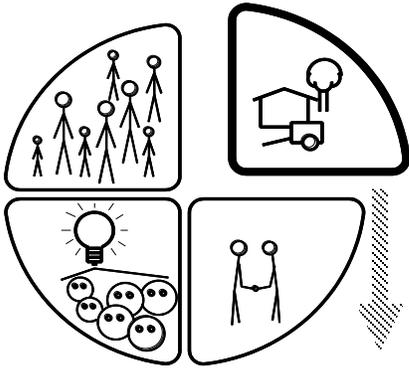


### 3: Muddy Rivers *Model Category: Setting*

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#### *Two Kinds of Setting*



To understand stories about people, it helps to know the “setting.” This includes not only the natural but also the human-made environment: tools used, clothes worn, food eaten, roads and buildings created—everything tangible. **Note that the Setting categories “natural” and “human-made” overlap—human-made facilities and tools require natural materials and resources, and many parts of setting are combinations of the two.**

Setting (environment) includes:

- Climate: This affects the kind of crops that can be grown, the kind of buildings built, and much more.
- Resources: Oil, coal, metal ore, water, soil, and all other useful things that come from the earth and the sea
- Land: Space for cities, towns, farms, and forests
- Oceans, rivers, plants and animals, microbes, etc.

The secondary (human-made) setting includes:

- Towns, cities, and buildings
- Food production facilities: farms, ranches, aquaculture, commercial fishing, food processing
- Transportation facilities such as streets, highways, railroads, etc.
- Communication networks, both two-way (like the telephone) and one-way (like TV and newspapers)
- Tools used for working, moving about, communicating, entertaining, and solving problems
- Provision for waste disposal
- Sources of energy, and ways of getting it where it’s needed.
- Significant peoples outside the group being investigated
- Everything else human made: symbols, art, etc.

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## Investigation: Climate Zones

Climate is, of course, an important part of the setting for every human group. One scholar, in discussing the origin of civilizations, describes climate variations that affect ways of life:<sup>1</sup>

Northern hemisphere landmasses—Europe, Asia, the northern part of Africa, and North America—have six major climate zones. From north to south:

1. Arctic or polar zone—Almost permanent frost; tundra vegetation
2. Cyclonic rainfall zone—Adequate year-round rainfall (including snowfall in winter), coming from the west. (West coastal regions in this zone have very high rainfall.) Region of forest growth. However, some inland areas in this zone are prairie grasslands, with peak rainfall in midsummer (July and August), and little winter precipitation.
3. Mediterranean zone—Transition region, with rain during the winter, drought during the summer. Natural vegetation is scrub and grass. Amount of rain tends to vary over a wide range from year to year.
4. Desert zone—Permanent drought, very little rain, few plants
5. Subequatorial or subtropical zone—Transition region, with rain during the summer, drought during the winter; grasslands
6. Equatorial or tropical zone—Much year-round rainfall; tropical forest.

South of the equator, the pattern is mirrored. Climate patterns are modified somewhat in many places by the terrain, how close a region is to ocean or sea, ocean currents, mountains, and other influences.

1. ***Hypothesize: Based on the climate zone descriptions above, describe the probable seasonal changes (over a year) in the flow of a river that begins in the Mediterranean zone (3), and flows south through the desert zone (4), before emptying into the sea.***
2. ***In the same way, describe the probable flow of a river that begins in the subtropical zone (5) and flows north through desert before emptying into the sea.***



