Hydraulic Civilizations

The Origins of Social Complexity

Civilizations: [Headrick] "Large-scale societies whose members contribute taxes, labor, or tribute to the state and pay homage to their leaders."

As farming populations gathered in larger and denser communities, interactions between different groups increased and the social pressure rose until new structures suddenly appeared, together with a new level of complexity.

Most of human history (chronologically speaking) has taken place in communities quite innocent of state power.

Ancient Mesopotamia (The Land between the Rivers)

Ancient Mesoamerica
About 5,000 years ago, the first states appeared

- **By ca. 3200 BCE** Small city-states existed in southern Mesopotamia
- **By ca. 3100 BCE** A state had appeared in Egypt
- **By ca. 2000 BCE** States had appeared in northern India and China
- **By 1000 BCE** States had appeared in Mesoamerica

A critical transition from:

- Personal relations to impersonal power
- Power over things to power over people
- The world of hierarchy, power, and states we know today

(Marvin Harris) "For the first time there appeared on earth kings, dictators, high priests, emperors, prime ministers, presidents, governors, mayors, generals, admirals, police chiefs, judges, lawyers and jailers, along with dungeons, jails, penitentiaries, and concentration camps. Under the tutelage of the state, human beings learned for the first time how to bow, grovel, kneel, and kowtow. In many ways the rise of the state was the descent of the world from freedom to slavery."

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**Scales of Social Organization: Table**

Increasing population density in farming regions provided the demographic and physical raw materials used to construct the first cities and states

Increasing congestion provided much of the motivation for creating states

- Probably a bit of both joining willingly together, and being pushed together

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**Bottom-up Theories of State Formation**

Humans found that as they lived in larger and more complicated communities, they had to divide up tasks and knowledge

- This development required new forms of communication, such as calendars to help people schedule their activities, or writing to help track the obligations and possessions of individuals
- Individuals became more dependent on the group as a whole, and the group had to be organized in new ways as individuals swapped skills and resources

These larger communities acquired an ecological power no individual could match
Top-down and bottom-up theories are complimentary

Emergence of state power

The concentration, in the hands of a few people, of substantial control over considerable human and material resources

Preconditions for large power structures

Appearance of large accumulations of human, material, and intellectual resources

Appearance of new ways of managing and controlling these resources

Irrigation

[Forbes] "We have no proof that irrigation was an invention of a private individual. More probably it was the first link in a chain of many gropings and attempts to master the natural rise and fall of the rivers in the valleys."

The fact that the Tigris and Euphrates rise in the wrong season forced the earliest inhabitants to adopt perennial irrigation.

Contrast with Egypt

Bringing the river water far from the river banks required canals, dikes, and other earthworks, and the coordinated labor of hundreds, if not thousands

"Forced-labor" was a form in which taxes were paid

Taxes depended on the area flooded, which encouraged surveying, geometry, and astronomy

A way of making the water of rivers or swamps available for crop cultivation

Early forms of irrigation were simple, diverting stream or river water into fields of crops
Figure 9:1 Hypothetical sketch of an agricultural cell in South Mesopotamia.
In southern Mesopotamia, farmers benefited from the region's rich alluvial soils laid down by the region's two rivers, the Tigris and the Euphrates. Eventually irrigation works became more elaborate. Large, carefully planned networks of canals were built, using the labor or thousands of people.

In arid lands with fertile soils, such as the flatlands of Mesopotamia or the lands along the Yellow River in China, irrigation could raise agricultural productivity decisively. But in Mesopotamia, large amounts of gypsum carried down the mountains with the silt made agriculture impossible in certain districts. Irrigation led to the accumulation of salts.

The Nile in Egypt had predictable floods. It was easier to manage. Three seasons: Inundation, Coming forth, Lack of water. Led the Egyptians to develop a calendar, the techniques of surveying (the "Nilometer"), including geometry and astronomy. Taxes on farmland were levied in relation to the surface area and depth of inundation. "Forced-labor" was a form of tax the peasant paid after the inundation. While the state fed them, they performed labor consisting of digging and clearing of canals and ditches, and megalith building.

Indus Valley like Mesopotamia. Both Egypt and Indus Valley inspired by Mesopotamia.

Yellow River Valley in China. Again, large-scale flood control, including a division of labor in society and a hierarchy of authority.

Central and South America. Valley of Mexico.
1500 Up to 2 million people lived in and around Tenochtitlán supported by raised-field farming, the *chinampa* system, rectangular islands surrounded by canals. 

Early settlers on the swampy lands around Tenochtitlán built up mounds of river vegetation and mud, held together with "fences" of willows. They cleared canals between the mounds and fertilized them with mud from the canal beds, with rotting vegetation, and with human refuse. They could raise up to seven crops a year.

Aztecs built aqueducts and causeways to bring fresh water to the city.

In all of these examples, the decline of central power led to the downfall of the irrigation system.

