects of population density.

Consequence #9: More people usually means more environmental impact.

Chinese people buy three million cars every year. They build a new powerplant every few weeks. Burning fuel in all those cars and electric generators has a big impact on air quality. According to some reports, 16 of the world's 20 most polluted cities are in China.

Remember the picture at the beginning of this chapter?

Economists say, "*air is a resource that is held in common*."

Definition: **Held in common** means no one person owns it. It belongs to everyone.

People often use resources that are held in common. For example, cars put smoke into the air. The impact depends partly on population density. If only one person has a car or truck that does not have a good pollution-control system, it does not do much damage. Millions of cars and trucks, however, can pollute the air and cause health problems. The principle is simple:

Many things are OK if only a few people do them.
They can become a problem if many people do them.

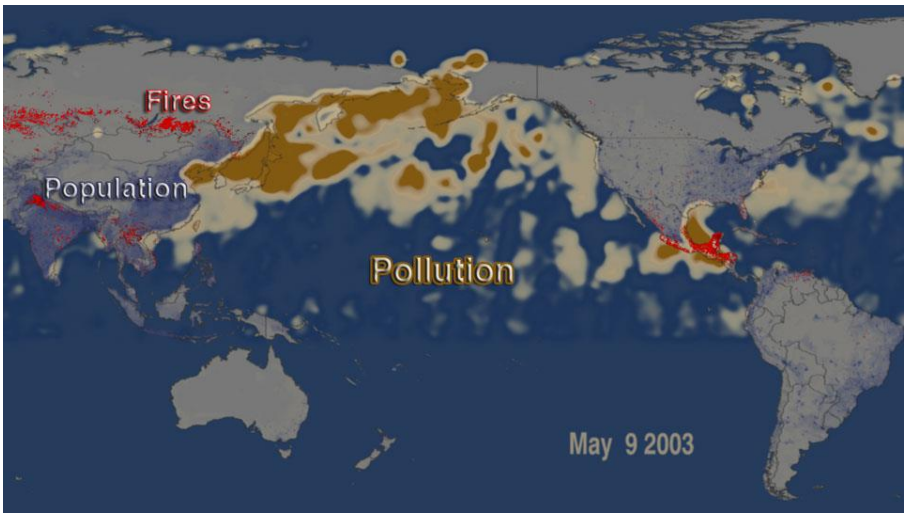
Example: A few billboards next to a highway can attract attention. A large number of billboards, however, can be so cluttered that none of them gets noticed.

Example: A few cabins on a lake can dump trash into the water without much harm. Pollution from a large number of cabins can kill fish and make swimming dangerous.

Can you think of some more examples?

In crowded China, air pollution has been called "an abuse of the commons." It causes thousands of deaths every year. Millions have lung diseases caused by pollution.

Air pollution in China is also a problem at a global scale. This map is based on satellite images from the National Aeronautics and Space Administration. It shows smoky air from China (the country is labelled with the word "population"). This smoky air goes east all the way across the Pacific Ocean.



Here is another fact: China recently passed the United States as the number-one source of greenhouse gases in the world. (These are the gases that cause global warming.)

Summary of this page: air pollution is a lot like the diseases described in Consequence #7. Both pollution and disease are more likely to start in crowded places and then spread all around the world.

Putting it all together: A large population eventually has to limit its growth in some way.

China's economy has grown very large. You have probably seen some of the headlines:

"China is now the world's largest producer of iron."

"China is building the world's fastest supercomputer."

"China built as many miles of road as the U. S. Interstate Highway system in ten years."

And so forth. (P.S. It took more than 50 years to build the interstate highways.)

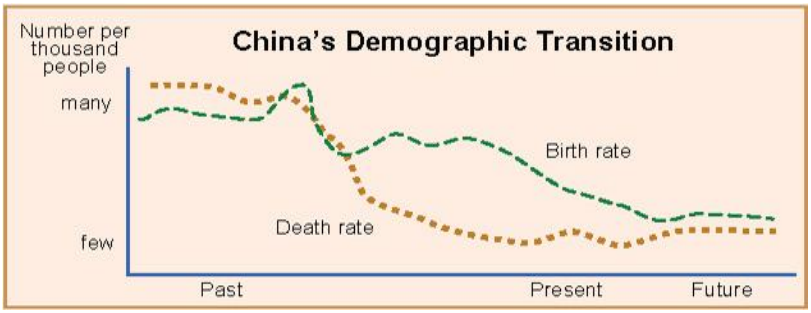
Here is an odd fact: rapid economic growth may be a result of efforts to control population.

How can this be true?

When a population is growing quickly, families have many children. Caring for them takes time and money. If people choose to have fewer children, they have more money to invest in other things. They can build new factories or roads. They can go to college or travel more.

People have chosen to have fewer children in many countries around the world. As a result, the birth rate is low in many areas. It is especially low in Europe, North America, and Japan. Demographers (people who study population) call this change the *demographic transition.*

Definition: The **demographic transition** is the change from high birth rate and short life expectancy (high death rate) to low birth rate and long lifetimes. In the middle of the demographic transition, medical care has lowered the death rate, but the birth rate is still high. The population grows very rapidly at this time.



As with any graph, you should first ignore the little ups and downs and focus on the general trends that you see.

In the 1970s, Chinese leaders decided that the country could not afford to keep growing. They wrote the "policy of birth planning." This policy has a nickname: the "one-child policy." Basically, the government made it illegal for most couples to have more than one child.

The birth rate went way down.

Here's the big bonus: People had fewer children to feed, but they still had the same income.

The benefits of extra money were soon obvious. More people could afford to buy televisions, even cars. Thousands of Chinese people traveled to other countries. Others went to colleges, often in other countries. Many communities invested in new factories, roads, and powerplants.

The one-child policy has a lot of problems. You can find details in an economics book or website. Here, we note that the one-child policy is just an extreme version of something that eventually has to happen in every country. Population simply cannot keep growing forever. Eventually, the bad effects of continued population growth outweigh the good effects.

People can decide when and how to limit population growth. They can do it voluntarily, or by obeying a law. Or they can wait for a famine or disease to do it for them. In this chapter, we simply tried to outline some of the geographic effects of population density.

Summary – How can the big idea about population density help us understand China?

Ultimate cause: Populations tend to grow unless growth is stopped in some way. Population growth can be stopped by pollution, by diseases, by wars with other people, or by the people themselves.

Big idea: The population density of a place (the number of people per square mile) has a large influence on the success of many kinds of human activity there. Some things are hard to do in a place that has few people. Other things are hard to do in crowded places.

Study area. China is a good place to study the effects of population density. This part of Asia had a large population thousands of years ago. China now has about four times as many people as the United States, even though the two countries are about the same size. Moreover, China has only half as much good cropland (places that are not too cold, too dry, or too high and steep). Each square mile of good land, therefore, has about eight times as many people in China as in the United States.

Consequence #1: Large populations can produce more than small populations.

Consequence #2: China's large population could do large and complex projects a long time ago.

Consequence #3: A large population, well organized, is usually able to defend against attack.

Consequence #4: Large populations are likely to have many smart people; these people can invent things that make life better there.

Consequence #5: A large population is likely to trade with other people.

Consequence #6: A large population often looks for places where people might move.

Consequence #7: A large population is more likely to develop diseases that spread rapidly.

Consequence #8: Population density has a complex influence on things like freedom, crime, and human rights.

Consequence #9: With the same income and technology, a large population has more environmental impact than a small one.

Putting it all together: Eventually, a large population has to limit its own growth in some way. China tried to limit the growth of population by passing a law. The "One-Child Policy" had problems, but it also set the stage for rapid economic growth.