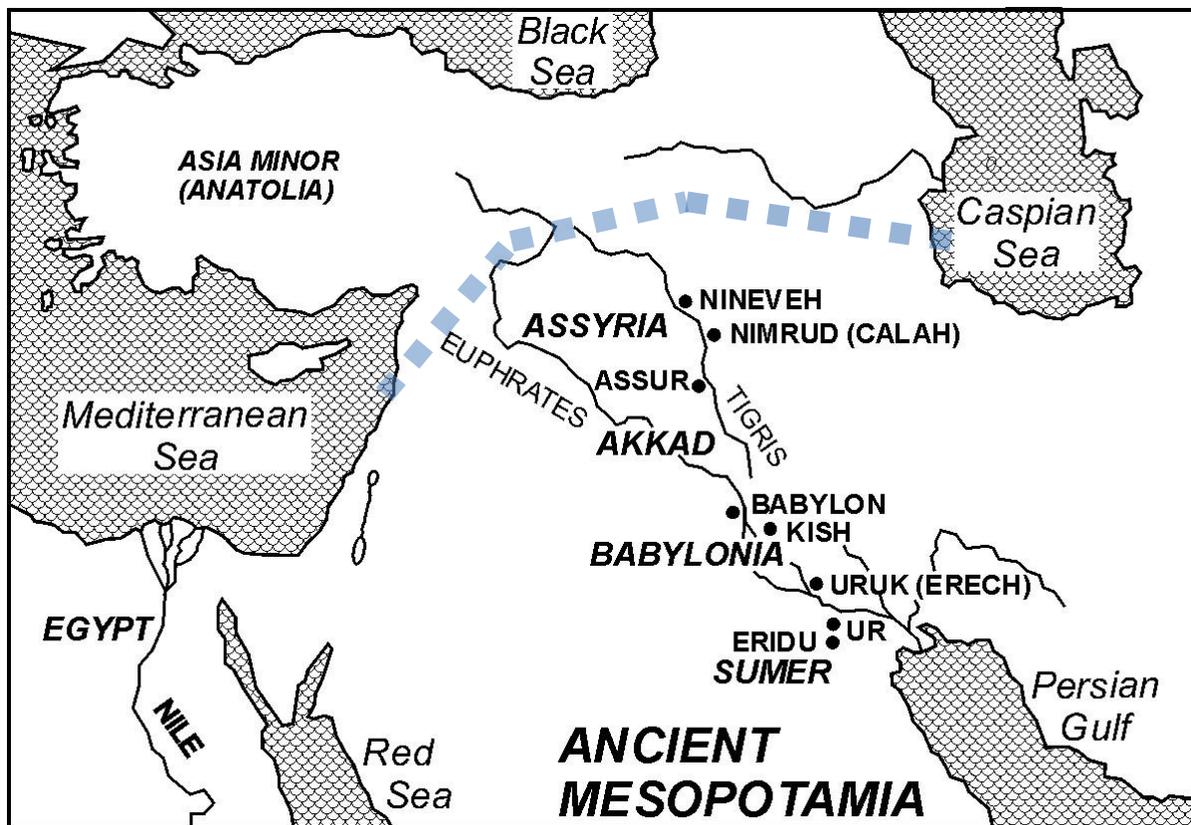
<http://communities.bentley.com/products/microstation/f/19565/t/71047>

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<sup>1</sup> Quigley, Carroll, *The Evolution of Civilizations*, Second Edition, 1979, Indianapolis, Indiana, pp. 178-179

Mesopotamia (a Greek name that means “between rivers”) is probably where complex civilizations first developed. The two rivers that form the region are the Tigris and the Euphrates, shown below. (Four Mesopotamian regions with ancient civilizations are labeled on the map—Assyria, Akkad, Babylonia, and Sumer.)

This map also shows part of the Nile River (bottom left). The Nile valley is where Egyptian civilization began soon after those in Mesopotamia. Most of the land that lies south of the blue dashed line is desert, above is Mediterranean climate.



<http://www.livebinders.com/play/play?id=1285439>

The headwaters of all three rivers are in regions with rich soil eroded and carried downstream during rainy seasons, making the rivers' color a muddy brown.

## Investigation: Mesopotamia's Setting

Herodotus was a Greek writer often called “the father of history.” He lived during the fifth century BCE (about 484 to 425 BCE).

His narrative includes information about both Mesopotamia and Egypt, which he’s thought to have visited about 450 BCE. Some of the account he wrote is known to be exaggerated or wrong, but most is probably accurate. Excerpts of his writing about Mesopotamia are on pages that follow.<sup>1</sup>

***Review the Setting sub-categories listed on Page 1 of this part. Identify, list and classify (in a knowledge-organizing tree) important parts of the Mesopotamian setting described by Herodotus. Make sure your list includes both natural and human-made parts.***

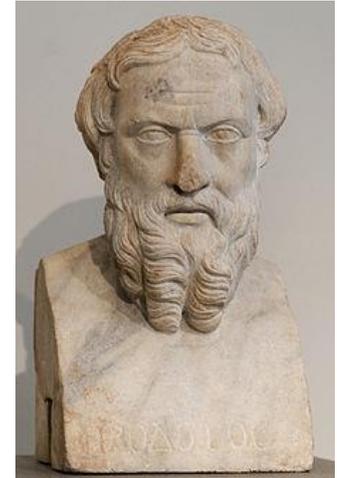


Photo of bust of Herodotus: <http://en.wikipedia.org/wiki/Herodotus>

Assyria [*the common name for the Mesopotamian region in Herodotus's time*] had many large cities. The best known and strongest in this era was Babylon... The following is a description of the place: The city stands on a broad plain, and is an exact square, a hundred and twenty furlongs along each side, so that the entire circumference is four hundred and eighty furlongs.

