### Chapter IV. Economic Thought and Other Intellectual Developments

**CHAPTER IV**  
**ECONOMIC THOUGHT AND OTHER INTELLECTUAL DEVELOPMENTS**  
**UNTILL THE RISE OF ISLAM**

| 1. Economic Thought of the Ancient Near East | 405 |
| 2. Economic Thought of Ancient Greece and the Hellenistic World | 415 |
| 3. Economic Thought of the Roman Empire | 427 |
| 4. Other Intellectual Developments of Ancient Greece | 445 |
| 5. Other Intellectual Developments of Roman Civilization | 459 |
| 6. The Roman Military Structure and Campaigns | 477 |

(Please CLICK EACH LINE of the Middle Column TO SEE THE CONTENTS)

**Photo IV-0-1. Currency Reform in Ancient Rome**  
Chapter IV. Economic Thought and Other Intellectual Developments


Photo IV-0-3. Building a Ship in Ancient Greece
Chapter IV. Economic Thought and Other Intellectual Developments

CHAPTER IV. ECONOMIC THOUGHT AND OTHER INTELLECTUAL DEVELOPMENTS UNTILL THE RISE OF ISLAM

Economic practices of the ancient world were closely related to natural phenomena as discussed previously, while economic thought was primarily concerned with ethics, religion, and politics to be discussed in this chapter. The physical environment and institutional arrangements had been influential in economic thinking and decision-making. However, ancient society was too primitive to be oriented to thinking of present economic thought. In the ancient world, philosophical, ethical, or religious values and principles were more influential than physical or material goods in forming of economic thought. Dualism in philosophy - materialism and idealism - opposed each other since the fifth century B.C. Idealism considers the belief as a presentation of mind without any relations to reality; while materialism takes the opposite direction focusing on the material world. The idealists believe that true nature of things is intellectual, not sensual, as shown in Plato who emphasized moral and duty. “They regard man, not as a creature of material environment, but as a more or less independent force…they emphasize unions of man in society as being manifestations of community of ideas…in which individual mind is subordinated to the social mind.” The materialistic tendency regards physical facts as determinants in the mental process. However, Men’s thought depends largely on their surrounding environment, so that economic ideas are determined by economic reality. “The Babylonians had ideas concerning interest and mortgages; Phoenicians thought about commerce and bills of exchange; the Greeks wrote on the subject of division of labor.” Individuals attribute to environmental conditions, so the materialism finds an optimum position in ethics or philosophy which is the basis of idealism. In this regard, individuals naturally fall in the conflict between materialism and idealism, and arrive at an optimal economic thought through the adjustment of materialism to idealism or vice versa.

Economic practices concern about the population, agriculture, industry, commerce, transport, communications, finance and banking, and other economic matters as discussed in the Chapter II; while economic thought deals with such factors as demand, supply, market, welfare; capital, labor, technology; wage, price, unemployment, rent, money, interest, profit; trade, investment, foreign exchange, and growth as to be discussed in this chapter. There were private property, division of labor, market exchange, money, and taxation in ancient times. Ancient Egypt had maintained annual account of royal granaries which inventory was measured with a giant scale called the “scale of justice” as a religious symbol. The rich soil left from the annual flooding of the Nile with favorable weather made high yields, but the opposite appeared in the drought years. The wise advisers kept records of annual production and administered the storage and surplus grain to manage future famines. They used a credit system based on the standard value of gold and silver. Sumerians in the Euphrates valley had kept the records of production for a three-year period during 2200-2100 B.C. “The records show yields from about 75,000 acres, with target amounts and shortfalls in yield from year to year. Average yields were about 12.5 bushels per acre, with three-quarters of a bushel retained for seed (6 percent).” In the Code of Hammurabi issued in 1760 B.C., the Babylonians used a tenant-farming system where rents were adjustable according to average output of the adjacent fields. They also used gold and silver as money with a barter system, and the prices of goods and services (wage) were fixed by the kings. Interest on loans was allowed, and if debtors cannot pay interest, creditors could sell debtors as slaves. The Assyrians were similar to the Babylonians, and minted silver as an official coinage in about 700 B.C. The Hebrew Scriptures, in which Moses began to write the Genesis in 1450 B.C., contains their laws about “occupation, agriculture, interest and usury, labor and wages, property rights, taxation, inheritance, weights and measures, adulteration, monopoly, and the poor.”
In ancient Greece, about the time of Homer, Hesiod views that work is not disgrace but disgrace is idleness. Plato considered economics as a minor section of ethics and politics. He wrote about issues on the division of labor, communal property, trade and money, and no interest on loans. He attributes the origin of the state to economic considerations: “A state arises out of the needs of mankind; no one is self-sufficing, but all of us have many wants” which is linked to division of labor. He believes that division of labor comes from diversity of natural endowment and becomes the basis of the social organization. He advocates communal property for the guardian class to minimize injustice and inequality of society, which idea was firmly rejected by Aristotle. Plato introduces retail trade by emphasizing that the state can enjoy free trade with complete immunity from import and export duties except the import of luxuries and the export of goods forbidden. He agrees with that money is necessary for daily exchanges, but denies interest from loans. Xenophon wrote on the economy on two issues: one is about estate management, and the other is about revenue increase of a state. He views that education and training makes farm workers productive and home managers profitable; and suggests that the Athenians may increase revenue through natural resources, more foreigners, foreign trade, silver mines, and peaceful environment. According to Aristotle, the state is by nature prior to the household since it is part of the whole; and economics is by nature prior to politics since the community is dissolved without a self-sufficient economy. The state controls over households and regulates their economic and social affairs. He concerned about the art of acquisition, the use and exchange of property, usury and monopoly, defense of private property, and justice in exchange. It is believed that slavery is based on the superiority of the master or the slave owner by nature.

In the Hellenistic age, economic thought was influenced by philosophic ideas. The Cynics favored plain living without property and wife; the Stoics followed the same favoring the advantages of a simple life, of agricultural pursuit, and of free labor; the Epicureans thought that economic problems can be resolved by reducing demand for goods rather than increasing supply. The Law of the Twelve Tables, completed by Decemvirate in 449 B.C., wrote about Roman lives of property, inheritance, and debt obligation: “A person who admits to owing money or has been adjudged to owe money must be given 30 days to pay.” Economic thought of the Roman Empire was developed by philosophers, jurists, and agricultural writers. The philosophers such as Cicero, Seneca, Pliny, and Aurelius, emphasize the right use of property based on their ethical standard. The jurists create juristic logic which is applicable to any pattern that recognizes private property and capitalist commerce inducing individualism; while they clarify the concepts of price, money, sale, loans, and deposit; which provide the basis of economic thought. The jurists define a just price set by the customary cost of production. But after the development of commerce and credit, “utility became the basis for exchange value” which judgment depended on “the wants of the average normal man.” The agricultural writers suggest the profitable use of land with technical framing and household management. In the goods market, the emperors always concerned about the shortage of grain supply to the major cities of the empire, and tried to maintain consistency by applying socialist measures. In the money market, Diocletian established sound currency by issuing a single uniform coin, which was guaranteed by the gold coinage with a fixed weight and purity, which replaced various provincial coins. Since the Edict of Milan in 313, Christianity became influential to economic lives and thought. The New Testament reflects the change of Hebrew society from traditions of communal tribes to new values of more complex society based on humanity. Matthew, Mark, Luke, and John written in the first century express negative concepts of money, necessities, wealth, and labor. “Blessed are you who are poor.” As the time passes, the Christians accommodate their earthly lives with social and economic institutions, and believe that wealth is a gift of God to promote human welfare.
Chapter IV. Economic Thought and Other Intellectual Developments

1. Economic Thought of the Ancient Near East

The theoretical foundation of micro or macroeconomics had not been developed until the time of Adam Smith, who published the Wealth of Nation in 1786. But even in ancient times, economic concepts were developed from material practices in production, consumption, and trade. Here in ancient Near East deals with ancient Mesopotamia, Egypt, and the Israelites. In agricultural production, factor inputs are land, technology, and labor. Both in Mesopotamia and Egypt, land was owned by their rulers and nobles; farming technology was primitive; and labor forces were supplied by tenant-farmers with returning of a certain proportions of output to landlords as taxes. For example, the tenant-farmers of Egypt paid taxes from ten to twenty percent of output to landlords, either Pharaoh or nobles. Since farming technology was primitive, the productivity of agriculture was largely dependent upon the degree of land fertility and the supply of water to the farm land through the irrigation system of the Nile and Euphrates. The farming practices in Egypt allowed them to grow staple food crops: grains such as wheat and barley, and industrial crops such as flax and papyrus. In industrial production, vast materials and resources were used and exploited by Egyptians, including the use of animal products, building materials, cosmetics, perfumes, fibers and glass. “Mesopotamian people invented many technologies including metal and copper-working, glass and lamp making, textile weaving, flood control, water storage, and irrigation.”

In the first Bronze Age, they developed from copper, bronze, and gold on to iron, and used expensive metals for palace decorations and weapons such as swords, daggers, spears, and maces. As resources dried up and became scarce, Egyptians could not maintain their costly technology, which can be observed “by the shift from monumental pyramid construction in the Old Kingdom to the small royal tombs of the Valley of the Kings in the New Kingdom.” The gap between supply and demand in agriculture and industry was filled by exchanges. In migration and trade, civilization moved from Africa to the southwestern corner of the Fertile Crescent in about 10,000 B.C., from which later migrations carried early agricultural practices to neighboring regions. The ancient peoples of Sahara imported animals from Asia between 6000 and 4000 B.C. By the beginning of the 4th millennium B.C., and ancient Egyptians were importing pottery as well as construction ideas from Canaan. “By the second half of the 4th millennium B.C., the gemstone lapis lazuli was being traded from its only known source in the ancient world - Badakhshan, in what is now northeastern Afghanistan - as far as Mesopotamia and Egypt. By the 3rd millennium B.C., the lapis lazuli trade was extended to Harappa, Lothal and Mohenjo-daro in the Indus Valley Civilization (Ancient India) of modern day Pakistan and northwestern India.”

The overland trade from the Nile to the Red Sea was known as early as pre-dynastic times. For maritime trade, shipbuilding was known to the ancient Egyptians as early as 3000 B.C. and perhaps earlier. “The legendary Sesostris is said to have started work on an ancient Suez Canal joining the River Nile to the Red Sea.” In Mesopotamia, coined money was not used until the very end of the Assyrian empire. “In 493 B.C., Darius I issued an edict introducing silver coinage, darics, into the Persian Empire, including Babylonia. From the late sixth century B.C. onward, there were several dynastic banking houses, such as Egibi family in Babylon and the Murashu family in Nippur, who amassed huge fortunes through usurious rates of interest.”

Ancient Egyptians practiced a barter system of cashless exchange: the governments centralized harvests in state warehouses. “Grain harvesters would deposit their grain into the central warehouses for security and convenience. The depositors could then withdraw a particular lot of grain when they wanted to make a purchase. Sometimes the deposits into these Egyptian grain banks were voluntary and other times it was required by the king. Written orders for grain withdrawal could be used to pay tax collectors, priests and merchants.”

Book I. From the Beginning to the Rise of Islam 405
Chapter IV. Economic Thought and Other Intellectual Developments

Photo IV-1-1. The Ancient Mesopotamian Economy

Photo IV-1-2. The Ancient Egyptian Economy
Chapter IV. Economic Thought and Other Intellectual Developments

Economic Thought of Mesopotamia: Jeffrey Hays posted Mesopotamian Economics on the web as follows. (i) “Mesopotamia was the first place where crop surpluses were produced to such a degree that enough labor was freed that it could be harnessed to build cities and monuments, produce art and crafts and support merchants, temples and monarchs. The Sumerian used the world’s first writing to record economic transactions and participate in a trade network that extended over thousands of miles. The Babylonians are credited with expanding commerce and developing an early banking system. Most of the early writing was used to make lists of commodities. The writing system is believed to have developed in response to an increasingly complex society in which records needed to be kept on taxes, rations, agricultural products and tributes to keep society running smoothly. The oldest examples of Sumerian writing were bills of sales that recorded transactions between a buyer and seller. When a trader sold ten head of cattle he included a clay tablet that had a symbol for the number ten and a pictograph symbol of cattle. The Mesopotamians could also be described as the world’s first great accountants. They recorded everything that was consumed in the temples on clay tablets and placed them in the temple archives. Many of the tablets recovered were lists of items like this. Royal seals were affixed to products.”

(ii) “The earliest form of trade was barter. The earliest known proto-money are clay tokens excavated from the floors of village houses and city temples in the Near East. The tokens served as counters and perhaps as promissory notes used before writing was developed. The tokens came in different sizes and shapes. Early Mesopotamians who lived in the Fertile Crescent before the rise of the first cities employed five token types that represented different amounts of the three main traded goods: grain, human labor and livestock such as goats and sheep. Clay tokens, described by some scholars as the world’s first money, found in Susa, Iran have been dated to 3300 B.C. One was equivalent to one sheep. Others represented a jar of oil, a measure of metal, a measure of honey, and different garments. In the Mesopotamian cities, there were 16 main types of tokens and dozens of sub categories for things like honey, trussed duck, sheep's milk, rope, garments, bread, textiles, furniture, mats, beds, perfume and metals.”

(iii) “In Mesopotamia, silver became the standard of value sometime between 3100 B.C. and 2500 B.C. along with barley. Silver was used because it was a prized decorative material, it was portable and the supply of it was relatively constant and predictable from year to year. Sometime before 2500 B.C. a shekel of silver became the standard currency. Tablets listed the price of timber and grains in shekels of silver. A shekel was equal to about one third of an ounce, or little more than three pennies in terms of weight. One month of labor was worth 1 shekel. A liter of barely sold for 3/100ths of shekel. A slave sold for between 10 and 20 shekels. No long after shekels appeared as a means of exchange, kings began levying fines in shekels as a punishment. Around 2000 B.C., in the city of Eshnunna, a man who bit another man’s nose was fined 60 shekels. A man who slapped another man in the face had to pay up 20 shekels.”

(iv) “Between 2800 B.C. and 2500 B.C., pieces of silver were caste a standard weight, usually in the form of rings or coils called har on tablets...The main problem with silver is that it was so valuable that weighing errors or impure silver should translate to a large amount of lost value. Some people tried to purposely cheat others by adding other metals into gold or silver or even substituting look-a-like metals. Fraud and cheating were so prevalent in the ancient world that there are eight passages in the Old Testament that forbid tampering with scales or substituting lighter for heavier stones. People often fell into debt - a conclusion based on numerous tablet letters describing people in various kinds of trouble for falling into debt. Many debtors became slaves. The situation got so out of hand in Babylon that King Hammurabi decreed that no one could be enslaved for more than three years for debt. Other cities, with residents racked by debt, issued moratoriums on all outstanding bills.”
Mesopotamian Labor: There were employment contracts in Ur. “As agriculture became more advanced, surpluses were generated, freeing farmers to perform other jobs. Over time former farmers could earn enough to specialize in certain tasks and become what would qualify as craftsmen. Tablets listed scores of professions. Trades during Mesopotamian times included tradesmen, butchers, stonemasons, water carriers, fishermen, estate workers, farmers, tanners, weavers, boat-builders, furniture makers, bakers, silversmiths, metal workers, pottery makers, beer brewers, bread makers, leatherworkers, spinners, weavers, clothes makers, tool and weapons makers, jewelers, woodworkers and people in charge of preparing sacrifices and maintaining buildings. Workers were often paid with barley. Under the Code of Hammurabi, maximum prices and minimum wages were fixed by decree and the terms for apprenticeships were defined. There were also many civil servants. One of the highest positions was the scribe, who worked closely with the king and the bureaucracy, recording events and tallying up commodities.”

Industry: “Organized production of hand-crafted good was first developed in Mesopotamia. The Sumerians produced manufactured goods. The weaving of wool by thousands of workers is regarded as the large-scale industry. The Sumerians a developed sense of ownership and private property. It seems like many business transactions were recorded and the minutest amounts and smallest quantities were listed. Contracts were sealed with cylinder seals that were rolled over clay to produce a relief image. There wasn’t much in Ur and other cities in Mesopotamia except water from the Euphrates River and mud brick made from the dry earth. Prized materials such as gold, silver, lapis lazuli, agate, carnelian all were imported.”

Trade: “ Assyrian booty in Nineveh Large scale trade was pioneered in Mesopotamia. Both luxury goods and raw materials circulated within Mesopotamia and were brought in from the outside as far away as India, Africa and Greece. Mesopotamia was where some of the first great trade routes were established. Control of the Euphrates, an Italian archaeologist Paolo Matthiae told National Geographic, meant control over the strategic traffic in metals from Anatolia and in wood from the Syrian forests near the Mediterranean, both natural resources essential to Mesopotamian economic life. The only goods available in abundance in Mesopotamia were mud, clay, reeds, palm, fish, and grain. To obtain other goods Mesopotamians needed to trade. Mesopotamians developed large scale trade. Ships brought in goods from distant lands. Labor and grain were exported. Metals were brought in overland routes and paid for with wool and grains. Goods were moved in jars and clay pots. Seals identified who they belonged to.