**New Forms of Power and Control: Power Based on Consent**

In small nomadic communities, individuals will normally resist attempts by individuals to assume power over them.

How did hierarchies arise despite this resistance?

*Consent-based power* (power from below)

In many human communities, power and resources are surrendered willingly to trusted leaders.

*Coercive power* (power from above)

In larger communities, leaders could use the increasing resources placed under their control to create new forms of power that enabled them to coerce at least some of the people they ruled.

In practice, all states rely on both types of power and the two are always intertwined.

Nevertheless, there is a clear historical and logical sequence leading from power based on consent to power based also on coercion.

Why village communities may willingly surrender some control over their resources and labor to trusted leaders:

As communities grow, new problems appear for which collective solutions have to be found:

- Agricultural, economic, and religious activities have to be coordinated more carefully.
- Internal conflicts have to be defused.
Conflicts with neighboring communities have to be managed

Handling these problems efficiently is often a matter of life and death, as failure can mean famine, sickness, or defeat in war

But they cannot be solved separately by each household

The majority of people in a community may willingly take part in building the simple social dams that concentrate surplus resources in reservoirs controlled by tribal or religious leaders (note the hydraulic metaphor)

[Headrick] "People obeyed [their superiors] because they realized the need to work together, because of peer pressure of the neighbors, and because they were afraid that refusing would bring down the wrath of the gods."

**Appearance of Monumental Architecture**

Food surpluses could feed construction workers for hydraulic and megalith engineering projects

Large structures like Stonehenge have no obvious utilitarian functions

**Egypt**

Pyramids and other structures were built from limestone

Required a labor force of tens of thousands of farmers recruited from the three-month flood season and fed with the grain taken from them as taxes during the previous harvest

Pyramid-building as nation-building

Megalith structures suggest that religious thinking was changing as human communities became larger and more complex

Just as ranked hierarchies appeared among humans, so there began to appear elite gods

The best way of showing respect for these more awesome and remote gods was to build special buildings, buildings closer to the sky than ordinary dwellings, where humans could pay their respects by offering sacrifices and gifts
Where monumental architecture appears, we can be certain that there exist powerful leaders or managers, for someone has to coordinate the labor of hundreds, even thousands of people.

In this way, secular and religious power went hand in hand.

Leaders hoped to inspire awe by building such structures:

Awe at the power of the gods, and also at the majesty of the priests and rulers who dealt directly with such powerful gods and who supervised the building of their residences.

Monumental architecture is both a sign of power and an instrument of power.

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**5000 BCE** Temple of Eridu in Mesopotamia

**Late Fourth Millennium BCE** Ziggurats, magnificent stepped structures, built with immense amounts of labor and displaying elaborate architectural detailing.

Provided an awesome setting for religious and political ceremonies.

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Ziggurats of Mesopotamia and pyramids of Egypt contain burials, palaces, and temples, which indicate the presence of high-status individuals.

Ziggurats, pyramidal towers containing temples, storerooms, and workshops, were built of sun-dried bricks of mud and straw.

In the center, on a ziggurat 12 meters high, stood the "White Temple" [immediate left].
Second Millennium BCE  Earliest pyramids in Mesoamerica built by the Olmec

Colossal stone heads, possibly depicting rulers, are typical finds in Gulf Coast Olmec sites

**Hierarchy: Emerging Inequalities in Wealth and Power**

New and more productive farming practices

Evidence of Emerging Inequality

Novel problem of the control and distribution of surpluses

Surprisingly quickly led to lopsided distributions, so that gradients of wealth and power appeared

Surpluses began to sustain populations of privileged (and mainly male) specialists

   Artisans, traders, warriors, priests, scribes, and rulers

Mesopotamia 4,000 years ago

Carpenter  Musician

Shipping
Wars over water in particular led to a class of professional warriors, supported by surpluses from the farms.

Rather than the productivity associated with the agrarian revolution raising the average material living standards of all members of society, the reality was that material wealth in complex societies likes to pile itself up into huge pyramids.

As populations became denser, people, like termites, found that they needed ways of organizing and coordinating their activities.

This meant conceding power to organizers who used that power in ways that benefited themselves as much as (and often more than) the communities they controlled.

Inequality is what all top-down theories of state formation predict.

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**Law and Order**

Babylon's gravitational pull made it one of the largest of all early cities, with a population exceeding 200,000 people.

Ca. 1792 BCE Here Hammurabi established a new imperial state.

[The Stele of Hammurabi]

The upper part of the stele depicts Hammurabi standing in front of the seated sun god Shamash. The king raises his hand in deference to the god, who gives Hammurabi the power to rule and orders the king to record the law.

The lower portion of the stele contains the actual code.

His law code, with its 282 laws carved into forty-nine basalt columns, provides the earliest detailed written evidence about legal and bureaucratic structures.

Some deal with the enforcing of the upkeep of canals, the protection of tenants against inundations and guarantees for sufficient supplies of water.