One furlong = about 200 yards, 0.113 mi., 0.183 km. ***Convert the city dimensions into terms familiar to you.***

**Note:** Apparently this is a major exaggeration. Today, the ruins of the city of Babylon consist of a number of mounds covering an area of about 2 by 1 km. The city in ancient times may have extended somewhat farther than indicated by the mounds. Although much smaller than Herodotus claims, it did occupy a fairly large area. (The dimensions given by Herodotus may have included the surrounding agricultural area that supported the city.) The population may have exceeded 200,000 when Herodotus was writing—the largest city on earth at the time. Every ancient writer that described Babylon was impressed by its size and grandeur.

Some of the description that follows is probably exaggerated, as well.

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<sup>1</sup> [http://www.shsu.edu/~his\\_ncp/Herobab.html](http://www.shsu.edu/~his_ncp/Herobab.html) Para. 178 (adapted)

The city [*of Babylon*] is divided into two portions by the river—the Euphrates—which runs through the city’s center. It is a broad, deep, swift stream, rising in Armenia and emptying into the Erythraean Sea [*Persian Gulf*]. The city wall is brought down on both sides to the edge of the stream. From these points, a wall of fired bricks goes along each shore. The houses are mostly three and four stories high; the streets all run in straight lines, not only those parallel to the river, but also the cross streets which lead down to the water-side. At the river end of these cross streets are low gates in the wall that skirts the stream, which are, like the great gates in the outer wall, of brass, and open on the water.

This is taken from a 3-D computer graphic recreation of Babylon, done by technician-artists at the Royal Ontario Museum. (Credit: © Byzantium 1200. Used by permission. <http://www.kadingirra.com/babylon.html>.) (This website has many other views of the city.)





One of the main gateways to Babylon, dedicated to the goddess Ishtar. Glazed bricks from the original gate were taken to Germany and used to recreate the entrance to a museum.

[http://childrenofthelamp.wikia.com/wiki/Ishtar\\_Gate?file=Ishtar\\_Gate.jpg](http://childrenofthelamp.wikia.com/wiki/Ishtar_Gate?file=Ishtar_Gate.jpg)

Very little rain falls in Assyria; enough, however, to make the grain sprout, after which the plant is nourished and the ears formed by means of irrigation from the river. The river does not, as in Egypt, overflow the grain fields of its own accord, but is spread over them by human effort or by the help of machines. The whole of Babylonia is, like Egypt, intersected with canals. The largest of them all, which runs toward the winter sun, and is impassable except in boats, is carried from the Euphrates into another stream, called the Tigris, the river upon which the town of Nineveh formerly stood.

Of all the countries that we know, none produces so much grain as this one. It doesn't grow figs, olives, grapevines, or any other tree of the kind; but in grain it is so fruitful that often it produces two hundred or even three hundred times as much grain as is produced anywhere else. The blade of the wheat-plant and barley-plant is often four fingers in breadth. As for millet and sesame, I shall not say to what height they grow. I realize that what I have already written concerning the fruitfulness of Babylonia must seem incredible to those who have never visited the country.

(Continued)