Trade Links: “The Sumerians established trade links with cultures in Anatolia, Syria, Persia and the Indus Valley. Similarities between pottery in Mesopotamia and the Indus Valley indicate that trade probably occurred between the two regions. During the reign of the pharaoh Pepi I (2332 to 2283 B.C.) Egypt traded with Mesopotamian cities as far north as Ebla in Syria near the border of present-day Turkey. The Sumerians traded for gold and silver from Indus Valley, Egypt, Nubia and Turkey; ivory from Africa and the Indus Valley; agate, carnelian, wood from Iran; obsidian and copper from Turkey; dierite, silver and copper from Oman and coast of Arabian Sea; carved beads from the Indus valley; translucent stone from Oran and Turkmenistan; seashell from the Gulf of Oman. Raw blocks of lapis lazuli are thought to have been brought from Afghanistan by donkey and on foot. Tin may have come from as far away as Malaysia but most likely came from Turkey or Europe. Many goods that traveled through the Persian Gulf went through the island of Bahrain. There was an early Bronze Age trade network between Mesopotamia, Dilmun (Bahrain), Elam (southwestern Iran), Bactria (Afghanistan) and the Indus Valley. Ivory combs, carnelian belts and beads were carried by ship to Dilmun in Bahrain where buyers from Ur snapped them up the Euphrates and carried them to Mesopotamia.” The discussions on its economy in Chapter II may explain their economic thought further.
Economic Thought of Ancient Egypt: As noted previously, the land of ancient Egypt was mostly owned by Pharaoh and wealthy nobles, and tenant-farmers used the land by paying an annual tax of ten to twenty percent of output, while farming technology was primitive. The peasant was subject doing forced labor to the king at any time: “dredging the canals, building roads, tilling the royal lands, or dragging great stones and obelisks for pyramids, temples and palaces. The vast majority of the population lived in mostly self-sufficient village communities in a state close to serfdom. Apart from the tenant-peasants, a large section of the population worked as farm laborers on the estates of noblemen and of the temples. Probably a majority of the laborers in the field were moderately content, accepting their poverty patiently. Many of them were salves, captured in the wars or bonded for debt; sometimes slave-raids were organized, and women and children from abroad were sold to the highest bidder at home.”

On the one hand, “Administrators, priests, traders and craftsmen lived mostly in the cities along the Nile, which could be supplied with victuals relatively easily and cheaply by boat. Agriculture created most of Egypt’s wealth. Grain, vegetables, fruit, cattle, goats, pigs and fowl were grown, and fish from the Nile were caught, and eventual surpluses, after deduction of the various taxes, were sold on the markets.” On the other hand, “A large part of the manufactured goods came from the families which produced the raw materials. Labor was divided according to gender, with the processing generally left to the women. While the men grew flax, their women spun it into thread and wove the linen. A sizable proportion of the grain produced was used for beer production. The fish caught by the men had to be cleaned and dried, which was generally done by women, to be of much use in the hot climate of Egypt, unless they were consumed immediately. In the towns small factories appeared, often financed by rich noblemen: bakeries, breweries, carpentry workshops and the like with a few dozen employees. In these manufactories weaving, for instance, became a largely male occupation with the introduction of upright looms during the New Kingdom.”

“Most of the things mined were of little interest to anyone but a small number of rich people. Precious metals were not in general circulation until the Late Period and even then remained in the hands of few. The metals used for tools - copper, bronze and, from the Late Period onwards, iron - were expensive and the implements fashioned from them were beyond the reach of many. Poorer people continued to use stone and wooden tools for most purposes well into the Bronze and even beyond into the Iron Age. Gems too remained in the possession of a wealthy minority and the stone quarried for temples and tombs served the same class of people and profited only the craftsmen involved in building.” The industrial workers were mostly freemen, partly slaves. “The free artisans were usually organized for the specific undertaking by a chief workman or overseer, who sold their labor as a group and paid them individually.” Most of the produce was consumed by the producers themselves. “What was left after landlords and tax-collectors had taken their share, could be sold by barter on the free market either directly to consumers or to professional traders.” High interest rates did not encourage commerce. Since coinage was not yet developed, payments were made in goods such as corn, bread, yeast, beer, etc. Credit was highly developed: “written transfer frequently took the place of barter or payment; scribes were busy everywhere accelerating business with legal documents of exchange, accounting and finance…. The Egyptian scribe keeps record of work done and goods paid, of prices and costs, of profits and loss; he count the cattle as they move to the slaughter, or corn as it is measured out in sale; he draws up contracts and wills, and makes out his master’s income-tax.” Pharaoh and provincial nobles maintained law and order in the state, and clerks took the census and examined income-tax return. Through Nilometers that measured the rise of the river, the scribe-officials forecast the size of harvest, and estimated the future revenue; they allotted appropriations to government departments, supervised industry and trade, and regulated the economy.
“The main energy source of ancient times was muscle power provided to a large extent by humans, but domesticated animals played an important role. The animals used in agriculture were donkeys for transporting produce and cattle for ploughing and other heavy work. Harnessing was inefficient. The yoke resting on the animals' shoulders was unknown, and the shafts of the ploughs were fastened to the horns of the cows. Horses were introduced into Egypt during the Second Intermediary Period and never achieved economic importance. Expensive to keep, they were only employed by the aristocracy and the military for pulling chariots and later for riding. Vehicles with light spoked wheels came into use during the New Kingdom and served mostly for warfare and sport. Anything transported by land, even in arid desert regions, was either carried by humans or donkeys, or dragged on wooden sledges. Wind energy was exploited only by ships and even there quite inefficiently: The square sails used enabled only sailing before the wind. The Egyptians were fortunate in that the Nile flowed from south to north. The prevailing winds were northerly and sufficed to blow the ships upriver. They were let to drift downriver with furled sails. But often a destination could only be reached through rowing which required large crews. Fire was needed for cooking and baking food, smelting and casting metal, glassmaking, burning pottery, and very rarely for making bricks. For the working of metals high temperatures had to be achieved and this was done quite possibly with charcoal. No coal was available in ancient times and wood was not very plentiful. One suspects that ordinary fires were fed with any dry vegetable or animal matter that was at hand. The heat of the sun on the other hand was put to very good use in the production of mud bricks, which were the perfect building material in a practically rainless country like Egypt.”

In ancient times, the practice of slavery was practically ubiquitous, but it seems less harsh and widespread in Egypt than in other society. Mining depended largely on slave labor, and the warfare and trade greatly increased the number of enslaved foreigners.

The beneficiaries of the economic system: (i) The Commoners: A major part of the levies imposed on the people was used to stabilize society; grain was stored which could be distributed in times of famine. “Corvée workers were fed from these stores during the months of inundation when work in the fields was impossible. Artisans constructing public buildings found employment, paid by the royal treasury. Even the offerings at the temples were at least partially used to feed the poor...While famines affected the poor much more than the rich, in normal times there was not that much difference as regards health, survival of their children or even longevity. Peasant villagers...hardly ever travelled far and their knowledge of what lay beyond their own community was limited. They came into contact with low ranking scribes and overseers, who were not much better off than they themselves. But by thrift and hard work they could hope to gain additional property and rise on the social ladder.” (ii) The Upper Class: “In a society where precious metals were not considered a special means of exchange and were mostly in the hands of the pharaohs and the temples, wealth was synonymous with possession of land. Theoretically all the land belonged to the pharaoh who could dispose of it at will. Large tracts were given to the military, above all during times of unrest when the kings needed their support and were unable to recompense them in any other way. Officials were also beneficiaries of such royal munificence. But most of the land came to be owned outright by the temples and the peasantry. A considerable amount of wealth was invested in the building of tombs and the services following burial, which were supposed to go on forever.” (iii) The Temples: “The gods had to be propitiated by offerings and rituals celebrated by great numbers of priests. To maintain this clerical establishment large parts of Egypt were donated to the temples. By the New Kingdom they appear to have owned as much as a third of the arable land and were exempt from paying taxes. Even the people in their employment were protected by law against impressment. This concentration of wealth may have contributed to the decline of the state under the 20th dynasty.”
Chapter IV. Economic Thought and Other Intellectual Developments

Economic Thought of the Jews: The Old Testament is history of the Jews, also explaining Jewish economic thought. Moses was born in 1526 B.C. and led the exodus from Egypt in 1446 four hundred years after the Israelites moved to Egypt. He wrote the first five books of the Hebrew Scriptures during 1450-1410 B.C. Since Zephaniah wrote its last book near the end of his ministry (640-621 B.C), thirty-nine books of the Old Testament contains over eight centuries of Jewish history during 1450-620 B.C. as a record of God’s creation of the world and his desire. “From the beginning, we learn that God created the world and called it good, making the material world fundamentally good. He further entrusted human beings with dominion over the earth - giving them both the privilege of enjoying the benefits of the material world, but also the responsibility for caring for the world….God set human beings free to utilize their God-given intelligence, initiative and creativity in discerning and applying what the wisdom He embedded into the world - this is all a part of the responsible exercise of dominion over creation that brings innovation and productivity to benefit humankind….Man has been created with an urge to control and harness the resources of nature in the interests of the common good, but he is subject to his accountability to God as a trustee to preserve and care for it. This process is precisely what an economist would refer to as responsible wealth creation. The dominion mandate coincides with human beings being made in God’s image, giving them an innate inclination to utilize the created world for productive purposes. In creation, God is portrayed as a worker, who continues working to sustain His world. His creativity, initiative, resourcefulness displayed in creation are also traits that have been given to human beings by virtue of being made in His image. Though human beings are clearly more than autonomous economic agents, responsible human dominion over creation involves exercising these creative qualities. In Genesis, God ordained work as a good thing and one of the primary means by which dominion was accomplished, though as a result of the entrance of sin into the world, work was corrupted and made more difficult."13

The Israelites built a holy nation where society should be fair by allowing the people to own and accumulate property and by taking care of the poor. In the Genesis, both the slave born in your house and the one bought with your money must be circumcised (Gen 17.13); from which we can see that society allowed slavery, so that people owned slaves as property to be bought or sold, and slave labor was freely used for farming and housekeeping. Abraham purchased a piece of land as a burying place for Sarah his wife from the Hittites with four hundred shekels of silver, according to the weight current among the merchants (Gen. 23.16-20); Isaac inherited everything from his father including God’ promise to make his descendants into a great nation (Gen. 25.19-28.9). Thus, the private property was allowed to the Israelites by the God, and was secured by inheritance, restitution, and protection. Jacob did everything, both right and wrong, with great zeal. He deceived his own brother Esau and his father Isaac. He wrestle with an angel and worked fourteen years to marry the woman he loved. Through Jacob we learn how a strong leader can also be a servant. We also see how wrong actions will always come back to haunt us (Gen 28.10-36.43). Joseph, one of Jacob’s twelve sons was obviously the favorite. Hated by his brothers for this, Joseph was sold to slave traders who sent him to Egypt, where his wisdom made him ascend to the governing authority over land of Egypt at his age of thirty. During the seven plenteous years the earth produced abundantly. He gathered up all the food of the seven years and store up all the food in the cities, which was beyond the measurement. When the seven years of famine began to come, Joseph opened all the storehouses and sold grain to the Egyptians, while all the world came to Joseph in Egypt to buy food (Gen. 41.37-57). Jacobs’ family also moved to Egypt for food. Upon their arrival, Joseph went and told Pharaoh, saying that my father and my brothers, with their flocks and herds and all that they possess, have come from the land of Canaan; they are now in the land of Goshen as an alien family under the rule of Egyptian king.
Chapter IV. Economic Thought and Other Intellectual Developments

Then Pharaoh said to Joseph, Your father and your brother have come to you. The land of Egypt is before you; settle your father and your brothers in the best part of the land; let them live in the land of Goshen (Gen. 47-5-6). This implies that there were the existence and inheritance of private property rights; the state government controlled the surplus and shortage of grain in the long run; and the migration of the people for food from Canaan to Egypt was tightly controlled by the Egyptian government. When the famine became severe in Egypt, there was no food in all the land. The Egyptians spent all of their money to buy food, so they brought livestock to Joseph for food. There was nothing left but their bodies and lands. So Joseph bought all the land of Egypt for Pharaoh, and made them slaves to Pharaoh from one end of Egypt to the other. Only the land of priests he did not buy; for the priests had a fixed allowance from Pharaoh, and lived on the allowance that Pharaoh gave them; therefore, they did not sell their land. Then, Joseph said to the people, here is seed for you; sow the land. And at the harvests you shall give one-fifth to Pharaoh, and four-fifths shall be your own, as seed for the field and as food for yourselves and your households. They said that “You have saved our lives, may it please my lord, we will be slaves to Pharaoh.” This implies two things: first, the government monopolized to buy and store up the surplus grain in plenteous years, and to sell them to the people during famine years, which made high profits to the state; second, the state nationalized the entire farm land by purchasing it from the people who owned land in the famine years with the money coming from selling grain, which allowed the state to establish the tenant-farming system with one-fifth return to the landlord (Gen. 47.13-26). Genesis indicates that there were property rights and their inheritance, the existence of free labor from a slavery system, weights and measures, adulteration, monopoly by the state, long-term planning for food supply, state control over immigration, and the establishment of the tenant-farming system, with other evidences explaining economic thoughts of the time.

As the Semitic power of Hyksos collapsed by 1549 B.C., the new kingdom arose and began to enslave the Jews. The Israelites became slaves for 400 years. Pharaoh oppressed them cruelly. The new king said to his people, “Look, the Israelite people are more numerous and more powerful than we. Come, let us deal shrewdly with them, or they will increase and, in the event of war, join our enemies and fight against us and escape from the land” (Exod. 1.8-10). Here we can see the political economy conflicting between the ruling class and the rising population of aliens in Egypt, which is similar to present times for certain groups of advanced states to resist to mass immigration. After escaping through the Red Sea, the Hebrews traveled through the wilderness and arrived at Sinai, God’s holy mountain. There they received the Ten Commandments, and instructions for building a tabernacle as a center of worship. “You shall not steal” (Exod. 20.15) implies the recognition of property rights. His laws help expose sin, and they give standards for righteous living. “Six days you shall gather it; but on the seventh day, which is a Sabbath, there will be none” (Exod.16.22-6). You shall keep the Sabbath, because it is holy for you; everyone who profanes it shall be put to death; whoever does any work on it shall be cut off from among the people (Exod. 31.12-17). “When you buy a male Hebrew slave, he shall serve six years, but in the seventh he shall go out a free person, without debt. If he comes in single, he shall go out single; if he comes in married, then his wife shall go out with him (Exod. 21.2-3). If one’s property is harmed by the other, the damage is compensated by the person who made the harm (Exod. 21.33-6). Laws about property continues: When someone steals ox or a sheep, and slaughters it or sells it, the thief make restitution, but if unable to do so, shall be sold for the theft. When the animal, whether ox or donkey or sheep, is found alive in the thief’s possession, the thief shall pay double (Exod. 22.1-4). If you lend money to my people, to the poor among you, you shall not deal with them as a creditor; you shall not exact interest from them. If you take your neighbor’s cloak in pawn, you shall restore it before the sun goes down (Exod. 22.25-6).
Chapter IV. Economic Thought and Other Intellectual Developments

The Sabbatical Year gave rest for the land and freedom for the slaves. “Six years you shall sow your field, and six years you shall prune your vineyard, and gather in their yield; but the seventh year there shall be a Sabbath of complete rest for the land, a Sabbath for the Lord: you shall not sow your field or prune your vineyard” (Lev. 25.1-7). The Jubilee year was significant to tenant farmers. “You shall count off seven weeks of years, seven times seven years, so that the period of seven weeks of years gives forty-nine years….And you shall hallow the fiftieth year and you shall proclaim liberty throughout the land to all its inhabitants. It shall be jubilee for you: you shall return, every one of you, to your property and every one of you to your family (Lev. 25.8-12). It precludes the transfer of agricultural land to tenant farmers, which gave an opportunity for small farmers to own their farming lands; that is a kind of redistribution of property. If a person consecrates to the Lord any inherited landholding, its assessment shall be in accordance with its seed requirements: fifty shekels of silver to a homer of barley seed. If the person consecrates the field as of the year of jubilee, that assessment shall stand; but if the field is consecrated after the jubilee, the priest shall compute the price for it according to the years that remain until the year of jubilee, and the assessment shall be reduced (Lev. 27.16-18). The census of Israel’s firstborn males is similar to the census of the population held present days. “Enroll all the firstborn males of the Israelites, from a month old and upward, and count their names.” The total enrollment was twenty-two thousand two hundred seventy-three (Num. 3.40-43). After the plague, Moses took the census of the new generation. The grand total of all Israelites from twelve tribes were little below six hundred two thousand (Num. 26.1-65), which was 2.7 times of the first census in my calculation. Since the population growth is fundamental for supply and demand of the economy, the result of this census may cause the change of government policies. Just before the people crossed the river into Canaan, the Israelites camped east of the Jordan River in the land of Moab.

Laws for proper worship consider only one altar for sacrifice, warning against worshiping other gods, clean and unclean foods, tithes, lending money, Hebrew slaves, and so on. The tithe was collected and used for charity. “Every third year you shall bring out the full tithe of your produce for that year, and store it within your towns; the Levites, because they have no allotment or inheritance with you, as well as the resident aliens, the orphans, and the widows in your towns, may come and eat their fill so that the Lord your God may bless you in all the work that you undertake” (Deut. 14-28). Rejoice during your festival, you and your sons and your daughters, your male and female slaves, as well as the Levites, the strangers, the orphans, and the widows resident in your town. (Deut. 16.14). “You shall not watch your neighbor’s ox or sheep straying away and ignore them; you shall take them back to their owner (Deut. 22.1). Interest on loans was partially allowed: “You shall not charge interest on loans to another Israelite, interest on money, interest on provisions, and interest on anything that is lent. On loans to foreigner you may charge interest, but on loans to another Israelite you may not charge interest” (Deut. 23.19-20). “You shall not withhold the wages of the poor and needy laborers…you shall pay them their wages daily before sunset, because they are poor and their livelihood depends on them; other-wise they might cry to the lord against you, and you would incur guilt (Deut. 24.14-5). To warn against foolish actions, “Go to the ant, you lazybones; consider its ways, and be wise. Without having any chief or officer or ruler, it prepares its food in summer, and gathers its sustenance in harvest. How long will you lie there, O lazybones? When will you rise from your sleep?” (Prov. 6.6-11). After wondering for 40 years in the wilderness, a new generation is ready to enter Canaan: Joshua leads the nation to cross the Jordan River. After conquering the whole land, the tribes received their land. The dignity and worth of human labor are emphasized and idleness is condemned. “The wealth of the rich is their fortress; the poverty of the poor is their ruin. The wage of the righteous leads to life, the gain of the wicked to sin” (Prov. 10.15-6).
Chapter IV. Economic Thought and Other Intellectual Developments

The wisdom books concern about the poor and oppressed: a community’s care for the poor is considered an indication of how they value God - he who oppresses the poor shows contempt for their Maker, but he who is kind to the needy honors God (Prov. 14:31, 17:5, 19:17). “The prophets routinely and forcefully spoke out against oppression, economic injustice and exploitation of the poor. They considered taking care of the poor a strong indicator of a person’s (and the nation Israel’s) spiritual health (Isa. 58:6-7), even making a strong connection between compassion for the poor and genuinely knowing God (Jer. 22:16). The prophets considers this neglect of the poor a serious disregard of the law, and it was one of the symptoms of the major disease afflicting Israel - abandoning their relationship with God for the worship of idols/false gods (Exek. 16:48, Amos 2:6-7, Amos 4:1, Micah 2:2-9, Hab. 2:6-12).”