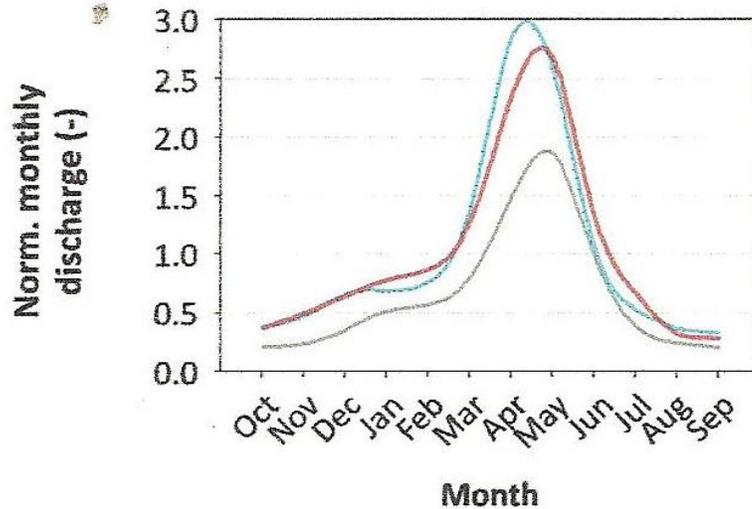
The only oil they use is made from the sesame plant. Palm-trees grow in great numbers over the whole of the flat land, mostly of the kind which bear fruit [*dates*], supplying them with bread, wine, and honey. They are cultivated like the fig-tree in all respects, among others in this: The natives tie the fruit of the male-palms, as they are called by the Greeks, to the branches of the date-bearing palm, to let the gall-fly enter the dates and ripen them, and to prevent the fruit from falling off. The male-palms, like the wild fig-trees, have usually the gall-fly in their fruit.

Herodotus got it partly right. Gall-flies have nothing to do with the process of raising dates. However, pollen-bearing flower clusters from male trees were cut off and placed next to flower clusters on female trees to ensure the pollination necessary for fruit formation. (Without pollination, fruit won't form.) Male trees produce no fruit, and using the blooms like this allows one male tree to pollinate many fruit-bearing female trees. Growing room (and scarce water) could in this way be saved for the productive female trees. See <http://www.dateland.com/how-are-dates-grown/> –ed.

***What do you think Herodotus meant when he said that “this fruit supplies them with bread, wine, and honey?” Record your hypothesis.***

But here is what surprises me most in the land, after the city itself: The boats which come down the river to Babylon are circular, and made of skins. The frames, which are of willow, are cut in the country of the Armenians above Assyria, and on these, which serve for hulls, a covering of skins is stretched outside, and thus the boats are made, without either stem or stern, quite round like a shield. They are then entirely filled with straw, and their cargo is put on board, after which they are allowed to float down the stream. Their chief freight is wine, stored in casks made of the wood of the palm-tree. They are managed by two men who stand upright in them, each plying an oar, one pulling and the other pushing. The boats are of various sizes, some larger, some smaller; the biggest reach as high as five thousand talents' cargo weight [*140 or more tons*]. Each vessel has a live donkey on board; those of larger size have more than one. When they reach Babylon, the cargo is landed and offered for sale; after which the men break up their boats, sell the straw and the frames, and loading their donkeys with the skins, set off on their way back to Armenia. The current is too strong to allow a boat to return upstream, for which reason they make their boats of skins rather than wood. On their return to Armenia they build fresh boats for the next voyage.

Below: <http://waterinventory.org/sites/waterinventory.org/files/chapters/Chapter-01-Euphrates-River-Basin-web.pdf>



Graph showing seasonal variations in the amount of water flowing in the Euphrates River at three locations (1.0 = annual average). The annual flow pattern of the Tigris River is very similar. The graph is based on data between 1938 and 1973, but **the general pattern has remained unchanged for thousands of years.**

From year to year, however, the flow is inconsistent, some years peaking with far above average flow, causing flooding. In other years the flow is much less than average.

(Upstream dams built since 1973 have radically changed the annual pattern.)

*How does this graph match with your hypothesis about the flow of a river from the Mediterranean zone through the desert to the sea (Page 2 of this section)? If the rains occur during winter, why might the peak flow occur later? Record your conclusion in your journal.*

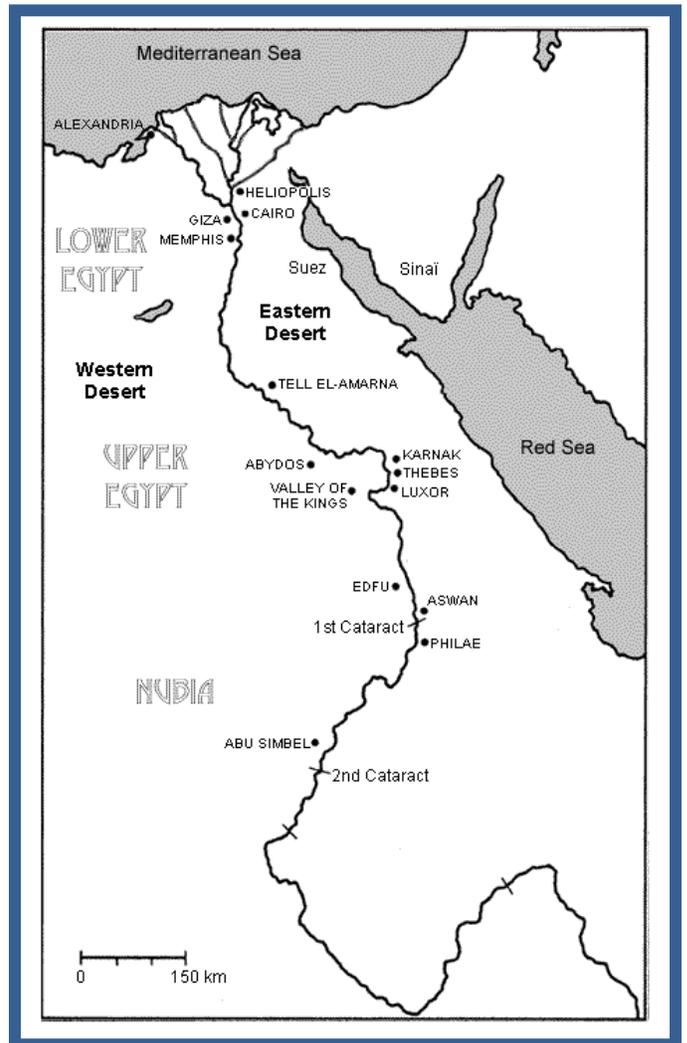
## Investigation: Egypt's Setting

Herodotus, the early Greek historian, also described Egypt and the Nile River.<sup>1</sup>

***In the same way as you did for Mesopotamia, identify, list and classify (in a knowledge-organizing tree) important parts of the Egyptian setting described by Herodotus, and shown in the pictures. As before: Make sure your list includes both natural and human-made parts of Setting.***

The Egypt to which the Greeks go in ships are islands which have been added to mainland Egypt. They are gifts of the river...the nature of the land of Egypt is as follows: First when you are approaching it in a ship and are still distant a day's journey, if you let down a sounding-line you will bring up mud and you will find yourself in eleven fathoms [20 m., 67 ft. water depth]. This then so far from shore shows that there is a silting forward of the land [*i.e. buildup of silt flowing out from the river that has settled on the bottom of the sea*]. Then secondly, as to Egypt itself, the extent of it along the sea is sixty *schoines*, according to our definition of Egypt...each *schoine*, which is an Egyptian measure, is equal to sixty furlongs. So the length of Egypt's coast is three thousand six hundred furlongs. From the coast inland as far as Heliopolis, Egypt is broad; the land is all flat and without springs of water, and formed of mud.

One furlong = about 200 yards, 0.113 mi., 0.183 km.



Map: <http://www.historymuseum.ca/cmce/exhibitions/civil/egypt/egcgeo1e.shtml>

<sup>1</sup> [www.gutenberg.org/files/2131/2131-h/2131-h.htm](http://www.gutenberg.org/files/2131/2131-h/2131-h.htm) (adapted)

In this first section (previous page), Herodotus is describing the Nile delta, the region where the river splits into several paths before entering the sea. Large rivers around the world have formed deltas at their mouths.

From Heliopolis however, as you go up, Egypt is narrow; for on the one side a mountain-range belonging to Arabia stretches...In this range are the stone-quarries which were used in cutting stone for the pyramids at Memphis.

On the side of Egypt toward Libya another mountain range extends, rocky and surrounded by sand: This is where the pyramids are built... So then, I say, from Heliopolis the land that belongs to Egypt is not as wide, for about four days' sail up the river. The space between the mountain-ranges which have been mentioned is plain-land, but where it is narrowest it seems to me no more than two hundred furlongs [25 km., 15 mi.] from the Arabian mountains to those which are called the Libyan. Farther up the river Egypt is broad again.

It was evident to me that the space between the aforesaid mountain-ranges, which lie above the city of Memphis, once was a gulf of the sea. ...Of the rivers which heaped up the soil in those regions none is worthy to be compared in volume with a single one of the mouths of the Nile, which has five mouths.

Egypt has soil which is black and easily breaks up, seeing that it is in truth mud and silt brought down from Ethiopia by the river... Egyptians in the delta gather in crops from the earth with less labor than any other men, even less than other Egyptians, for they do not need to work breaking up furrows with a plough, nor in hoeing, nor in any other of those kinds of labor which other men have to do to raise a crop. When the river has come up of itself and watered their fields and after watering has left them again, then each man sows his own field, then lets in swine, and when the swine have trampled the seed into the ground, he waits for the harvest.