The wisdom books connects between diligence, hard work, initiative, and prosperity: Lazy hands make a man poor, but diligent hands bring wealth. A child who gathers in summer is prudent, but a child who sleeps in harvest brings shame (Proverbs 10:4-5). The wage of the righteous leads to life, the gain of the wicked to sin (Proverbs 10:15-6). The fool, or one who lacks wisdom and character, ends up with a life of calamity, but the wise person, the one who has well developed character, ends up with a life of prosperity and wellbeing. Of course, the Proverbs are rules of thumb and not legal guarantees from God, so there are exceptions to this general pattern - both the poor saint and the rich idiot! And sometimes the poor are poor because they are the victims of injustice (Prov. 13:23). To be sure, this is not teaching anything like a prosperity theology in which God always automatically rewards righteousness with material wealth. Although one’s prosperity is ultimately a blessing from God, it is recognized that wealth doesn’t last forever even in one’s life (Proverbs 27:24).

In sum, (i) Property rights: The God allowed private property to the Israelites, which was secured by inheritance, restitution, and protection. A commandment “You shall not steal” must be subject to property ownership. (ii) Money and just prices: In trade, as standards of values and prices, gold and silver were used along with barter exchanges. (iii) Labor: The dignity and worth of human labor were emphasized, and idleness is condemned: hard working was connected to the rich and idleness to the poor. (iv) The God allowed slavery that was prevailed in society of the time. Although slaves belonged to the master, the Jews were freed in the seventh year. (iv) Interest on money loans to another Jews shall not be charged, but loans to foreigners, you may charge interest. For labor compensation, you shall not hold the wage of the poor and needy laborers. (v) Tithe was claimed: “Just as the poor are protected by a number of provisions that command acts of charity – their triennial claim to the tithe, their participation in feast days.” (vi) The Israelites moved for food to Egypt during the famine years, where they settled under the protection of Joseph. But Moses led them to leave Egypt, cross the Red Sea, arrive at Sinai, where they wandered 40 years. They finally crossed the Jordan River to enter Canaan. In this period, economic thought can be observed as below. (vii) The Egyptian government estimates production and consumption of grain in the long run. In the abundant years, state collected grain and stored up in huge storages; and in the famine years, state sold it out. (viii) In the famine years, land owners sold their land for food, then Pharaoh purchased all the land of the state, and lent it to tenant farmers. The state established a tenant-farming system with returning of a fifth of output to the landlord. The migration of Jews was tightly controlled by the host countries because of politico-economic reasons. (ix) Six days you shall work, but on the seventh day, that is the Sabbath, you shall rest. Six years you shall sow your field, but the seventh year there shall be a Sabbath of complete rest of land. Tenant farmers become the owner of the land after fifty years of farming, the seventh Sabbath year or the Jubilee year. (x) The Jews took two censuses at least some decades before Moses died in 1410 B.C. The census must be greatly significant to estimate the supply, demand, and distribution of the economy as well as to organize the people.
Chapter IV. Economic Thought and Other Intellectual Developments

2. Economic Thought of Ancient Greece and the Hellenistic World

The city-states of Greece formed alliances, but they collapsed as a result of internal strife among the citizens as well as between states, particularly between Athens and Sparta. They were finally conquered by the Macedonians first and the Romans later. In the major city-states, slaves and resident aliens formed the majority of the population, while citizens were busy in politics on jury duty one day, in the legislative assembly the next, and other civic function the following day. Since the foreigners were not allowed to own land, many of them became active trade and crafts initially for survival in foreign states. “Although the Greeks’ standards of personal consumption expenditure in terms of housing, clothing, and food were modest ones, common enjoyment was fostered by what is our own terms would be called lavish standards of public consumption in the form of public buildings and festivals. Every town had its own theatre, and the environment abounded with temples, artwork, and sculpture whose remnants to this day give an intimation of a beauty attained by no other civilization. Much of the revenue for this arose from the payments of allies or defeated enemies, which contributed a large part of the state income. Calculations have been made that in one period around 440 B.C. the large portion of the revenue of the city of Athens went for the construction of temples and artwork on the Acropolis, in addition to the financing of a substantial number of public festivals.”

The economic structure of the Greek world was largely affected by four events as follows. First, by the adaptation of Phoenician alphabet early in the ninth century B.C., the Athenian laws were codified and written in 621 B.C.: the availability of the written word was a significant factors in the development of trade and the reshuffling of economic classes with the rise of merchants and new men of wealth. Second, the Greek colonies around the Mediterranean Sea and the Black Sea late in the eighth century B.C. became their important trading partners stimulating production, consumption, and trade, which opened a new pattern of life beyond the base necessities of subsistence. Third, the invention of coined money in Liddia in Asia Minor in early seventh century spread to Greece. The coined money had the intrinsic value of precious metals, which were more convenient units of account and means of exchange than earlier types of money, and made it possible to accumulate wealth without limit. Finally, at the time of the spread of coined money, the rise of lending money at interest with credit transactions appeared in the second half of the seventh century B.C., probably originated with loans of cattle or seed corn, which produce more returns than interest payments. “As opportunities for the productive use of money became more plentiful, the idea was expanded to cover returns on borrowed funds.”

The rising industry and commerce increased the gap between the rich and the poor, between large landholders and small proprietors or landless laborers, or between aristocratic landholders and the new moneymen classes in the Greek city-states. In this environment, the poor citizens became against the rich, and they saw aristocratic communism providing an equal share to the citizens. The political power of the poor citizenry influenced the assembly to divert wealth of the rich to the poor by the fines, confiscations, and public works. This was the beginning of the collapse of the Athenian age of prosperity, falling into the Hellenistic world. The philosophers of Greece expressed their economic thought in various ways. Hesiod views that work is not disgrace but disgrace is idleness; and Xenophon writes about estate management and revenue growth of a state. Plato considers economics as a minor section of ethics and politics; writing on the division of labor, communal property, trade and money, and no interest on loans. According to Aristotle, economics is by nature prior to politics since community is dissolved without a self-sufficient economy. In the Hellenistic age, economic thought was influenced by philosophic ideas: the Cynics, Epicureans, and Stoics favored their specific types of life.
Chapter IV. Economic Thought and Other Intellectual Developments


**Chapter IV. Economic Thought and Other Intellectual Developments**

**Homer, Hesiod, and Aesop’s Fables:** The *Iliad* and the *Odyssey* written by Homer during 750-25 B.C. reflects the Mycenaean world of Troy around 1400-1100 B.C. and in part his own time. Homer implied that wealth was obtained by “gifts, theft, prizes for winning competitions, plunder received in war, and tribute paid by defeated cities to their conquerors.” According to him, Trade was a secondary or inferior way of acquiring wealth. Gifts were exchanged by reciprocity: hosts provided hospitality and gifts for their guests, which were returned later by the receivers. The household owning land was the basis of the agricultural economy that the family and the slaves worked on the estate. There were traders and artisans providing services.

Hesiod was a Greek poet generally thought to have been active between 750 and 650 B.C. Among his works, “The *Works and Days* is a poem of over 800 lines which revolves around two general truths: labor is the universal lot of Man, but he who is willing to work will get by. Scholars have interpreted this work against a background of agrarian crisis in mainland Greece, which inspired a wave of documented colonization in search of new land. This poem is one of the earliest known musings on economic thought. This work lays out the five Ages of Man [including Golden, Silver, Bronze, Heroic, and Iron Ages, while Hesiod finds himself in the Iron Age], as well as containing advice and wisdom, prescribing a life of honest labor and attacking idleness and unjust judges as well as the practice of usury. It describes immortals who roam the earth watching over justice and injustice. The poem regards labor as the source of all good, in that both gods and men hate the idle, who resemble drones in a hive. In the horror of the triumph of violence over hard work and honor, verses describing the Golden Age present the social character and practice of nonviolent diet through agriculture and fruit-culture as a higher path of living sufficiently,”18 As Hesiod’s brother Perses took more than his share of his father’s estate in his favor, the poem attacked unjust judges: “it is better to teach him the virtues of work and to impart his wisdom which can be used to generate an income.”19

“As for those who give straight judgments to visitors and to their own people and do not deviate from what is just, their community flourishes, and the people blooms in it. Peace is about the land, fostering the young, and wide-seeing Zeus never marks out grievous war as their portion. Neither does Famine attend straight-judging men, nor Blight, and they feast on the crops they tend.” “Property is not for seizing: far better God-given.” “Seek no evil gains: evil gains are no better than losses. Be a friend to him who is your friend, and give your company to him that seeks it. Give whoso gives, and give not whoso gives not: to a giver one gives, to an ungiver none gives. Give is good, Snatch bad, a giver of death.” “If your spirit in your breast yearns for riches, do as follows, and work, work upon work. When the Pleiades born of Atlas rise before the sun, begin the reaping; the ploughing, when they set.” “I suggest you reflect on the clearing of your debts and the avoidance of famine. First, a household, a woman, and a ploughing ox – a chattel woman, not bedded, one who could follow the herds…Do not put things off till tomorrow and the next day. A man of ineffectual labor, a postponer, does not fill his granary: it is application that promotes your cultivation, whereas a postponer of labor is constantly wrestling with Blights.”20 In the remaining two thirds of the poem, “Hesiod goes through the agricultural year from ploughing-time to ploughing-time. His main concern is with cereal culture, but he also takes in vine-growing. The emphasis is on when to begin each task and on being sure to make all the necessary preparations in good time. We are not actually told much about how to do the jobs. Hesiod is writing a poem, not a technical manual: the contrasted descriptive passages about mid-winter and high summer are purely ornamental, and there are many other memorably picturesque details. The agricultural section is followed by one on seafaring, as the farmer may wish to sell his produce elsewhere.”21 The kings disappear once Hesiod has finished with the theme of justice; Perses also disappears. His *Theogony* was his earliest work concerning the origins of the world and of the gods.22
Chapter IV. Economic Thought and Other Intellectual Developments

Aesop was a slave and story-teller believed to have lived in ancient Greece during 620-560 B.C. The first printed version of Aesop’s Fables in English appeared in 1484, and descended to modern times through a number of sources. “Typically they might begin with a contextual introduction, followed by the story, often with the moral underlined at the end.” The political meaning appeared in “The Frogs Desiring a King” and “The Lion and other Beasts,” and the economic meaning in “The Ant and the Grasshopper” and “The Husbandman and his Sons.”

(i) The Ant and the Grasshopper: “In the early winter, a whole colony of Ants were out working hard, turning over in the sun the food they had gathered all the summer, so that it wouldn’t spoil. While they were busy at this, along came a bedraggled Grasshopper who had managed somehow to live after the summer. He was cold and thin and very hungry. So he went up to one of the Ants and said in a whiny voice, ‘How about giving me a little bit of all that food you have there, Ant?’ ‘I am sorry, Grasshopper, but we worked all summer to gather this food and we need every bit of it to feed us through the winter. What do you do all summer?’ ‘Oh, I sang and drank and danced all the time. I couldn’t bother to work. Why, what does that have to do with it? I am hungry now, not last summer.’ ‘That is just the point,’ said the Ant. ‘If we sang and danced and drank all summer we would starve in the winter and it looks as though that is what you are going to do. Goodbye,’ and he went on with his work. The Point: Save while you are young or you’ll have nothing when you are old.”

(ii) The Husbandman and his Sons: “A Husbandman had two Sons. When he old man was about to die he called them to his bedside and told them that all he had to leave to them was his farm and his vineyard. ‘There you can own together,’ he said, ‘but don’t sell them to anybody else, because there is a treasure buried there which lies one foot under the ground.’ Naturally, the Sons thought he meant that money was there, so after he died, they plowed and dug all over the place. They didn’t find any money, but they had done such a good job of plowing while they were looking for it that the crops they planted were fine ones and they were very well off. The Point: Good work pays dividends.”

His two fables below have political meaning. (iii) The Fables of the Lion and other Beasts: It reflects that partnership with the mighty is never trustworthy. “It then relates how a cow, a goat and a sheep go hunting together with a lion. When it comes to dividing the spoil, the lion says, ‘I take the first portion because of my title, since I am addressed as king; the second portion you will assign to me, since I’m your partner; then because I am the stronger, the third will follow me; and an accident will happen to anyone who touches the fourth.” The fox walked away, but he spoke in a low growl that “You may share the labors of the great, but you will not share the spoil.” It implies that the distribution of rewards after any revolution could be similar in real politics. (iv) The Frog Desiring a King: “The Frogs, who were living a free and easy life, all got together one day and asked Jupiter to let them have a king who might watch their moral and make them live a little more honestly. Jupiter was in pretty good humor that day; so, with a laugh, he tossed down a log and said, ‘‘All right, there is king for you.’ The log landed with a splash and scared the frogs so that they were afraid to go near it. After a while, however, when it lay so still, they went a little closer and a little closer. In a very short time, they were hopping and diving all around it and treating it with familiarity and contempt. Not being content with such a do-nothing, insipid king, they sent to ask Jupiter to send them a different sort of ruler. Jupiter by that time was tired of their complaining, so he sent them a Stork who wasted no time or ceremony. He started in eating frogs right and left as fast as he could gulp them. What frogs were not eaten began to croak and ask for still another king, or to be allowed to go back to the good old days when they had no king at all. ‘No,’ said Jupiter, ‘this was your idea and so now you will just have to make the best of what you asked for.’ The Point: If you are getting along all right, you had better think it over before you ask for a change.”

It teaches us the importance of one’s decision-making.
Chapter IV. Economic Thought and Other Intellectual Developments

Xenophon’s Oeconomicus: As shortly discussed in Chapter II, Xenophon (430-354 B.C.) of Athens was a Greek historian, soldier, and mercenary, and student of Socrates about the time of Plato, and served in the cavalry during the last years of the Peloponnesian War. He left Athens in 401 with other fellow Greeks to serve as a mercenary in the army of Cyrus the Younger; but after the death of Cyrus, he was chosen to lead them to return from Persia back to Greece. On their return to Greece, the remnants of the Ten Thousand Greeks joined the Spartans in 399 B.C. in an effort to free the Ionian cities from Persia, and finally returned to Greece in 394 B.C. After the battle of Coronea, the Athenians sentenced him to exile for having favored the Spartans. The Spartans granted him an estate at Scillus where he lived, but was forced to move to Corinth in 371 B.C. when Sparta was defeated by Thebes. Athens rescinded the decree of his banishment in 365 B.C. so he was free to live in Athens. During his exile of some twenty years, Xenophon devoted himself to writings which were influenced by his life: growing up in urban and rural settings, service as a citizen-soldier for Athens and as a mercenary for Persia and Sparta later, and life of exile debarred from politics. Reminding that he spent nearly half of his life away from Athens, we can see that his writings were more practical than theoretical, and that he might consider broad international readers including the Athenians and others. In his writings, the Hellenica is a continuation of Thucydides’ History of the Peloponnesian War; and the Anabasis describes his youthful participation in the failed campaign of Cyrus the Younger to claim the Persian throne. A number of his writings display his pro-Spartan bias and admiration, especially Agesilaus and Constitution of Sparta. After the death of Socrates, Xenophon wrote several Socratic dialogues, including an Apology concerning the events of his trial and death.27

In his Oeconomicus, Xenophon deals with estate management of family members, slaves, animals, the house, land, and all produced, consumed, and disbursed by estate. He sees that education and training make farm workers produce surplus and an estate manager increase assets.28 Xenophon was interested more in specialization of crafts than in division of labor. His division of labor is only between men and women: The god prepared man’s body and mind to be more capable of enduring cold and heat and traveling and military campaigns, so he assigned the outdoor work to him; but the woman was physically less capable of endurance, so he assigned the indoor work to her. The god gave both of them equal powers of memory and concern as well as equal ability to practice self-control, but they are not equipped with the same natural aptitudes. Hence, their partnership is more beneficial since one is capable where the other is deficient. He equally treats men and women, and gives full recognition to the value of women’s work. “I think that a wife who is a good partner in the estate carries just as much weight as her husband in attaining property. Property generally comes into the house through the exertions of the husband, but it is mostly dispensed through the housekeeping of the wife. If these activities are performed well, estates increase, but if they are managed incompetently, estates diminish.” Xenophon applies the art of war for farming by introducing the Persian king Cyrus for whom he had served as a mercenary. Cyrus examines all of the land by the way of military inspections. Those governors making land prosperous with more inhabitants receive rewards, but those governors making the opposite are removed from office. If the garrison commander does not adequately defend the country, king’s officials concern with the inhabitants and agricultural production, which brings an accusation against the commander “on the grounds that the people are not able to do their work because they are not properly protected.” Cyrus uses garrison commanders to manage the inhabitants to grow and farming to be prosperous in their districts by providing peace. He gives rewards to those who cultivate their land best and make them productive and those who defend their cultivated land. The king manages agriculture of the state by using his military and civil leaders, which skills can be applied for estate management.
Xenophon discusses on how to educate a wife who is in charge of estate management, and how to train housekeeper and other workers to accumulate surplus. Several chapters are used to teach the occupation of farming such as plough, sowing, reaping, threshing, and winnowing; which may be part of economics, management, or agronomics. Xenophon views that “the best line of work and the best branch of knowledge is farming, by which human beings obtain the necessities of life.” Farmers differ from each other: some live in surplus while others cannot provide their necessities not because of the amount of knowledge but because of amount of concern in farming, considering that it is easy to learn the farming principles. He respected labor and diligence: “I think the earth constitutes the best test of evil and lazy men….laziness in farming is a clear indictment of an evil soul….The man who understands no other money-making occupation, and refuses to farm, must obviously be determined to live by stealing, or robbery, or begging, or else be totally irrational.” He partly mentioned about prices and values in trade: merchants sail wherever an abundance of grain exists to purchase it at the lowest price, and they carry grain across the sea to sell it wherever the highest price exists. He uses term “the highest price” and “the highest value” by the same notion. Xenophon concludes that “the man in charge — whether he is a foreman or a supervisor — who can produce workers who are enthusiastic, eager for work, and persevering, these are the ones who manage to prosper and to make their surplus a large one” and that “the person who intends to possess these abilities needs education, and must possess the right kind of nature, and most important of all, he must be divine” because it is a gift of the gods.