As regards the nature of the river, neither the priests nor any other man was able to explain why the Nile comes down increasing in volume from the summer solstice [late June] onwards for a hundred days, and then begins decreasing, with less flow in its stream. Through the whole winter season it continues to be low, until the summer solstice returns.

***How does Herodotus's description of the flow of the Nile match with your hypothesis about the flow of a river from the subtropical zone through the desert to the sea (Page 2 of this section)? Record your conclusion in your journal.***

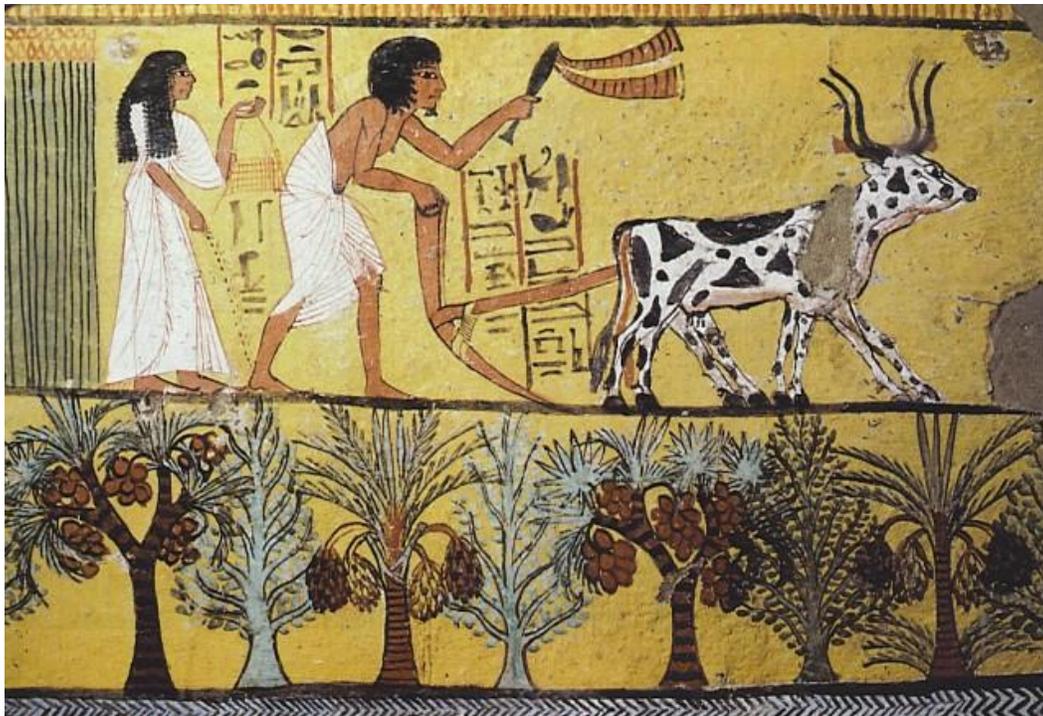
***Science/history investigation: How, why, and where have important river deltas formed? (You might design an experiment that demonstrates delta formation.)***

The priests agreed with one another in saying that the Egyptians were the first of all men on earth to find out the course of the year, having divided the seasons into twelve parts to make up the whole; and this they said they found out from the stars. The Egyptians, reckoning the twelve months at thirty days each, bring in also every year five unnumbered days, and thus the circle of their season is completed and comes round to the same point whence it set out.

***Why would Egyptians have a special interest in an accurate calendar? Record your hypothesis.***

As to their diet, it is as follows: They eat bread, making loaves of a kind of grain, which they call *kyllestis*, and they commonly use a wine made out of barley, for there are no grapevines in their land. Of their fish some they dry in the sun and then eat them without cooking, others they eat cured in brine. Of birds they eat quails and ducks and small birds without cooking, after first curing them; and everything else which they have—birds or fishes—they eat roasted or boiled, except such as have been set apart by them as sacred.

When rich people entertain guests, and they have finished eating, a man bears round a wooden figure of a dead body in a coffin, made as realistic as possible by painting and carving, and measuring about a cubit or two cubits [45 to 90 cm., 18 to 36 inches] each way. This he shows to each of those who are drinking together, saying: "When you look upon this, drink and be merry, for you shall be like this when you are dead."