In his On the Means of Improving the Revenue of the State of Athens, Xenophon suggests how to increase the revenue of Athens as a “remedy for the poverty of our citizens” which is not only a part of public finance but also a policy proposal for economic development. First, the natural resources of Attica directly generate income and revenue for the state. Second, a great number of foreigners to sojourn at Athens increase its revenue. The foreigners who reside at Athens create consumption demand and pay taxes just like its citizens although they have no right to vote. If the state gave them admission to join the army, and allowed them to purchase the real property, a great number of respectable persons would settle at Athens. Third, if the state grants privileges to merchants, increasing traffic will bring more revenue. Athens has the finest and safest harbors for vessels where navigators may moor and rest in case of storm. If merchants do not wish to barter, Athens provides money for exchange with silver. Merchants and ship-owners bring a great quantity of trade, which generates more gains from trade and more duties from customs. He suggests that the state builds lodging houses and maintains public vessels giving better security for them. Fourth, he views that silver mines bring great profits to the state. He overstates the law of increasing returns of silver mining by viewing that the greater number of people employed, the more profitable becomes the silver ore. Excess of commodities lowers their prices in other industries, but there is no limit to demand for silver by viewing “that the silver ore is not going to fail and that silver will never lose its value” since the operations of silver mine constantly require more work and workers. If gold is abundant, its value depreciates, but the price of silver rises. If the state possesses public slaves employed in the mines, they bring more revenues not only from the profits made by slaves but also from the indirect impact of employment on the rent of public buildings and other necessities, which generates additional income. Moreover, he approaches to a joint stock method of operations: “There are ten tribes at Athens, and if to each of these the state should assign an equal number of slaves, and the tribes should all make new cutting, sharing their fortune in common, then if but one tribe should make any useful discovery, it would point out something profitable to the whole.” Xenophon finally emphasizes the necessity of peace for the maintenance and improvement of the revenue: the city saves money to be productive during the peace time, but the city spends money for military acquisition during the war time.
Plato’s Economic Thought: In Greek society, generally, the individual was subordinated to the state so that the state aimed on the formation of good citizens; the state regulated over every sphere of social life in order to bring different individual into harmony for the good of the whole; and the institutions continuously pursued efficiency of the system. Plato’s Republic describes his idea of the utopian state ruled by the philosopher-king, and his Laws considers more practical state ruled by law as a second best in the absence of the wise king as previously discussed. In the Republic, the city state is small without enough people and resources, so that all economic and non-economic activities are strictly regulated. He considers a permanent class society consisting of warriors as the ruling class; and farmers and artisans as the ruled; while men and women are equally treated in education and jobs. The guardian class should live together without individual properties and family ties. The division of labor is natural course of society, so that the producers supply proper necessities, and the guardians provide national security. In his Laws, he abandons the concept of common property, and views that although the state distributes the same size of land to each citizen, the property ownership cannot remain unchanged because of individual differences, so that he suggests an upper limit of land holdings for each citizen. Let’s review further on his division of labor, communal property, trade and money, and economic ethics.

(a) Division of Labor: His division of labor is based on natural endowment and the social organization. Plato considers two classes of society under the philosopher-king: the warriors who provide national security, and the artisans who supply the necessities. He views that the human inequality from natural endowment gives rise to specialization in order to form the ideal structure of the community: “there are diversities of natures among us which are adapted to different occupations” and “all things are produced more plentifully and easily and of a better quality when one man does one thing which is natural to him and does it at the right time, and leaves other things.” Plato emphasizes education divided into gymnastic for physical fitness and music for spiritual harmony, and views that “if education remains in the established form, there will be no danger” since education corrects deficiencies and supplies the power of self-government. Over twenty-one centuries later, Adam Smith writes the division of labor as “the greatest improvement in the productive powers” by taking an example of “the trade of the pin-maker” in the first chapter of his Wealth of Nations. Although Plato views that the division of labor produces more and better, there is a fundamental difference between two ideas: Plato is based on natural endowment of individuals, while Smith is based on efficiency with specialization of workers.

(b) Communal Property: Plato considers the way of life of warriors as soldiers in a camps: “none of them should have any property of his own beyond what is absolutely necessary; neither should they have a private house or store closed against anyone who has a mind to enter; their provisions should be only such as are required by trained warriors, who are men of temperance and courage; they should agree to receive a fixed rate of pay, enough to meet the expenses of the year and no more; they will go to mess and live together like soldiers in a camp.” He views that if they ever acquire homes or lands or money of their own, they will become housekeepers and husbandmen instead of guardians. The guardians will have a community of women and children: “the best of either sex should be united with the best as often, and the inferior with the inferior as seldom as possible.” The state brings up all their children, gives equal educational opportunities, and allows no hereditary benefits to all classes. He expects that common property and families provide communal unity and bring social harmony without personal pleasures and pains against inequality and unfairness, so there would be no quarrels among men in the absence of private property. However, Plato revised his ideas of common property in the Laws written in his later years. If the state distributes one of the land allotments to each citizen, the equality of property holdings cannot remain unchanged since “each person will depend not only on the virtue of his
ancestors and himself, and the strength and handsomeness of bodies, but also on the way one uses money or property.” Dividing the city into 5,040 allotments (a lot for each family), Plato suggests that the state must announce the upper limit of land holdings to avoid harsh poverty or wealth among citizens. Setting the limit of poverty to be the value of the allotment, the state should regulate that if anyone acquires lands more than four times of the lot value, the surplus should go to the state without any penalty. His original idea lay in the elimination of private property applicable to the ruling class, but Plato recognized that the equality cannot be achieved even though the state distributes the same size of land to each individual from the beginning. To resolve the problem of unequal wealth, he introduces the upper limit of land holdings for each citizen in the state. The Greek society around 400 B.C. was engaged in the class war between the rich and the poor, so that many intellectuals such as Aristophanes intended that “there shall only be one and the same condition of life for all….I shall begin by making land, money, everything that is private property, common to all.” Like other intellectuals of his time, Plato’s communism is not a nationalization of the land by the state, but an equal sharing of wealth by the citizens, that can be achieved by proper policy measures. Plato’s communism was far different from the Marxism experienced and failed in the former Soviet Union and its satellites.

(c) Trade and Money: Plato introduces the origin of retail trade in his Republic. “Suppose now that a husbandman, or an artisan, brings some production to market, and he comes at a time when there is no one to exchange with him, - is he to leave his calling and sit idle in the market-place? Not at all; he will find people there who, seeing the want, undertake the office of salesmen. In well-ordered states….their duty is to be in the market, and to give money in exchange for goods to those who desire to sell and to take money from those who desire to buy. This want, then, creates a class of retail-traders in our state.” He also introduces a money-token for purpose of exchange at the market place, and considers “hirelings” who sells their labor at their prices. In his Laws, Plato introduces gold and silver as the money: “no one is to be allowed to possess any gold or silver in any private capacity. There is a need for currency in daily exchange – the money that can scarcely be avoided when dealing with craftsmen, and that is required by all who pay hired help – slaves and foreigners – their wages. For these purposes, we assert that they should possess a kind of coin that carries value among them, but is valueless among other human beings.” Plato suggests that the city should possess reliable Greek money (coin) for transactions in the domestic as well as foreign markets, which ideas were useful for the Roman expansion.

(d) Ethical Prejudice: Plato views on justice, commerce, and usury as follows. First, he defines in part that “justice is to speak the truth and to pay your debts” in his Republic. Although justice is virtue that is necessary to keep the social order, the paying of debts cannot be a major criterion of justice. If a person has a full intention to pay his debts but is unable to do so because of his failure in business, we cannot say that he is unjust. In spirit, he is just; but in reality, he fails in doing his obligation. Second, there was a general prejudice of the Greek philosophers against artisans with ideas that artisans were physically not fit to military service, and in reality that many industrial arts were engaged by foreigners with the labor of slaves. Similarly, in Plato, the prejudice against shopkeepers and merchants was much stronger than against the artisans, by viewing that they were at the best a necessary evil. The trade was motivated by profit-making by private hands, which was more than the labor cost in transactions, that was not acceptable for Plato like others. Third, Plato denies interest from loans: “no money should be lent at interest” in the Laws, which is the similar notion to his rejection of commercial profits. The Christians, some centuries later, disapproved profit-making except labor costs in business transactions. In around 1250 A.D., St. Thomas Aquinas proposed a new ecclesiastical doctrine: the investors share in the gain for the shared risk or loss, which was approved by the Pope.
Aristotle’s Economic Thought: The economic thought of Aristotle mainly appears in his *Politics* by two categories: household management and defense of private property. He views in Book I that “there is no difference between a large household and a small city” in management except the number of subjects. Households naturally form a village, and villages naturally form a city, so that every city exists by nature. The city consists of the ruler and the ruled, and has priority over the individual since “no individual is self-sufficient when isolated.” The household is composed of husband and wife, father and child, and master and slave; and their management including slave and property. In Book II, Aristotle investigates whether the citizens should share everything in common or not, which question is directed to Plato’s *Republic*.

(a) **Slavery**: Aristotle defines that the slave by nature is a human being who is by nature the possession of another as a tool for purposes of doing something. By nature, slavery and mastery are based on the inferior and the superior in body as well as in soul. The law allows what is conquered in war belongs to the conquerors, which slavery is legally just; but the enslaved and the free by law need not always be slave and free by nature. He views that slavery by nature and mastery by conquerors who are superior in virtue are just, but the enslaved and the free by law need not always be slave and free by nature.

(b) **The Art of Acquisition**: Aristotle introduces two types of science of property: household management and the art of making money. First, the science of household management studies how to use goods of necessities acquired by the methods in pure form or in combinations of the nomadic, piratical, fishing, hunting, and or farming ways of life. The necessities are true wealth limited in both quantity and size, but this science guides us the true and proper use of goods which satisfies natural wants. Second, the art of making money studies how to exchange goods as a way of securing self-sufficiency outside the household. This aims at monetary gain through exchange and trade, initially arising from a surplus in some things and a deficiency in others.

(c) **Use and Exchange**: Every piece of property has two functions: use and exchange. A pair of shoes is used for its primary purpose of wear, and is used for exchange of other goods as a means of barter. Aristotle introduces money for foreign trade where the barter system is not practicable because of its long distance. At first, serviceable commodities were used as money measured by size and weight, but in the process of time they put a stamp on it to avoid the trouble of weight and to mark the value. Later coins were used as a medium of exchange as well as a measure of wealth, which facilitated its accumulation. But money is not wealth since the replacement of one currency by another makes the former useless. In the *Ethics*, Aristotle views that money is a representative of demand, so that its value is not constant but changes from time to time, which will be discussed further in “justice in exchange” later.

(d) **Usury and Monopoly**: Aristotle hates interest earning from lending. “Money came into being for the sake of exchange, but interest just makes the money itself increase.” Interest is money born of money, which is contrary to nature. He considers mercantile activity by three parts: the first part includes provision of ships, carrying goods, and putting them up for sale; the second part is lending money at interest; and the third part is wage labor. Aristotle introduces monopoly in trade by an example of the achievement of Thales of Miletus. Thales noticed from the study of stars that there would be a good harvest of olive. He deposited all his money on all the olive presses in Miletus and Chios with low prices in the absence of bids against him. At the harvest time, he sold them at any price he wanted, which gave him a good opportunity to collect a great deal of money. He notices that some cities use monopoly to raise funds when they are short. “It is useful also for political rulers to know about these things, for many cities have need of business practices and suchlike revenues, just as households do, only more so. Hence, some politicians even focus all their political activity on these matters alone.”
(e) **Defense of Private Property**: Aristotle opposes not only communal property but also the restriction of private property because of lack of diversity, reciprocity, and self-sufficiency. No city comes into existence from those who are all alike since a city is not an alliance but of many different human beings. It is held together “by the mutual give-and-take of the citizens, each rendering to the others an amount equivalent to what he receives from them.” The city is a place equipped with capable citizens and proper resources for self-sufficiency: “what is less a unity is more choice-worthy than what is more a unity” and extreme unity of communal property cannot provide proper necessary means for self-sufficiency. Aristotle views that having wives and children in common will lead to the opposite of what Socrates intends: violent crimes, improper sexual relations, directing to the wrong class, weakening of ties of love, and confusion of classes. Aristotle compares communal property with private property as follows. The private property is more productive since people care most about what is their own and less about what is common since they think someone else is looking after it. Private possessions combining with common use make the best: “land could be held separately, but the crops could be brought to a common store and consumed in common….with land common and farmed in common but the crops divided for private use.” In communal property, people complain that they have contributed more work but received less reward, which destroys social peace. Private property gives more pleasure to the owner since human beings in nature have the love of self, of money, and of property. The scheme of communism reduces the virtues of moderation and liberality by a false notion of unity: private property enables people to practice common goods without compulsion of the community. If the communal property were such a good thing, it would have instituted long ago: if the long experience of past time is ignored, the social cost of abolishing private property may largely surpass the benefit gained from communal holdings of property. Aristotle opposes to the upper limit of the private property holdings. It is necessary to set a limit on reproduction or population rather than to make possessions equal. If the number of children exceeds the amount of property, there would be general poverty initiating revolution. Equalizing the property possession may help to make peace of society, but their desires should be leveled by adequate education based on individual differences. People fall into factional conflict not only because of inequality in possessions but also because of inequality of honors. The masses are indicted to revolution by the former, but the elite are indicted by the latter. People always want more and better, so that they should learn how to limit their desires for more wealth and superior positions through adequate education and suitable institutions because of the limit of resources.

(f) **Justice in Exchange**: In his *Ethics*, Aristotle views justice in distribution, transactions, exchange, and politics. Distributive justice deals with sharing of wealth and honor according to individual merit or worth in society, while corrective justice deals with equality in transactions based on numerical proportion. While political justice considers both nature and law, Justice in exchange is based on reciprocity, that is not suitable either to distributive or to corrective justice. Reciprocity conflicts with corrective justice, since it is proportionate rather than equal. Letting A be a builder, B a shoemaker, C a house, and D a shoe, we get an equation A : B = x C : D in exchange where x is a proportional share of a house. This means that the builder exchanges the x-proportional value of his house C with a shoe D made by the shoe-maker B. Since currency is a medium of exchange, their values are measured by demand and supply of two goods: how many shoes equal to a house. If we consider the labor theory of value, x could be a proportion of labor cost making a house, which is exchanged with the entire labor cost making a shoe. If we consider the utility theory in valuation, x would be a proportion of the house utility, which is exchanged with utility of a shoe. Considering the diminishing return of utility, the proportion x often varies according to changing conditions – less utility with abundance.
Hellenistic Thinkers: After the Peloponnesian War, Greek cities were more open to the world embracing all humanity by receiving people from the east, Cyprus, and regions around the Black Sea and those bordering on India. Alexander pursued a policy of Cosmopolitanism with an individualistic tendency, by establishing a huge market and discovering new trade routes, which strengthened the connection with eastern thought. Meanwhile, the upheaval of political turmoil threatened individual security and safety, and many citizens became in slavery, went to exile, and lost their possessions. As discussed in Chapter III, Hellenistic economic thought was influenced by Peripateticism, Cynicism, Stoicism, and Epicureanism. (a) With the Peripatetics, Theophrastus (327-278) was the first successor of Aristotle, and wrote a treatise on wealth. Dichaearchus, a student of Aristotle, wrote that “private property was the cause of the arising of hate and strife among the citizens.” Aristotelian economics, known as Pseudo-Aristotelian Oeconomica due to its vague authenticity, introduces some economic ideas of the time. In Book I, economics is prior in origin to politics; for its function is prior, since a household is part of a city. The parts of a household are man and property, and the human part concerned about relations between father and children, husband and wife, and master and slave. The householder should be able to acquire properties, to guard them, to order his possessions aright, and to make a proper use of them. It is emphasized that the virtuous companionship of man and wife is essential to provide precious unity of mind and will as well as harmony and efficiency at home. In Book II, there are four economies: the economy of the king, of the provincial governor, of the city, and of the individual. The revenue sources of the king are from land, the peculiar products of the district, merchandise, taxes on cultivation and market dues, cattle, and the poll tax and others. In personal economy, the careful attention is needed because the incomings and expenses are small. Here the main source of revenue is the land, next other kinds of property, and investments of money. All levels of economy should pay attention to that the expenditure must not exceed the income.

(b) Cynicism was established by Diogenes of Sinope (412-323 B.C.) who was born in Sinope of Turkey and studied in Athens as a disciple of Antisthenes. He denounced the comfortable life and inured himself to hardships with “a life of austerity and self-mortification” not by producing goods but by extinguishing desires and surrendering possessions. “He wore coarse clothing, ate plain food, and slept on the bare ground, in the open streets, or under porticoes.” He devoted himself to “a wandering life of freedom, like a bird, unafraid of tyrants and governments, not constrained by any human laws, undisturbed by politics and political events, free from the hindrance of children and a wife.” He set the standard of the minimum which demonstrated that human being could survive “under the humblest and meanest of conditions.” He taught that “wealth without virtue is worse than poverty” and that “virtue cannot dwell either in a wealthy state or in a wealthy house” and considered “love of money as the cause of all evil.” Diogenes loved independence from worldly goods and self-sufficiency, which is different from Christian asceticism aiming at salvation after one’s death. The Cynics wanted plain living with high philosophy without property and wife. Diogenes advocated that men and women should live in communities where “everyone would be the spouse of everyone, without the arrangement of marriage, and that children, too, should not belong to their parents, but the community at large” which idea was not different from Aristophane or Plato. The Cynics had no established center due to their profession of poverty, and Cynicism has been considered as a religion of the proletariat, which parallel is deceptive. In modern sense, the proletariat preached revolution and radical changes of society, while the Cynics wanted no revolution but desired to return to the nature by preaching anarchy rather than proletariat rule. Crates (365-285 B.C.) was a student of Diogenes, and married a woman who had fallen in love with him; and they lived together as beggars. Crates later became the teacher of Zeno who founded Stoicism.
(c) **Stoicism** was founded by Zeno (336-264 B.C.) who was influenced by the simple life of the Cynics. The Stoics pursued happiness in the spiritual harmony of individual man by rejecting emotions and passions and by overcoming the desire for pleasure. The Stoics viewed that the man is naturally political animal, and the *polis* is the most perfect society for self-sufficiency. The Stoics depended on the will of God meaning the will of nature, which is the basis of natural law, becoming “absolute and universal transcending political borders and the restrictions of time and place.” Seneca wrote that happiness lies in self-sufficiency and tranquility, and wise man’s soul should have the quality of a god’s. The Stoic doctrine disdains worldly goods, but approves the selling and buying of personal property that might help a man to be virtuous; and approves “earning from teaching, from serving the wealthy, and from government employment.” Regarding slavery, Chrysippus (280-07 B.C.), the second founder of Stoicism, recognized the inequality of the status: “Nothing can prevent some seats in the theatre from being better than others.” The Stoics speculated “the advantage of a simple life, of agricultural pursuits, and of free labor as compared with slave labor.” They thought that the foreign travel could only bring the traveler into contract with inferior peoples, so that no one under the age of forty should be permitted to travel to foreign lands. Most importantly, natural law became the basis of Roman law, which was the main source of the civil law of the continental Europe and Latin America, which similarly influenced the common law of the English speaking countries. The concept of natural law developed by the Stoics became the ideal of a universal humanity in jurisprudence and ethics up to present time. Thus, Stoicism influenced both civil and common laws such as in “no penalty without law” and “the doctrine of corporation” that the possession of assets for the use is separated from the ownership of titles. In this regard, the Roman law influenced the law of property and of contract and developed commercial law containing reasonableness in transactions: reasonable values, reasonable prices, and reasonable terms and conditions.

(d) **Epicureanism** was founded by Epicurus (341-271 B.C.) who considered that pleasure is the aim of life for all humanity. He views that man attains happiness from the pursuance of pleasure not for physical desire but for peace of mind by emancipating themselves from a way of life having no reason, no self-discipline, and no careful weighing of results caused by an action. He classifies three basic desires – natural and necessary, natural but not necessary, and neither natural nor necessary – and gives rewards only to the necessary desires which are natural but not harmful. Epicurus might know the diminishing return of utility: “pleasure cannot be increased beyond a certain limit. So far as sensual gratification is concerned, this limit is reached when the pain which promoted desire has ceased; thereafter pleasure can be varied - by kinetic pleasure – but not augmented. The mind has its own pleasures the limit of which is reached with the ability to calculate….and to access the feeling which cause mental disturbance.” Epicurus views that economic problems can be resolved by reducing the demand for goods rather than increasing their supply: “if you wish to make a person wealthy, do not give him more money, but diminish his desire.” Epicurus was a pragmatist seeking adjustment by controlling his own thought: you try to be content with little if there is no plenty. Epicurean hedonism was criticized by the Stoics, who disapproved the search for pleasure by rejecting emotions and accepting reason based on natural law. Thus, the essential point of Epicurean economic thought lies in “pragmatic adjustment” to deficiency or insufficiency in order to preserve peace of mind by restricting human desires: not increase of wealth or possessions but limitation of desires to be rich. Epicureanism might imply the theory of utility in economic thought at present time: to maximize utility (pleasure) subject to constraints (insufficiency). The Epicureans challenged Platonists, but later became the main opponent of Stoicism. After the death of Epicurus, Hermarchus led his school, and later many Epicurean society flourished in the late Hellenistic and the Roman eras.
Chapter IV. Economic Thought and Other Intellectual Developments

3. Economic Thought of the Roman Empire

Since economic thought or theory is based on economic reality, the analyses of economic thought often become a mixture of both, particularly in the ancient period. My discussions in this section depend largely on The Cambridge Companion to the Roman Economy edited by Walter Scheidel. He writes that “Thanks to its exceptional size and duration, the Roman Empire offers one of the best opportunities to study economic development in the context of an agrarian world empire. Moreover, the fact that the Roman period was the only time when the entire Mediterranean basin was contained within a single political domain raises the question of how much the specific characteristics of the Roman economy owed to imperial unification.”

His book covers theory, labor, production, distribution, and outcomes; and concerns performance, comparison, and causation of the Roman economy on the development of economic thought.

**Performance**: Material remains are crucial importance, but in the absence of records of how much was produced, traded, and consumed, modern observers commonly interpret different kinds of data as putative proxies. “Temporal or spatial variation in the quantity and quality of such proxies is taken to reflect economic change.” Demographic change might be interpreted as a proxy of growing economic output, but not as of a proxy of growing per capita income. Urbanization may be interpreted by different ways: intensive income growth, division of labor, the rising share of non-farm sectors, and the formation of city-based ruling class. The scale and direction of long-distance trade is often inferred from potteries, shipping containers or table wares, and shipwrecks. Technological progress is measured by tracking installations of water-mills, but coinage does not tell us about the scope of credit money. Isotopic evidence of lead pollution reflects mining output, but does not show the use of metal in the entire economy.

**Comparison**: How the Roman economy performed relative to that of other pre-modern systems comes in three ways: the same period, the same place, and the same type of social formation. The first compares Roman Italy against the Hellenistic East, or the mature Empire against economies in ancient Iran, India, and China. The second situates the Roman economy within a particular region or eco-system. We may focus on the Mediterranean properties, stressing the nexus between physical connectivity and diverse micro-ecologies. We can compare continuities or functional equivalences between the Roman economy and the later European economies of the Middle Ages. The third kind of comparison transcends the constraints of time and space by focusing on institutional and organizational features. The Roman economy is compared to the economies of other large agrarian empires wherever and whenever they existed, such as the economy of Mughal India or that of the Han Empire.

**Causation**: Two types of relations are considered. In relations of market (positive perspective), “Roman conquest created favorable preconditions for production and trade. Empire lowered transaction costs by reducing risk, easing the flow of information, and standardizing media of exchange at the same time as it facilitated an expansion of primary production that in turn encourage urbanization, manufacturing, and production for the market. It enabled different regions to capitalize on their comparative advantage in producing goods for exchange.” In relations of domination (negative perspective), political and economic integration created landowning elites, who were driven by tribute and rent collection with the unfair modes of exchange: state demands for tax and elite demands for rent; and their conversion and transfer impelled reciprocal flows of taxes and traded resources; that encouraged urbanization, monetization, and the formation of exchange networks.” However, in the most general terms, “it is hard to see how Roman rule could have failed to lower transaction costs in ways that were, at least in principle, conductive to an increase in the volume of exchange.”
Chapter IV. Economic Thought and Other Intellectual Developments

Photo IV-3-1. Constantine II as Caesar 317-337 A.D.: Heraclea Mint
https://upload.wikimedia.org/wikipedia/commons/6/69/Solidus_Constantine_II-heraclea_RIC_vII_101.jpg,

Photo IV-3-2. Gallo-Roman relief depicting a river boat transporting wine barrels
Roman Economic Thought: It was meager or even negligible for the Romans to contribute to economic thought, but some developments appeared in the areas of the philosophers, the agricultural writers, and the jurist as an echo of Greece. It is believed that “The Athenians were thinkers, keen and analytic. The Romans were men of action, warriors and statesmen. The former left a philosophy which profoundly affected the ethics and economics of later thinkers; the latter built institutions which as profoundly affected law and politics.” (a) The philosophers like Cicero, Seneca, Pliny, and Aurelius primarily emphasize the right use of wealth based on the ethical standard of Stoicism, but they did not provide any economic doctrine. The Stoics believe that man adjusts to natural law and thus may gain happiness, so their thought was not directed toward more production or fairer distribution of wealth. In his On Duties, Cicero sets high standards in acquiring and using personal wealth: “Their wealth should in the first place be well won, and not dishonorably or invidiously acquired. Secondly, it should be increased by reason, industriousness, and thrift. Thirdly, it should be available for the benefit of as many as possible, provided they are worthy of it, and be at the command not of lust and luxury but of liberality and beneficence.” Cicero forbids one to profit at another’s expense and is tolerant towards wholesale trade with the country estate but condemned usury. In his On Providence, Seneca views that “Avoid luxury, avoid debilitating prosperity which makes men’s minds soggy….All excesses are injurious, but immoderate prosperity is the most dangerous of all. It affects the brain....” He considers that money is the root of most evils and that envy and greed are the sources of all injustice. In his Natural History, Pliny views that a ring of gold ruins mankind. In Meditations, Aurelius wrote that “Do few things, if you would enjoy tranquility” and “Be satisfied with your business, and learn to love what you were bred to do; and as to the remainder of your life, be entirely resigned, and let the god do their pleasure with your body and soul.”

(b) The Roman jurists analyzed facts and produced principles which were not only normative based on natural law but also explanatory based on the reality of various cases. “They created a juristic logic that proved to be applicable to a wide variety of social patterns – indeed to any social pattern that recognizes private property and capitalist commerce. So far as their basic facts were economic, their analysis was economic analysis” although the scope of their analysis was strictly limited by practical purposes. The jurists define or clarify the concepts of price, money, sale, loans, and deposits, which provide the basis of economic thought. Particularly, Roman law contributed to two economic principles: private property and complete freedom of contract, which are the first basic requirement of the capitalist economy with competitive prices and stable money. The Roman law, called the Justinian code, is based on natural law that is common to all peoples, which was mostly published in 533. The code formed the basis of civil law in many continental European countries and remained effective until Constantinople was captured by the Ottoman Empire in 1453. The influence of Roman law was in the direction of individualism so that the property owners maximize utility of their property rights: they not only enjoy property but also arbitrarily abuse it without legal restrictions although ethics moderate its misuse. Thus, economic thought of Roman jurists is considered by three points. First, the Roman jurists made a distinction between natural law and human law: the Roman citizens were ruled by jus cive, while the foreigners were ruled by jus gentium that was broader and less guided by local customs. Second, Stoic philosophy and natural law stimulated an individualistic idea of property, which moved the Roman people away from the clan or family as a social unit. Hence, individual rights replaced community rights of property, which separated law from religion, resulted in freedom of contract. Third, the Law of the Twelve Tables fixed the interest rate but condemned usury. Later years, interest was entirely forbidden, but Justinian fixed the annual rates of interest at from four to eight percent though actual rate varied according to market conditions.
(c) The agricultural writers deal with the practical and technical principles on farming and estate management rather than economic thought. In his Agriculture, Cato wrote that “Trading can sometimes bring success, but it is insecure; so can money-lending, but that is not respectable. So our forefathers thought; and so they enacted that a thief should pay any penalty twice over, a money-lender four times over, which allows us to infer how much worse a citizen they thought a money-lender was than a thief. When they wanted to say that a man was good, their highest compliments were to call him ‘a good farmer and a good husbandman’. I believe that a trader may display bravery and skill in the course of trade, but, as I said above, it is insecure and liable to disaster. As to farmers, their offspring are the strongest men and bravest soldiers; their profit is truest, safest, least envied; their cast of mind is the least dishonest of any.” In his Agriculture, Varro discusses on farming knowledge, equipment, operations, and proper season; which aims at the most profitable use of a piece of land. “Therefore, you will accurate determine the number of slaves and other equipment which you should provide if you observe three things carefully: the character of the farms in the neighborhood and their size; the number of hands employed each; and how many hands should be added or subtracted in order to keep your cultivation better or worse.” Similarly to both Cato and Varro, Columella wrote On Agriculture, which concerned about the profitable use of land with technical farming and household management.

Both industrial and commercial regulations did not interfere in economic matters, since the Roman law protected private property and freedom of contract. The Roman economic thought (unwritten theories) can be partly implied by its economic policies applied under the Roman rule. The Roman emperors applied socialist policies at the time of difficulties although they supported fundamentally free competition in the market during the peace time. For the goods market, the emperors tried to maintain consistent supply of grain and necessities particularly to Rome. In case of any shortage of grain supply, the government took any kind of strict measures to resolve the problem. Heavy fines were levied on grain merchants who hoarded grain to raise prices by monopoly power. The government took measures “to prevent foreign competition with Italian producers, to regulate prices of oil, and to prevent the exportation of precious metals.” For the money market in times of financial crisis, “the state established a public bank to supplement the activities of the professional bankers; and never passed any measures to protect debtors. Let’s take examples of the socialism under the rule of Diocletian.

Diocletian succeeded military campaigns but faced economic decline with empty treasury, which induced a command economy to the empire. He established a sound currency by issuing a single uniform coin, which value was guaranteed to the gold coinage with a fixed weight and purity, intending to replace various provincial copper types of coin. Diocletian distributed food to the poor at half the market price or free, and launched extensive public works to appease the unemployed. The state controlled many branches of industry to ensure the supply of necessities for the cities and armies such as grain imports, and he persuaded the ship-owners, merchants, and crews engaged in the trade to accept such control by guaranteeing of their security in employment and returns. The government required a minimum product for munitions factories, textile mills, and bakeries for the army and others of the state, the associations of manufacturers carried out orders and specifications. Diocletian issued an edict on prices in 301, requiring setting maximum legal prices and wages for all important articles and services in the empire. As a result, goods were hidden with high inflation, and countless sellers violating the edict were sentenced to death: the edict had to be relaxed and was finally revoked by Constantine. War and invasion destroyed property and killed manpower, and heavy taxes and forced labor made many people to run away. Economic disorders were so grave that the empire could not maintain law and order: no economic policies and theories could hold the empire to revive.
Christianity and Economic Thought:  

The New Testament reflects the change of Hebrew society from the inherited traditions of the tribal community ruled by justice as shown in the Old Testaments to new values of more complex society based on love of all humanity, particularly of the oppressed classes. As a mysterious new monotheistic religion, Christianity attracted many Romans, and shared some common values with the Roman philosophers: ideals of poverty and asceticism for the Cynics, natural law and sharp distinction between virtue and vice for the Stoics and love of mankind for the Epicureans. The Roman plebian accumulated wealth from colonial exploitation, usury and monopoly; but slaves and proletariat were in terrible conditions without any material improvement. The oppressed classes such as the slaves, poor peasants, fishermen, and artisans were unable to transform society for themselves, so that revolutionary Christian Gospels provided them peace in mind. The early disciples of Christ, who belonged to the oppressed classes, relinquished their occupations and possessions to follow Jesus. They were sent out to preach gospels to peoples without carrying money.

Matthew, Mark, Luke, and John were written in the first century, and describe about money, necessities, wealth, and labor with negative concepts. Money: “Do not store up for yourselves treasures on earth, where moth and rust consume and where thieves break in and steal; but store up….in heaven” (Matt. 6.19-21). Necessities: “Therefore I tell you, do not worry about your life, what you will eat or what you will drink, or about your body, what you will wear….Look at the birds of the air; they neither sow nor reap nor gather into barns, and yet your heavenly father feeds them (Matt. 6-25-33). Wealth: “No one can serve two masters….You cannot serve God and wealth” (Matt. 16.24). “Blessed are you who are poor, for yours is the kingdom of God. Blessed are you who are hungry now, for your will be filled (Luke 6.20-21). “The poor man died and was carried away be the angels to be with Abraham. The rich man also dies and was buried. In Hades, where he was being torment, he looked up and saw Abraham far away…” (Luke 16.19-31). “How hard it will be for those who have wealth to enter the kingdom of God! It is easier for a camel to go through the eye of a needle than for someone who is rich to enter the kingdom of God” (Mark 10.23-27). Labor: Jesus tells the parable of the workers paid equally for the day regardless hours of works (Matt. 20.1-16). On the other hand, productive activity was recognized: “If a man will not work, he shall not eat” which emphasizes work ethics in society.

As time passed, peoples began to live with different classes of society, and the Christians accommodated their earthly lives with social and economic institutions where the rich and the poor as well as slaves and masters coexisted. In Paul’s instructions, the rich are not condemned unconditionally but are urged to do good: “As for those who in the present age are rich, command them not to be haughty….They are to do good, to be rich in good works, generous, and ready to share, thus storing up for themselves the treasures of a good foundation for the future, so that they may take hold of the life that really is life (Tim. 6.17-19). Wealth is a gift of God to promote human welfare. If the wealth is denounced, how can we practice the virtues of liberality and charity? John Chrysostom (347-407) views that private property is responsible for much contention and strife. If the rich obtained wealth with injustice, their property should be distributed to the poor. Basil (329-79) pursued an egalitarian ideal: “whoever loves his neighbor as himself, will possess no more than his neighbor.” Ambrose (339-97) views that wealth is a gift of God but considers private property responsible for various evils. Augustine (354-430) considers that private property is a creation of the state, of human right rather than of divine right. Several fathers of the church stressed the worth and dignity of labor. If one man’s gain becomes another man’s loss, and if exchange transactions benefit just one side rather than both, those economic activities need to be opposed. Most economic activities pursue private gain but may turn out to be beneficial to society, which – hard working and fair gains is desirable by Christianity.
A conference of Catholic Bishops defined that social justice, in modern terms, “implies that persons have an obligation to be active participants in the life of society and that society has a duty to enable them to participate in this way.” The form of Biblical justice is contributive, which means that “all who are able to help create the goods, services, and other non-material or spiritual values necessary for the welfare of the whole community.” The Greek Christian Fathers “stressed the diminishing utility of goods, thus if the rich shared part of their surplus with the poor, their utility derived from non-luxury goods would be increased. Furthermore, at the same time they will receive the forgiveness of God and their chances of entrance to God’s Kingdom will be increased.” They attacked “on unfair and unethical accumulation of wealth, and on the dangers of avarice resulting in the garnering of wealth which then lay idle.” The Greek Fathers considered wealth to be a means of satisfying necessary wants and the sum of material goods at the disposal of man and society, by taking three positions: the accumulation of wealth through fair economic actions, its rational use in the purchase of necessary goods and in almsgiving; and continued ownership of wealth. They view that the unlimited struggle for wealth accumulation causes injustice, war and slavery; and that stationary wealth is useless, but the proper circulation of money and the proper use of wealth become the productive public benefits.