<http://www.followmefoodie.com/2013/08/history-of-egyptian-food/>

*(Several important parts of setting are shown in this ancient Egyptian painting.)*

The boats in which they carry cargo are made of the thorny acacia tree, and that which exudes from it is gum. From this tree they cut pieces of wood about two cubits [925 mm., 3 ft.] in length and arrange them like bricks, fastening the boat together by running a great number of long bolts [*ropes*] through the two-cubits pieces; and when they have thus fastened the boat together, they lay cross-pieces over the top, using no ribs for the sides; and within they caulk the seams with papyrus. They make one steering-oar for it, which is passed through the bottom of the boat; and they have a mast of acacia and sails of papyrus. These boats cannot sail up the river unless there be a very fresh wind blowing, but are towed from the shore. Down-stream however they travel as follows: They have a door-shaped crate made of tamarisk wood and reed mats sewn together, and also a stone of about two talents weight [1 talent = 26 kg, 57 lb.] bored with a hole; and of these the boatman lets the crate float on in front of the boat, fastened with a rope, and the stone drags behind by another rope. The crate then, as the force of the stream presses upon it, goes on swiftly and draws on the *baris* (for so these boats are called), while the stone dragging after it behind and sunk deep in the water keeps its course straight. These boats they have in great numbers and some of them carry many thousands of talents' burden.

When the Nile comes over the land, the cities alone are seen rising above the water, resembling more nearly than anything else the islands in the Aegean Sea; for the rest of Egypt becomes a sea and the cities alone rise above water. Accordingly, whenever this happens, they travel by water not now by the channels of the river but over the midst of the plain.



<https://archhistdaily.wordpress.com/tag/egypt/>

## Summarizing: Muddy Rivers and Civilizations

When humans began planting crops, in many places they found that if they planted in the same spot for several years, the plants gradually became less healthy, and produced much less food. The only solution they found was to move their gardens to fresh ground, which often meant also moving where they lived.

However, in—

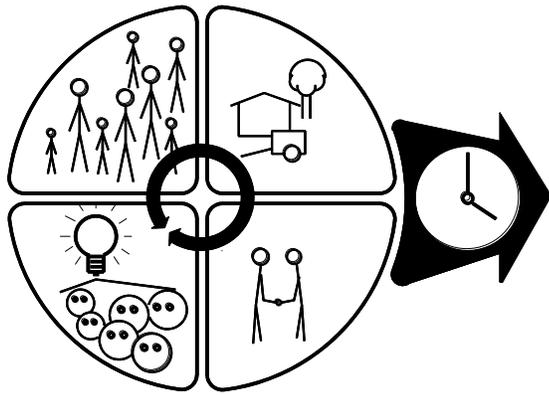
- Mesopotamia, near and between the Euphrates and Tigris Rivers,
- Egypt's Nile River valley,
- The Indus River valley in what is now Pakistan and India, and
- The Hueng He (Yellow) River valley in China,

—the same plot of ground could be used for planting every year for hundreds of years, almost always producing good crops. **Every one of these regions had rivers that were muddy, and that frequently flooded, and these four valleys were all places where early civilizations developed.**

*Based on this information, and on your earlier investigations of settings in Mesopotamia and Egypt, record your ideas about relationships between river valley natural settings and secondary (human made) settings that developed there. Check the list on page 1, particularly for kinds of human-made setting (e.g. “transportation”), to make your report as complete as possible.*

## Follow-Up: Your Setting

1. *Sketch a map of your own region—the area within 200 to 250 miles of your home. Mark, on the map, the most important natural and human-made features of setting. Identify areas and types of agriculture, location and size of cities, and important transportation facilities.*
2. *Describe in short statements how the natural setting in your region affected the development of the human-made parts.*



### ***For Teacher/Mentor—Overview:***

In some ways, this unit is conventional. Every ancient history textbook points out that river valleys are cradles of civilization, and describes in some detail the role of rivers in supporting the agriculture that makes cities and civilization possible. We've used primary sources—predominantly the writings of Herodotus—as sources of information about rivers in Mesopotamia and Egypt.