**Talmud and Rabbinic Literature:** Talmud indicates Jewish economic thought as Miman A. Ohrenstein analyzed. In markets and prices, the Sages consider non-price competition, price competition, and competition by means of product differentiation. Talmudic scholars were largely in favor of pro-market by viewing that price undercutting is instrumental to expand the market, and product differentiation is a current term of monopolistic competition. They support the market intervention when the market is not competitive so that prices are set either by sellers or buyers only. It is recognized that there exist relations between investment and risk, danger of loss; and the business profit is a legitmate reward for an entrepreneur’s assumption of business risks. The prices are formed by the interactions of supply and demand, and fluctuate seasonally in normal cycles and differ from region to region. In order to mitigate the effect of such vagaries in price, the transactions of necessities were based on solid information. The notion of social justice means distributive equity and fairness embracing justice and charity: righteousness, justice, equity, truth and virtue. Talmudic labor considers economic and social elements: to maintain economic independence and to promote the social value in human society by achieving self-fulfillment and removing the social evil of idleness. It is right and worthy that a proportion of self-interested activities make individual healthy, which contributes to public benefits.

Regarding income distribution, Torah condemned the idleness and required the worker’s daily wage to be paid before the sun has set; introduced the minimum wage that “with which the worker is craving to purchase his bare necessities.” Talmudic writers view that there is a strong linkage between education, productivity, and earnings. Labor disputes appeared between the powerful Temple authorities and highly organized team of experts; and the conflict resulted in a labor strike with eventual triumph of labor over management. The Sages did not use their power of legislation to prevent the workers’ strike since Torahitic laws demanded legal and economic equality for the labor class. Talmudic law did not establish a legally fixed wage, but leave them to voluntary agreement between employer and employees, based on the market forces. There were artisan guilds in the cities such as Jerusalem: the dryers and woolworkers wielded much union power. For redistribution, the Bible concerns three focal points: provision for the helpless, relief for the poor, and taxation via transfers, with benefits from Sabbatical and Jubilee years. Talmud examined the problem of distribution and tried to explain a spirit of graciousness of the giver and the dignity of the receiver, the existence of a reciprocal relationship between the rich and the poor, the establishment of standard for interpersonal transfers to the needy.
**Chapter IV. Economic Thought and Other Intellectual Developments**

**Labor Input in the Roman Imperial Economy:** In production, input factors in production are land, labor, capital, and technology; in which the quality of labor is relatively more important than that of other elements for the growth of the Roman imperial economy. The ability of human resources, meaning the capacity to perform various tasks on the job, is based on the balanced development of workers in terms of intellectual, psychological, and physical abilities. These capabilities of individual workers are enhanced through their education, training, and health even in present time. Nowadays, it is important for individual personality and desire need to fit to the organizational demand to maximize the efficiency of human capital. “Over the past two centuries, higher levels of education have provided the foundation for discovery of new knowledge and the resulting technological advances needed to sustain growth over long periods at unprecedented rates. Training and education of the work force has enabled the technology to be used in economic production. At the life span and health of the population have improved to permit longer life spans and more intensive use of the skills. The magnitude of these gains is striking, as the average life span has more than doubled and the productivity per worker has increased by an order of magnitude in the most developed economies.” Unlike others, Richard Saller has conceptualized a study of the Roman economy based on human capital: “While it is not possible to calculate a growth rate with any confidence, it is possible to assess Roman institutions for education and training against those of other pre-modern economies. I will argue that Roman imperial levels of urbanization, education, and literacy exceeded those of previous societies, but fell noticeably short of the most advanced society of early modern Europe before the industrial revolution…Rome benefited from the more intense exchange of knowledge and differentiation of labor that generally comes with higher levels of urbanization…Rome was not able to break out of the contradiction that more intense urbanization also brought higher mortality.”

(a) **Human Capital:** One may consider three levels of education and training of children in the skills of production: traditional learning from parents and family, apprenticeship, and formal education. (i) **Learning from family:** The family provides the primary form of training of the next generation: reaching physical maturity, boys learned basic agricultural skills from fathers and other relatives and neighbors. In India “the decline in production in bad years was forty percent in households where the head was under forty years old, in contrast to a decline of only fifteen percent on farms with a head over sixty. Similarly, profits were multiples higher on farms with older heads.” Thus, “the overwhelming majority of the rural workforce relied on skills and knowledge gained through the first level of learning, and that the learning accumulated through a lifetime.” (ii) **Apprenticeship:** A substantial minority of sons would not have had father alive to transmit their skills, and slaves did not always have a master with the skills; and there was the variation in conditions from one shop to the next. “Apprenticeship was a mechanism that allowed labor to be moved from the natal family to a household where it was needed and could be supported with food for a limited term. The apprenticeship contracts usually include provision for the master craftsman to provide very basic subsistence for the apprentice.” The apprenticeship contracts vary in length from a year or less up to six years. Most are for only a year or two, which means that the investment in human capital through apprenticeship was small. (iii) **Formal education:** Moreover, the class of the magister is a lower type of technical school which peddled craft literacy to children, slave and free, to enhance their employability. The paedagogium was the training school for young slaves of the great aristocratic houses, where urban slave children were taught the elements of letters and numbers, as well as finer arts of elegant domestic service. The Roman army required the skills of literacy and numeracy, as well as on craft, engineering, and medical expertise. (iv) **The woman labor:** In Rome, freeborn women were not completely barred from the training and education that enhanced men’s life chances, though receiving much less training than males.
(v) Urbanization and Human Capital: Generally speaking, cities facilitate education, and the exchange of information and ideas – transmission of knowledge and productive skills - because denser populations generate more interactions. To take and illustration, Augustine’s education progressed through a hierarchy of larger towns and cities, as his training advanced to higher levels of specialization. The letters of Pliny suggest that his hometown, Como, was of a size to be on the cusp of having enough children from families of sufficient means to employ a teacher, whereas much larger cities such as Rome, Alexandria, Antioch, and Carthage brought together enough teachers and students to generate the most sophisticated level of intellectual discourse of classical antiquity. The larger cities also housed the large urban familiae with their paedagogia to train slaves, the largest of which was the imperial household.” Beyond formal education, “cities were sites of concentrated demand that encouraged the development of specialization and sub-specialization. Given the limit of formal education and information technology, most skills had to be transmitted by face-to-face interactions, which were facilitated by concentrations of population. Thus, the urban setting stood to increase the stock of human capital.” (vi) Roman Investment in Human Capital: “The level of literacy and education were higher in the Roman Empire than before or for centuries after, just as the early imperial economy was probably more productive than before or immediately after.” It is estimated “that the average number of years of formal education across the whole population was less than a half year per person and that at any given time perhaps one-half of one present of the population over the age of five were receiving basic education.” It is roughly estimated that “a student population at any given time in the range of 250,000 taught by 10,000 teachers. Roman investment in education, and the resulting literacy, were high by pre-modern standards, but lower than those of the early modern economic leaders. But human capital was not sufficient to obtain technological innovation.

(b) Slave Labor: Building on Greek and Hellenistic institutions, ancient Rome created the largest slave society in history, which addresses three principal questions: what was the Roman slave economy like; how many and where did they come from and how were they different from others; and why did Romans employ slave labor? (i) Slavery in the Roman Empire: There is a wide range of sources evidencing Roman slavery such as literary accounts, legal sources, inscriptions, papyri, and from material remains. “Slaves were engaged in an enormous variety of activities, as estate managers, field hands, shepherds, hunters, domestic servants, craftsmen, construction workers, retailers, miners, clerks, teachers, doctors, mid-wives, wet-nurses, textile workers, potters, and entertainers. In addition to the private sector, they worked in public administration and served in military support functions. They were owned by private individuals as well as the state, communities, temples, and partner-ships.” Slaves could be kept in chains or placed in positions of trust, resided in their owners’ homes or were apprenticed or rented out. “A number of texts refer to large-scale slave-owning in Italy and the provinces: 4,116 slaves bequeathed by a rich freeman; 400 slaves each in the households of a Roman aristocrat and a North African land owner; 2,000 slaves owned by a pretender; imperial legislation addressing owners of more than 500 slaves; more than 500 slaves repairing buildings in the city of Rome and 700 slaves taking care of its aqueducts; more than 152 slaves owned by a single landowner on a small Aegean island; 107 public slaves appropriated from an Anatolian town; 1,000 or 2,000 slaves ascribed to each of the wealthy of Antioch in Syria; 3,000 and 6,000 slaves held by two Capadocian temples; and 2,400 or more rural slaves freed by a late Roman aristocrat.” The number of slaves seems roughly to be 5 to 10 percent of the population in Roman Egypt, and 15 to 25 percent in Roman Italy. Roman slavery was very similar to Greek’s in many ways: slavery was fully commercialized in a sense that slaves were produced for markets and purchased rather than captured in the later period, although their manumission rates are not well known.
(ii) The Economy of Roman Slavery: Walter Scheidel views that there are three basic preconditions for the employment of slave labor: first, slavery must be institutionally acceptable; second, slaves must be effectively available; third, there must be demand for slave labor because alternative sources of labor or insufficient or otherwise inadequate. “The third variable subsumes several preconditions that are commonly regarded as separate but are actually components of demand: significant asset inequality (creating demand for non-family labor), accumulation of capital (allowing the acquisition of slaves) or military power (allowing their capture), the existence of markets (allowing the sale of the products of slave labor), constraint on the free labor supply, and employers’ tastes.”34 Moreover, slaves must, on average, produce enough to justify the capital input associated with their purchase and maintenance: slave labor must have been profitable. “The property rights over labor that the institution of slavery bestowed on slave-owners required them to make a capital investment that was not necessary for the employment of free labor. The fixed capital invested in slaves diminished as slave aged, and further depreciation was caused by the probability of loss due to death, flight, or manumission.” From the cost-benefit point of view, slave labor was sustainable, for a given output, if wages replacing slaves were lower than the cost of fixed investment and maintenance of slaves. But it is impossible to evaluate their transaction prices properly. As long as slave prices reflected the value of slave labor, slave-ownership that regularly required considerable capital outlays ought to have generated considerable benefits as well. Since its reliance on fixed capital, slave labor is particularly suited to economic activities with relatively steady employment opportunities such as effort-intensive and care-intensive types of work. The effort-intensive labor is suitable for farming or mining; and the care-intensive labor is suitable for positions in which institutional arrangements and cultural norms allow salves autonomy with trust. Manumission was an integral element of the reward-incentive system and with a lasting bond between the former master and his freed slaves.

(iii) The Development of Roman Slavery: Article X.6a of the Law of the Twelve Tables, which was promulgated in 450 B.C., writes that "Anointing by slaves is abolished, and every kind of drinking bout...there shall be no costly sprinkling, no long garlands, no incense boxes."35 Slavery seems to be already common in the Roman Republic in the fourth and third centuries B.C. The manumission tax was introduced in 357 B.C., debt-bondage was abolished in 326 or 313 B.C., and slaves for public service was allowed during the Second Punic War (218-201 B.C.). The Greeks enslaved other Greeks in Sicily and Africans; and the treaty of 346 B.C. between Rome and Carthage mentioned the Carthaginian slave trade in Italy. “In the Italian core of the growing empire, the slave system continued to expand under the late Republic, a period of unusually dynamic economic development that witnessed unprecedented capital inflows; high mobility engendered by migration and at times extraordinary military commitments of the free labor force, both of which would have destabilized labor markets; and growing access to slaves through war and trade. Both the demand for and the supply of slaves soared. Rapid urbanization and the spread of villa estate – perhaps a new style rather than a new system of labor but surely indicative of increases in scale – were closely linked to the expansion of slavery in this period.” Outside Italy and Sicily, net growth of slavery as a result of Roman expansion occurred farther east, west and north. “The imperial integration of slave markets favored regions with high nominal incomes, such as Italy, giving it a comparative advantage in the competition for slave labor. The fact that the expansion of the Italian villa system peaked in the first century B.C. does not prove a subsequent decline in the slave mode of production because the archaeological record may merely reflect changes in elite residential patterns or concentration of landownership.” The price of slaves varied according to its supply and demand, but the scenario based on economic reason seems to be least likely one due to other hidden elements of influencing markets.
Chapter IV. Economic Thought and Other Intellectual Developments

(c) **Contract Labor**: The workers in the Roman Empire faced increasing competition as population grew over the first two centuries A.D. until the Antonine Plague in 163 A.D., when their wages and prices doubled over a period of thirty years due to the loss of population. After 190 A.D., prices and wages remained stable until 270 A.D., when serious inflation set in. “The growth of urbanism, fueled by a transfer of wealth from the countryside to the cities, brought profound changes to the Roman economy.” It is suggested that while a small elite (about 1.5 percent of the population) controlled a disproportionately large share of the wealth, generating perhaps one-fifth of the total income. “The empire also saw the growth of a middling class (about one-tenth of the population) that had considerable wealth of its own, perhaps another fifth of total income, while the largest class (80-85 percent of the population), including farmers living at close to subsistence level, also cumulatively accounted for considerable wealth and income.”

(i) **Farm tenancy** in the Roman Empire represents a broad range of relationships, including wealthy lessees of estates, small-farmers cultivating own land and farms belonging to other landowners under labor contract. Wage labor was also an important means of exploiting estates in some parts of the empire, like Egypt. In the classical Roman farm lease, the tenant paid a fixed rent in cash, and generally leased the farm on a short-term basis, for five years. The landowner was expected to provide a fixed assets, the farmland, storage buildings, and other heavy equipment attached to the farm, such as wine presses, olive presses, or large storage jars fixed in the ground. The tenant, for his part, provided movable property, including tools, slaves, and livestock. “Both landowners and the Roman legal authorities demonstrated a willingness to adapt the classical farm lease to provide tenants with greater security and more of an incentive to invest in the long-term productivity of their farms.” According to classical Roman lease law, it is assumed that landowners and tenants could freely enter into contractual relationship. The borderline between small landowners and tenants was often blurred since the former also rented lands for themselves.

(ii) **Wage Labor**: There were two types of wage laborers - long-term wage laborers or the permanent workers on the estate, and workers hired on daily basis. The former engaged in more specialized functions such as shepherds, donkey drivers, or oxen drivers, while the latter engaged in less skilled jobs. Their daily wages were four drachmas for the permanent (skilled) workers, and two drachmas and two obols for temporary (non-skilled) workers. (iii) **Construction and other Industries**: Wage labor played an important role in both public and private building programs, which represented a steady source of employment for both masons and skilled artisans as well as ordinary construction workers. For example, the construction of baths of Caracalla in Rome, that is one of the most ambitious public building projects, “took at least six years and hired between 1,900 and 13,100 workers at any one time, including hundreds of skilled artisans, hundreds of oxen drivers, and thousands of ordinary workers.” Of wage labor in manufacturing sector, instead of maintaining permanent employees, artisans would hire sub-contractors on a short-term basis as business warranted, since the production of consumer goods was seasonal. (iv) **The Welfare of Workers**: In the Roman Empire, the purchasing power of wages was tied to demographic factors: for example, wages were relatively high in the period following the Black Death in the fourteenth century, but as population increased in the sixteenth century, real wages tended to fall. “The daily wages paid to such workers surely supplemented what they gained from their other sources of income, and many of them produced much of the food that they consumed.” “Legionary soldiers, together with the auxiliary forces (whose pay was somewhat lower), sailors, and urban guards represented perhaps 400,000 people receiving cash wages on a regular basis.” Since much of wage workers were replaced by slaves, their wages would have been modest. In general, the prosperity of free workers largely depended on agriculture, and “the fortune of small farmers were tied to population pressure and the demand for land.”
Roman Economic Thought in Production: (a) **Raw Materials**: Both the Roman Republic and the Roman Empire were directly interested in control of the extraction and supply of certain types of metal and stone; and the corporate supplied materials like timber and glass. (i) Metals: “The Roman state took a strong interest in the mining of precious metals needed for the tri-metallic currency used throughout the empire, either operating mines directly (under military supervision, and sometimes using slaves, condemned criminals, or tributary labor as part of the workforce), or by contracting operations to lessees.”37 (ii) Minerals: They were used as agents in various stages of textile production: for example alum in mordant dyeing. (iii) Gems and precious stone: The sources and extraction of the precious gemstones are not known. Precious and semi-precious stones came from select and rare geological deposits, some outside the empire: diamond traded from India and Sri Lanka. (iv) Clay: It was used for pottery, roof tiles, bricks, vaulting tubes and ceramic pipes, and forms of architectural decoration. Good clay beds were a valuable economic resource and might be exploited directly by a landowners’ slaves or freemen, or their use leased to specialist potter. (v) Stone and building sand: Most of building stones were supplied locally in the Mediterranean, having good local deposits of sandstone or limestone. “In many cases building stone was quarried immediately locally to cities; but where necessary there was local trade in such stone; further downstream than upstream along rivers, for reasons of transport cost.” (vi) Timber is for building of construction, shipbuilding, furniture, mine shoring, barrels, and firewood. Silver fir was used for construction and shipbuilding; maple, boxwood, citrus with oak and beech were used for furniture. (vii) Glass: “The manufacture of glass involves heating sand with a flux in large kilns to produce slabs of raw glass. The raw glass is then heated in glass-blowing furnaces and blown into vessel form. Natron, produced in south of Alexandria in Egypt, was almost universally used as the flux in raw glass production.