**The objectives of this unit are to introduce learners to the analytical concept “setting,” apply the concept to historical sources, and enhance their ability to organize the knowledge they develop.**

“Setting,” as we define it, includes the natural environment in which a group or society lives, but also includes human additions and modifications, and tools for cultivating, transporting, communicating, and so on. For example, domesticated animals used for meat, milk, wool, transportation or work are resources and/or tools and therefore parts of the Model element “setting.”

Setting also includes surrounding human groups which influence the group being investigated, and such things as disease—which, historically, has had powerful negative effects on isolated groups when these groups are first contacted by outsiders.

The account written by Herodotus is, in many ways, like most history narrative—a compendium of his conclusions. However, his description includes enough concrete details to give room for some analysis using the subcategories of “setting” given at the beginning of the material for learners.

### ***Notes on the investigations:***

#### ***Investigation: Climate Zones***

The usual world geography categories given to middle school learners for climate zones, which, for example, merely note “temperate zone,” lack the explanatory power of this slightly more elaborate model. The zones that Quigley describes [page 2] are created by global air circulation and the surface winds generated within each region (e.g. the subtropical trade winds), and by seasonal changes in sun angle. These account for effects like the monsoon rains that so strongly affect south Asia, and, as brought out in the learner materials, the seasonal cycles of rivers through the desert where civilizations began. The activity—generating hypotheses about seasonal variations in river flow—should be easy for most learners.

As a supplementary activity to emphasize the categories, you might have learners sketch a continent such as North America, mark (probably with color) the climate zones, and illustrate it with photos from each zonal region.

#### ***Investigation: Mesopotamia’s Setting and Investigation: Egypt’s Setting***

These activities combine use of the knowledge-organizing process described in Unit 2 with helping learners build understanding of *setting*, the first Model category to be expanded in these materials. The systemic relationships to be discovered are fairly

simple—those between the natural environment—muddy rivers that flood seasonally, and human-made aspects of setting—mainly cities, agriculture, and trade (via river travel).

The point here, of course, is that in-depth understanding of any society, group or situation requires an understanding of its milieu. For example, Britain’s development as a sea power in the 16<sup>th</sup> and 17<sup>th</sup> centuries can’t be understood independently of the island’s size, position, and resources. European development of Latin America relates to the availability of silver and gold. Making sense of developments in the American South in the first half of the 19<sup>th</sup> century requires an understanding of climate, soil, and terrain suitable for cotton farming, slaves, and rivers providing steamboat access.

Setting alone doesn’t “explain” human behavior, of course. Geographic determinism has generally fallen out of favor. But setting can, obviously, limit the possibilities for certain kinds of action, and open other possibilities. Many major modern cities formed and grew because they had natural harbors for ships. Countries around the Persian Gulf have outsized world influence because they control an underground sea of crude oil. With the definition of setting expanded to include tools, innovations such as writing, domesticated animals, wheeled vehicles, hard metals for tools, and the like, setting becomes a major driver of social change.

**Herodotus:** The accounts of Herodotus and other ancient historians are used as sources in this and later units. As with any historical writings, these accounts are subjective and biased, of course, but analysis by learners generally focuses on aspects of the accounts that can be interpreted with accuracy adequate to open windows on the past. This differs from the usual learner’s history book, because using these accounts requires questioning and use of a range of cognitive processes for active-learning investigation.

**Delta formation:** Fast-moving water can carry a great deal of silt, but when the water slows down, the silt begins settling and building up on the river bottom, sides and on the inside of bends. This happens most often near where the river meets the sea. As river bottoms become less sloped, the water flow slows, spreads in a fan, and drops the silt it was carrying, eventually building islands and multiple channels. The buildup of silt along the river banks can create natural levees, so the river level is occasionally higher than the surrounding land.

### *Summarizing: Muddy Rivers and Civilization*

This activity “puts the pieces together,” suggesting one critical point that we couldn’t make elsewhere using primary sources—the role of flood-borne silt in keeping fields fertile.

We’ve posted an interesting article on what might be the most significant historical relationship between setting and civilization—ten collapses that have occurred because of drought: [www.marionbrady.com/worldhist/DroughtCivilizCollapse.pdf](http://www.marionbrady.com/worldhist/DroughtCivilizCollapse.pdf). The understanding that major drought affecting large regions has occurred periodically (and may occur in the future) is important, but seeing that this could cause a civilization to collapse is hardly a surprise to learners investigating systemic relationships.

HLB June 2015, minor rev. August, October 2016

World history unit links: <http://www.marionbrady.com/WorldHistory.asp>.