(b) **Energy Generation**: Mankind could exploit fossil fuels harnessing them to mobile energy only with the industrial revolution. (i) Solar radiation: Sunlight, being the ultimate energy basis for plant and animal life, provides direct warmth that can be used to heat building. (ii) Human muscle power: An enormous amount of labor in the ancient world was carried out by human muscle power. A variety of mechanical devices increased the potential of human muscle power: the wheel and axle, the lever, pulley, winch, and wedge. (iii) Animal power: The ox, horse, donkey, mule, and camel are more powerful than humans but less adaptable to complex tasks. “Around the third century B.C., the potential uses of animal power were extended by the invention of several machines that could be driven by rotary motion, and besides transport and agriculture, these rotary machines constituted the most important use of animal power.” (iv) Water-power: The current of flowing water facilitates transport downstream, and had been exploited ever since the first boat. A major addition was enabled by the harnessing of water-power to turn wheels that could then be used to drive other machinery. (v) The water-driven water-lifting wheel was one of the products of the extraordinary milieu of mechanical creativity fostered in Alexandria in the middle decades of the third century B.C. “The overshot and undershot water-mills convert the rotary motion of the water-wheel into rotary motion in a horizontal plane.” The sawing of stone with water-powered saw became possible. (vi) Wind: The wind was harnessed chiefly to propel ships for river-line transport. “The wind was also used in winnowing, to sort the threshed grain from the chaff by throwing it in the air and letting the wind carry the light chaff away, while the heavier grain fell back onto the threshing floor.” (vii) Fuels: “Ancient fuels included firewood, dung, olive pits, and occasionally coal for ovens, furnaces, and kiln; and olive oil, animal fats, and occasionally other kinds of nut and vegetable oils for lighting.” The Roman world was an organic economy: the available energy budget in each years was very limited, so that the invention of machines was stimulated in order to adjust to the lack of capital input in the economy.”38
Food Production: (i) Roman farming was sophisticated and productive, as anticipated for the modern agricultural revolution: “seed selection; effective tillage; hoeing and harrowing to destroy weeds; crop rotations; the suppression of bare fallow; the rotation of legumes; whether for human consumption, fodder or green manure; irrigation, particularly of meadows and garden vegetables; artificial leys sown with leguminous fodder crops; housing of livestock; improved manure management; careful grazing management for range and pasture land; and most decisively...ley farming or convertible husbandry, still the most effective system of intensive mixed farming.” The Romans properly managed their manure that was cheapest and most beneficial source of nitrogen. The size of livestock bones were dramatically larger than those of the Bronze and Iron Age; and their use of fodder crops was arguably equal to that of England and the Netherlands of the 1880s. The integration of livestock into arable farming fostered heavy manuring and high yields. Their wheat yields matched or exceeded the performance of the most intensive Medieval or Modern agriculture, or that of Italy as a whole in the 1970s. High yields came from viticulture, a particularly demanding branch of intensive farming, such as well-managed vineyards. The Romans kept sheep or other livestock on their farms, allowing them to manure their vineyards. (ii) Commercialization of farm produce: The Greco-Roman agriculture was intensified upon the existence of prosperous urban mass markets for farm produce, integrated by vigorous trade networks. The Romans specialized in the production of expensive and profitable crops such as meat, cheese, fruit, fresh vegetables, and wine. The sort of intensive mixed farming was critical to improve agricultural productivity. “Rome was the wealthiest and most important urban market in the pre-industrial world, and the demand it created for agricultural produce spawned a dense network of villas and horti packing Rome’s suburbium.” Condiments and spices mostly imported from the Near East, Arabia, India, and East Asia. Black pepper was important in Roman cooking; and wine and olive oil were highly traded throughout the Mediterranean and beyond. “Fruit consumption, like that of meat, fish, and fresh vegetables, tends to be highly elastic, and is dependent upon prosperous urban populations for much of their market, but fruit orchards, unlike market gardens, need not to be located in the immediate suburbs of substantial towns or cities.” (iii) Drainage, irrigation, and tools: Urbanization and trade played the most important role in permitting Greco-Roman farmers to exploit the land to its full potential. It is common that drainage was a constant concern of most ordinary Roman farmers. They made great strides in irrigation. “The most intensive irrigation was reserved for market gardening, but irrigated meadows were both productive and lucrative. “Transport infrastructure played a critical role in facilitating the large-scale trade in such bulky agricultural commodities as grain, wine, and olive oil. In addition to infra-investment of harbors, roads, canals, drainage ditches, rural aqueducts, cisterns, and dams; more direct investments on the farms are often provided to prevent erosion, field fences, hedges, and planting of trees, which served as boundary markers, windbreaks, and sources of fodder, brush, and lumber. There was a type of animal-powered harvesting machine, but the wine or oil press was surely a far more common and expensive machine. (iv) Food processing: “Although livestock, and even fish or shellfish, could be transported live, and some fresh unprocessed produce could be traded long distance with appropriate packaging, perishable food could be transported more safely, and preserved for consumption out of season, if dried, smoked, cured, or salted, or packed in wine, vinegar, brine, or sugar syrups using honey or boiled must.” Wine production is the most complex and demanding branch of ancient food processing. “The preservation of fish by salting or smoking, and the production of garum or fish sauce, is the other Greco-Roman food processing industry which was organized on a massive scale, comparable to the trade in wine and olive oil in its geographical reach.” Other processed animal products such as cheese, ham, and sausage were produced and exported considerably.
Chapter IV. Economic Thought and Other Intellectual Developments

(d) **Manufacturing**: It is clear “that urban development and modest economic growth in Italy did create concentrated consumer markets in which demand became sufficient to provoke labor differentiation and specialization within several individual industries.”\(^{40}\)

(i) **Specialization and industrial organization**: “The theoretical material strongly suggests that integration is only one possible response to increasing occupational specialization, and one which entrepreneurs will select only when its cost-benefit balance is superior to those of other available solutions. Comparative evidence from early modern Europe not only bolsters this conclusion, but also suggests that integration was not necessarily the preferred response to economic growth and expanding occupational specialization in pre-industrial societies.”

(ii) **Disintegrated production in the Roman world**: Roman artisans accommodated an increasing specialized workforce in subcontracting network rather than in integrated firms, which would account for both the persistence of small workshops and the evidence for differentiation in the labor force. Such specialists as manufacturers handling precious metals were imbedded in networks of production in which artisans were linked to one another by subcontracting arrangements. The Roman jurists certainly assumed “that builders routinely subcontracted with other craftsmen for specialized services on the job site.” For instance, builders employed only minimal permanent workforce and recruited additional manpower by the job: the conscientious builder did not hasten to collect craftsmen from all sides and employ numerous laborers upon accepting a contract, nor remain satisfied with one or two, but instead carefully considered his needs and recruited accordingly. “Textile production offers greater scope for analysis. In urban textile industries, independent artisans appear to have been involved in several stage of the production process: dyers, fullers, and tailors all ran shops of their own in Rome during the early imperial period, and the same is likely to have been true in other cities during much of antiquity.”

(iii) **The structure of demand and the costs of integration**: Entrepreneurs will tend to create integrated businesses if and when the savings they accrue by reducing transaction costs outweigh those imposed by integration. It is viewed that manufacturers had little incentive to create integrated businesses because of two reasons: first, the costs of integration in the Roman world were relatively high; second, “that transaction costs were mitigated in some industries by labor market conditions, and in others by the ability of manufacturers to embed their production in professional collegia capable of functioning as private-order enforcement networks.” There are two reasons why the costs of integration are high: first, “seasonality shaped consumption patterns by generating waves of travel and temporary migration, thereby altering the size and composition of the local consumer base;” and second, “the particularized consumption habits of wealthy consumers further complicated the strategies of manufacturers in the upper levels of the market, who were compelled to produce many of their goods to order.”

(iv) **Transaction costs and private-order enforcement in the Roman world**: Transaction costs in certain production lines were simply not high enough to outweigh the cost of integration; and other manufacturers were able to mitigate high transaction costs by using voluntary associations with networks, thereby forestalling the need to create integrated firms. In general, “industries that depended on widely-dispersed and easily acquired skills fell into the former category, while those in which specialized training remained important fell into the latter.” Since underemployment was often endemic among much of the rural and urban populace, the market in unskilled labor tended to be thick, as did the market for workers who possessed skills that were readily and quickly acquired on the job. Transaction costs in these labor markets were correspondingly low: because workers in these segments of the market were plentiful and could be replaced easily and at short notice; the consequences of broken contracts were not severe; subcontractors had insufficient leverage to attempt opportunistic re-negotiation of their contracts; there, integration offered fewer tangible benefits for them.\(^{41}\)
Roman Economic Thought in Distribution: (a) Predation. From the late fourth century B.C., the Romans rooted such valuable goods as treasure and art works, and captured people as slaves in campaigns throughout the Mediterranean: a steady stream of moveable wealth began to flow into Rome and Italy during the three centuries of vigorous imperial expansion. Many of the spoils of empire were not immediately transferable. Roman conquests were regularly followed by confiscation of agricultural lands in subjected communities. Across Italy and in the provincial parts of the empire, the Roman state began to draw proceeds from farming of public lands out to contractors. Others of the confiscated lands were developed into colonies, urban communities settled by Roman citizens and Latin allies who had been allocated parcels of land in the new territory. “Arable and grazing lands were not the only ones targeted. Areas endowed with particular natural resources were another favorite, such as quarries and, in particular, precious metal mines.”

“Arable and grazing lands were not the only ones targeted. Areas endowed with particular natural resources were another favorite, such as quarries and, in particular, precious metal mines.”

“It is difficult to exaggerate the scale of brutality, human suffering, and sheer ruthlessness involved in this process of expansive imperial predation, but harder to gauge the economic impact in precise terms.” Under the Roman colonization schemes, several hundreds of thousands of people were resettled and granted land-allotments. Moreover, it is believed that enormous destruction was left in the wake of the progress of the Roman legions.

For Roman imperialism, a group of state contractors provided needed services. “These publicans would bid at auctions for building contracts, delivery of military equipment and food rations, mining concessions, and the right to collect customs as well as the land taxes in a select number of rich provinces in return for a stipulated annual sum. Senators being legally barred from these activities, but the publicans were drawn from the affluent layer just below the senatorial order. “Most of them were wealthy landowners, a necessary requirement since holders of government contracts had to offer land as security for the fulfilment of terms. Many of these contracts were in any case far too large to be underwritten by a single person; publicans regularly had to band together in larger companies…In connection with their activities developed a complex web linking credit and land in Italy to the political exploitation of provincial societies.” The tax-farming companies were “an institutional precursor of the modern business corporation and joint-stock company; they were organized with something resembling an executive, a board of directors, and a wider group of passive investors and partners; they also acquired a corporate existence.” Power accumulated profits under the emperor as under the Republic. More people in the conquered territories were admitted to a share of the privileges and benefits afforded by imperial rule. The empire was like a network of rent-seeking elites.

In this regard, pre-industrial statehood was in the establishment of a ruling coalition of rent-seeking elites. “Such natural states existed to generate rents to the rulers by limiting access to valuable resources and make their enjoyment dependent on political privilege. In classical economic accounts, rent-seeking is seen primarily as wasteful and destructive. Rents divert the allocation of economic resources away from the most efficient employment and distort the free operation of the market.”

A process of creative destruction can cause the conductive formation of large business corporation. But above corporations did not shape the long-term development of Roman economic life: “They emerged only in the sphere of state-contracting, during the middle to late Republic, and were scaled back under the early Principate.” Rome conquered most of its rivals to impose a hegemonic and imperial peace on the Mediterranean world. With no serious competition left, there was little to challenge the continuous hold of the ruling, rent-drawing groups on society and no urgent need to introduce radical institutional changes. When the frequency of disruptive warfare declined, Rome moved to a mature natural state. “As the consumption of rents settled into a more stable pattern, markets may even have been able marginally to optimize the utilization of resources.”
(b) **Transport.** (i) Maritime shipping lanes were favored, but sailing in the Mediterranean was difficult, since winds and currents were often in opposition with a rigid seasonality on sea travel. “Sailors certainly braved the winter months, and it is clear that local journeys, cabotage, and ferrying could take place at any stage of the year, weather permitting. A strict seasonal approach may have been present in the transport of tax grain from Africa or Alexandria, where risk was not politically acceptable, but private merchants may have braved the winter months in search of good prices.” Some other risks were difficulties of navigation, treacherous waters and straits, and piracy. Despite clear limitations with ancient shipping, significant development were made in sailing design and rigging, “but most importantly, improvement in hull design allowed for much bigger ships; pumps were also introduced.” The average size of ships seems to have been about 340 tons, but the most famous ship commissioned by Caligula was at 1,300 tons to carry an Egyptian obelisk, which size of vessels were useful to carry the fifty-foot columns for imperial building projects. (ii) Rivers provided navigable highways deep inland, further adding to this connectivity. “Their tributaries, if navigable, extended their reach. Ports, whether on coast or on rivers, were met by roads, most of them major roads, but they in turn were connected to minor roads and tracks. Rivers provided easily accessible transport for communities. Even when navigation became difficult further upstream, rafts, rather than boats could be used, and commodities like timber could be floated downstream. Indeed, without rivers, trade in timber would have been severely hampered. But rivers did present problems of navigation: swift streams or currents, rapids, waterfalls, and narrows, presented difficulties, some rivers froze in winter months, such as the Danube, and other flooded, as the Nile famously did.” Rivers provided inland communication with connections between places, and ports acted as nodal points, connecting maritime, riverine, and land routes – “the notion of land routes as the shortest distance between two prominent seamarks or navigable rivers perhaps still underestimates their importance.” (iii) Roads: The Roman roads had both military and economic purposes, allowing an imperial power to exploit the resources of its provinces, but secondary economic activity naturally followed. “Cities, towns, villages, villas, farmers, merchants, and professional transporters all benefitted from Roman roads.” It was suggested that “travel by land could, in some circumstances, be quicker than travel by water, especially in the winter months when poor weather or contrary winds might halt all sea travel.” Wagons pulled by oxen are slower, but those pulled by such animals as donkey, mules, or camels are fast; and pack animals were the preferred mode of land transport in terms of speed. “Horses pulling loads were capable of covering distances of over 40 km per day, with loads of 680 kg; camels could pull more and travel further. Pack animals could cover similar distances, carrying loads of between 80 and 150 kg, depending on terrain, distance to be traveled, and the condition of animals.” (iv) An integrated system: Transport in the Roman world combined land, river or canal, and sea transport, rather than viewing them separately. “Through the construction of roads, bridges, canals, ports, and the development of systems of communications, such as the cursus publicus, the Romans fostered connectivity.” While many of these initiatives were centrally directed by the emperor, “it is simplistic and misguided to see in this a clear central direction of purpose or conscious development of infrastructure – in short, an imperial transport policy. The reality is implicit, “that most of the initiative for the development of infrastructure was local, carried out with local knowledge of both topography and economic necessity, and that imperial involvement was characterized by a desire to control provincial finances, rather than promote a grand plan for the development of a transport infrastructure.” In addition to direct taxes on land and person; indirect taxes, custom duties, and transit tolls were exacted in ports and at borders throughout the empire. Meantime, transport is arranged for the cargo by contracts with traders, generating an opportunity for professional transporters.
Chapter IV. Economic Thought and Other Intellectual Developments

(c) **Money and Finance**: Roman money owed much to the Greek model. (i) **Monetization**: The Romans had some form of money by the time of the Laws of the Twelve Tables, where penalties are reckoned in the monetary unit of the *as* that is the basis of pre-weighted bronze bars. “The first Greek-style silver drachms produced by Roman authority in Campania in the mid-third century B.C., too, can hardly be have been central to the economy of the Republic, not do they match the size of the indemnity payments that Carthage is supposed to have paid to Rome after the first Punic War.” By the end of the second Punic War, Rome massively increased its silver coinage in monetization. In 214 B.C. “a monetary reform created a totally new monetary system in which the denarius first appears, replacing the silver drachm minted so far for the Campanian coin system. The adoption of coinage as the dominant form of money in Rome must be linked to the new level of income and expenditure derived from tribute, indemnity payments, and predation, on the one hand, and the costs of warfare and imperialism (stipends, construction work, and subsidies to client kings) on the other. Precious metal, the backbone of the new denarius coinage, is believed to have been captured at first, but soon was derived from mining resources that came into Roman possession.”

The imperial expansion increased monetization: more Roman coins were needed with more lands and people. First, the Roman army stimulated monetization with spread the practice of monetary exchange. Second, urbanization stimulated monetization with the development of markets in cities and towns. Third, the commercialization of agriculture and the expansion of villa economies from the late Republic period onwards became another stimulus for monetization. The Julio-Claudian emperors managed to hold both silver and gold coins stable in weight and fineness until the middle of the first century B.C. The rising demand for coinage in the military sector as well as in the provinces made the Roman state begin to stretch its financial resources by lowering the weight and fineness of the precious metal coins. After massive price inflation, Roman monetary units were fixed to a gold standard.

(ii) **Imperial money**: In Italy, Sicily, and Africa; the Roman silver currency soon was the only precious metal currency after the Roman conquest. In other areas, denarii were the dominant currency, but coexisted with local issues, while the Roman denarius had become a top-currency in the Roman Empire. Where local monetary traditions remained strong, official exchange rates were introduced in order to integrate old coinages into new monetary systems. A unified currency facilitated the collection of taxes and benefited the flow of coins between Rome and the provinces.

(iii) **Money beyond cash**: First, if a purchase was made by *nomen*, the purchase price was extended as a loan and paid later in the form of some monetary transfer, or in installments. Second, if the transaction has been made by *permutatio*, it means barter or written order of payment between banks or bill of exchange. Third, transactions across provincial boundaries were made by loan contract called *chirographa* (informal written contract) or *sungraphae* (formal written contract); which referred to debt claims transferable to third parties. (iv) **Credit and banking**: Lending and borrowing in Roman society took place at all social levels, and for a wide range of purposes. A significant part of the imperial elite including wealthy provincials were lenders and debt claims, rather than money, constituted the monetary part of the property of the wealthy. Loans were made and mediated in several ways: interpersonally, through middlemen, and through bankers. Forms of intermediations were negotiators, mandated agents, and professionals specialized in money-lending. Bankers formed a special type of credit institution: they took funds in deposit, and they paid interest unsealed deposit by allowing to lend them to third parties. In sum, “the fundamental development of the Roman monetary economy must be regarded the growth of a currency network based on the Roman denarius, the development of monetary instruments based on Roman law and an imperial administrative infrastructure, and the development of Ronan law that backed up an increasing range of monetary transactions and banking operations.”

47
Post-Roman Economic Thought: The classic accounts of late Roman, post-Roman, or early medieval economies had relied upon textual sources, but “its frequently allusive and incidental character, its qualitative and quantitative limitations, and its random distribution generally make it difficult to get much sense of the scale of production or distribution, to draw convincing comparisons across space or time.” In recent decades, the parameters of our understanding of the ancient and early medieval economy improved owing to archaeological evidence, technological specification, pottery typologies, and approximation of productive quality. In general, “the Roman state provided fiscal and transport infrastructures that made exchange easier, its tax-demands stimulated market activity, and its political authority assured a significant level of economic integration. More specifically, the emperors found it politically expedient to command routine transports of staple foodstuffs to their armies and their capitals, where necessary over long distances, and came to resolve the considerable logistical implications through the mechanism of the Annona, in effect a compulsory purchase- and distribution-system.” The textual evidence shows that the shipment of staple foodstuffs within the context of the Annona system tended to be regarded as symptomatic of a command economy that negated commercial enterprise. Nevertheless, “the ceramic data made this proposition increasingly untenable by privileging the manifold outcomes of interregional exchange over the mechanisms through which it was achieved. The extraordinary diffusion of African fine-wares might have owed much to the Annona, as we shall see, but it cannot conceivably have been a direct manifestation of the imperial will…No less apparent, however, was the correlation between those Mediterranean regions involved in surplus production for the Annona and those that dominate the ceramic record of contemporary interregional exchange. It was this above all that led to the re-conception of state intervention as a catalyst rather than a barrier to commercial enterprise, through both its encouragement of surplus production, and its subsidizing of interregional transport.”

The Vandal conquest of Carthage in 439 A.D. and consequent ending of Annona-transports probably disrupted established patterns of African ceramic production and distribution, and perhaps further encouraged the shipment of eastern goods to western consumers as a result, but it had no lasting structural impact upon their dominance of overseas markets. “The demands of the Annona may have been instrumental in facilitating the African hegemony over interregional exchange in the first place, but its systems of production and distribution had become sufficiently established to endure without them.” Therefore, in the Mediterranean, “there was no fifth-century break between the late Roman and post-Roman interregional exchange-systems, which constitute a unitary late antique phase running from the third century (in the West) and the fourth century (in the East) down to around 700 A.D. Within the separate system of northwestern Europe, however, the economic legacy of the Roman state was much more short-lived. The principal driver of economic integration here had always been the fiscal cycle and in particular the military Annona, which did not survive the disbanding of the centralized professional army. In Britain, the resulting meltdown was swift and absolute. Across much the Gaul, however, the crisis was significantly less severe.” The impact of the disintegration of the western empire upon the economies of its Mediterranean regions was more gradual. “In the early fifth century most of these areas were neither closely integrated into the state system of supply, nor visibly engaged in the export of goods in bulk outside regional networks. Southern Gaul and the Italian peninsula sustained an assortment of fine-ware and, in some cases, amphora productions, but with rare exceptions these wares normally circulated within distinct sub-regional orbits.” It would be hardly surprising that the African economy suffered temporarily from the political upheaval, and more generally from the withdrawal of the subsidizing effects of the Annona. However, commercial demand for their wares was sufficient for them to renew their dominance of networks of interregional exchange.
Chapter IV. Economic Thought and Other Intellectual Developments

The economies of the post-Roman western Mediterranean were persistent in traditions of production and distribution, without the significant development of new patterns of interregional exchange. “In general, the ceramics manufactured in southern Gaul and Mediterranean Spain indicate the increasing localization of production and distribution over the sixth and seventh centuries…In contrast, meanwhile, the major ports in these regions remained integrated into the wider Mediterranean economy, and continued to receive African and eastern imports in quantity well into the seventh century. The Italian peninsula exhibits a broadly comparable pattern, though it unfolded along a more discontinuous route. Here the Gothic War and Lombard invasions shredded the political and fiscal integration that might otherwise have combined with the particular concentrations of wealth held by its elites to give Italy an advantage over other western regions, and replace it with a lasting pattern of economics and political fragmentation. Some regions emerged in better shape than others; a crude distinction might be drawn between a Lombard north, where ceramic production had in many areas deteriorated to rudimentary levels by the mid-seventh century, and the Byzantine-held south, which sustained the production of semi-fine Red Painted wares on some scale, as well as its connections with the interregional exchange-system.” However, “The Justinian re-conquest and its precarious legacy clearly damaged the Italian economy. It is trickier to assess the Byzantine impact on Africa, where the resumption of Annona-shipments, now healing for Constantinople rather than Rome, swiftly followed its smooth reentry into the imperial orbit. Whether or not the region’s economy had been prospering outside imperial control, this renewal of guaranteed demand, combined with the temporary restoration of nine-tenths of the Mediterranean coastline to Byzantine rule might be expected to have enhanced the possibilities of African production and exchange…But within Africa…we see the beginnings of a localization and degeneration of ceramic production, a contraction in internal distribution-networks, and retreat in rural settlement, all trends that will accelerate as the seventh century advances.”

The economies of the eastern system had been set upon a different trajectory: the foundation of Constantinople likely stimulated their internal complexity and integration with the extension of the Annona to the new capital. Rural settlement in several regions of the Near East created an intricate web of interregional exchanges “as all of the coastal regions from the shores of the Aegean round to Alexandria traded not only with each other, but also across to the West.” The millions of modii of grain shipped annually from Egypt to Constantinople. “Egyptian shippers enjoyed commercial advantages by virtue of their service to the state, they must instead have exploited it to cram their holds with textiles, papyrus, and spices, or, perhaps likeliest of all, yet more grain.” However, when the Byzantine Empire lost most of its richest territory to the Arabs in the early seventh century, the state lost its ability to command supplies from Egypt, Syria, and ultimately Africa. So production and circulation of the fine-ware and amphorae outside the regions gradually declined and finally ceased. The impact of political crisis is perhaps most obvious in the vicinity of Constantinople in the later seventh century, as the eastern Mediterranean was taken over by the Arabs. In the eighth century, “the fiscal integration, state-backed transfers of goods, and military or maritime exchange-networks that had all been characteristic of the Roman economy had either disappeared altogether, or become confined within specific regional systems which were, as ever, at varying stages of development.” In the Frankish heartlands, they were intensifying and expanding outwards, as the Arabs had accelerated their interconnections. The ceramic evidence suggests that the economies of most coastal regions were reduced in scale by comparison with earlier periods. It is suggested that “the integrated exchange-system of earlier periods had vanished, leaving in its wake a patchwork of local and regional networks of varying complexity, that were incidentally, but not structurally, connected. In the absence of an overarching political and fiscal framework, such a system would not be easily revived.”
Chapter IV. Economic Thought and Other Intellectual Developments

4. Other Intellectual Developments until Ancient Greece

The mental development of the human race started from language expressing their feeling and thought. Communications through signs called gesture seem primary, and speech is secondary. Although the languages were the medium of education, the nature of languages is not necessarily simple in vocabulary and structure. As trade connected tribes of diverse languages, intellectual mode of records became desirable for better communications to help memory or to convey messages, which developed forms of writing. “Hieroglyphics have been found on Easter Island, in the South Seas; and on one of the Caroline Islands a script has been discovered which consists of fifty-one syllabic signs, picturing figures and ideas. Tradition tells how the priests and chief of Easter Island tried to keep to themselves all knowledge of writing, and how the people assembled annually to hear the tablets read; writing was obviously, in its earlier stages, a mysterious and holy thing, a hieroglyph or sacred carving.” Literature is at first words rather than letters, and “it arises as clerical chants or magic charms, recited usually by the priests, and transmitted orally from memory to memory.” Science began with agriculture when the natural men needed to cultivate soil; geometry when to measure land; astronomy when to observe stars, to measure time or to construct a calendar, and to navigate across the sea; mathematics when to calculate transactions in trade; and medicine, physics, and chemistry when to resolve their practical problems. Art is a creation of primitive sense of beauty as an expression of thought or feeling; while “The thought may be any capture of life’s significance, the feeling may be any arousal or release of life’s tensions.” Art appeared in various forms: music and dance, pottery and painting, sculpture and architecture, and literature and drama. This section briefly focuses only on the historical development of letters, history, literature, education, science, and technology.

For other intellectual developments, in ancient Mesopotamia and Egypt, science began with agriculture to cultivate soil; geometry to measure land; astronomy to observe stars; mathematics to calculate transactions in trade; and medicine, physics, and chemistry to resolve practical problems in daily life. (i) In ancient Greek, Homer wrote epic poems in his Iliad and Odyssey portraying the deeds of heroes of the thirteenth century B.C. In the fifth century, there were two famous historians: Herodotus wrote the History of the Persian Wars, and Thucydides wrote the History of Peloponnesian War. Aesop told many beast fables which were orally transmitted, and later a collection of them appeared as Aesop’s Fables. The Greeks enjoyed dramas, and the plays of tragic poems were written by famous authors who won the rewards in the competitions at the city of Dionysia. They were Aeschylus, Sophocles, Euripides, and Aristophanes. (ii) In the Hellenistic age, scientific research was established in Alexandria and Pergamum, while Athens had remained the center of philosophy. In astronomy, Aristarchus presented the heliocentric view of the universe, and Eratosthenes measured the circumference of the earth within 200 miles of error. In mathematics, Pythagoras developed the numbers of odd and even, and prime and square, and discovered the hypotenuse theorem; Euclid published The Elements that became a standard text of geometry until present days; Archimedes worked on mathematics and physics, calculated the value of phi, invented the screw, and discovered specific gravity; and Apollonius wrote the Treatise on Conic Sections. In medicine, Hippocrates marked the beginning of western medicine, and Herophilus and Erasistratus contributed to further development through anatomy. In literature, Theocritus started little poems, Apollonius wrote epic poems, and Menander wrote numerous comedies; while Polybius wrote The Histories of Rome. (iii) In the Roman world, Histories were written by Sallust, Caesar, Livy, Tacitus; Plutarch wrote biographies of Greek and Roman heroes; and Procopius is added for the later period. Plautus and Terence wrote comedies, Vigil and Ovid wrote epic poems; and Horace, Petronius, and Juvenal wrote satires.
Chapter IV. Economic Thought and Other Intellectual Developments


Letters and Science in Ancient Near East: In Mesopotamia, the Sumerians developed a cuneiform of writing: they made wedge-shaped impressions on clay tablets by using a reed stylus, which were then baked or dried in the sun. The cuneiform system consisted originally of pictures of things making a pictographic system. The original pictures were gradually developed into signs over centuries of time from 3000 B.C. to 600 B.C. The signs were also transformed into the symbols of sounds, making a phonetic system which represents neither pictures nor the signs, although the Sumerians and Babylonians never reached at that point. “For centuries, writing was a tool of commerce, a matter of contracts and bills, of shipments and receipts; and secondarily, perhaps, it was an instrument of religious record, and attempt to preserve magic formulas, ceremonial procedures, sacred legends, prayers and hymns from alteration or decay.” Around 2500 B.C., the cuneiform was adapted by Semitic-speaking peoples. About that time, schools taught the cuneiform system of writing and gave experiences of numerous trials and tribulations; which was necessary for children to seek careers for priests, and civil and military leaders. The Sumerians established great libraries, where the historians reconstructed past records and built up current ones: their 30,000 tablets had been preserved in the Library of Ashurbanipal (now in the British Museum), which became the main sources of Babylonian life. Trade and culture could pass from Asia along the Mediterranean to the Nile that isolated Egypt from the remainder of Africa. The Egyptian pictographic writing seems to have come in from Sumeria. The Babylonians developed Semitic languages of Sumeria and Akkad, their characters were written originally in Sumerian, but the vocabulary diverged into different languages. In literature, the Epic of Gilgamesh was famous that was the records of the legendary king who abused the citizens of Uruk. “According to the myth, the gods respond to the prayers of the oppressed citizenry of Uruk and send a wild, brutish man, Enkidu, to challenge Gilgamesh to a wrestling match. When the contest ends with neither as a clear victor, Gilgamesh and Enkidu become close friends. They journey together and share many adventures. Accounts of their heroism and bravery in slaying dangerous beasts spread to many lands.” It is written that “Two thirds of him is god, One third of him is man, There’s none can match the form of his body….All things he saw, even to the ends of the earth, He underwent all, learned to know all; He peered through all secrets, Through wisdom’s mantle that veileth all. What was hidden he saw, What was covered he undid; Of time before the stormflood he brought report. He went on a long far way, Giving himself toil and distress; Wrote then on a stone tablet the whole of this labor.”

The Babylonians developed science in mathematics, geometry, astronomy, and medicine. In mathematics, they divided the circle into 360 degrees and of the year into 360 days; and developed the sexagesimal system in which both time and degrees are divided by sixty which became the parent of duodecimal systems divided by twelve. The Babylonian figure of \( \pi \) was 3 that was a very crude approximation. Their astronomy was a science of stars to predict the fates of men, not to guide the course of caravans and ships. Around 2000 B.C., the Babylonians kept accurate records of the rising and setting of Venus, and observed the positions of various stars. They divided the year into twelve lunar months: six months having thirty days and six months having twenty nine, and added one more month occasionally to harmonize the sun with the seasons. The day was divided into twelve hours, and the hour into thirty minutes. By the time of Hammurabi, a regular profession of physician had been established with fixed fees and penalties by law. Babylonian science, more in medicine than in astronomy, depended upon religion. It was not unusual for the people to demand for supernatural diagnosis and magical cures, so that “sorcerers and necromancers” were more popular than physicians. The survived medical tablets informed us that their medicine practiced not in justice, and their magical cures were “merely subtle uses of the power of suggestions” by the ignorance of our ancestors.
In Ancient Egypt, the earliest writing was in pictography that passed into ideography in which certain pictures did not represent their objects but suggested their ideas; which were converted into the syllabic signs; which were converted into syllabic sounds; making twenty-four consonants of alphabet passed to Greece and Rome. The ancient Egyptians never adopted a alphabetic writing, but mingled pictographs with ideographs and syllabic signs. Their schools were attached to the temples, where the priests taught children from well-to-do families, and the students receiving higher grade were able to use paper made from the papyrus plant. Meantime, the scholars were mostly priests enjoying comfort and secured life of the temples. As shown in the design for and construction of the Pyramids, mathematics was highly developed; geometry was progressed for the measurement of land boundaries due to the fluctuations of the Nile; and astronomy was linked to the prediction of the day on which the Nile would rise, and the point on the horizon where the sun would appear in the morning of the summer solstice. They kept the track of the position and movements of the planets for centuries, from which the calendar was built. The Egyptians divided the year into three seasons of four months each: the rise, overflow and recession of the Nile; cultivation; and harvesting. The month consisted of twenty-nine and a half days; and they added five days at the end of the twelfth month to make the year of the sun. Their calendar allowed 365 instead of 365 ¼ days to the year, becoming six hours shorter than the sun in a year. They never corrected this error, but in 46 B.C., the Greek astronomers of Alexandria added a day every fourth year which made the Julian calendar. More accurate correction was made in 1582 by omitting a day in century years not visible by 400, which made the Gregorian calendar that we are using now.

A document dating about 1600 B.C describes forty-eight cases in clinical surgery "from cranial fractures to injuries of the spine.” Their doctors used an abundant list of drugs against various diseases; and promoted health by public sanitation such as a sewage system by copper pipes. Herodotus stated that the Egyptians had doctors specialized in particular area of the body, and admired their health conditions by ranking them the healthiest next to the Libyans.

In ancient Persia, science was “a commodity which they could import from Babylon.” In medicine, the priests treated patients by a combination of magic and hygiene. “They resorted more frequently to spells than to drugs, on the ground that the spells, though they might not cure the illness, would not kill the patient – which was more than could be said for the drugs.” As the wealth of Persia grew, the lay doctors organized a guild of physicians and surgeons, whose fees were fixed by law as indicated in the Hammurabi’s code. The medical novice practiced upon bodies of the immigrants and the poor for a year or two as an intern: “if a worshiper of God wish to practice the art of healing, on whom shall he first prove his skill – on the worshiper of Ahura-Mazda, or on the worshipers of the Daevas (the evil spirits). In art, since the Persians had been engaged in many wars, they were mostly dependent on foreign or foreign-born artists, who produced precious things to fill their luxurious tastes at home and palaces. In architecture, the Persians achieved their own style. Under the kings of Cyrus, Darius I, and Xerxes I, they built palaces and tombs, which greatness was assumed by archeologists although many of them were lost. “At Susa, the Artaxerxes I and II built palaces of which only the foundations survive.” It is believed that their painting and sculpture were mostly the work of imported artists from Assyria, Babylonia and Greece. “The tomb of Cyrus took its form from Lydia, the slender stone columns improved upon the like pillars of Assyria, the colonnades and bas-reliefs acknowledged their inspiration from Egypt, the animal capitals were an infection from Nineveh and Babylon. It was the ensemble that made Persian architecture individual and different – an aristocratic taste that refined the overwhelming columns of Egypt and the heavy masses of Mesopotamia into the brilliance and elegance, the proportion and harmony of Persepolis.” We review science and literature of Ancient Greece, Hellenistic Kingdoms, and the Roman Empire below.
Historiography of Ancient Greece: The Greeks used a Semitic form of alphabet created by Egypt and passed on to them by the Phoenicians in the fourteenth century B.C. They developed lyric and epic poems reflecting an aristocratic society of the time. Presumably in the early eighth century B.C., Homer wrote epic poems in his *Iliad* and *Odyssey* describing the deeds of heroes, courage and honor, in the third century B.C. The *Iliad* starts from the wrath of Achilles and Agamemnon in the tenth year of the siege of Troy. The Greeks sack some of the neighboring towns and take two beautiful captives: Chryseis is allotted to the king Agamemnon and Briseis to his general Achilles. Being forced to release Chryseis, the daughter of Apollo's priest, Agamemnon takes Briseis, so that Achilles, the greatest warrior of the age, withdraws his forces from the battles in vengeance. The Greeks are nearly defeated by the Trojans in battles without Achilles. As his dearest friend Patroclus is killed by the Trojan prince Hector, Achilles reenters the fighting, slaughters Trojan soldiers, and kills Hector. Achilles refuses to return Hector's body, but his father Priam, the king of Troy, begs his son's body back to him. Achilles, moved with compassion, grants his request. He...sends his body home in the next morning. The funeral of Hector ends the epics of the *Iliad*. Achilles embraces honor and glory, and Hector shows the high quality of an ancient hero. In later Greek and Roman poetry and drama, Achilles is killed on the battlefield by Paris with a poisoned arrow to his vulnerable heel. Odysseus made his men build a large wooden horse hiding him and twenty others inside. The Greek ships withdraw from Troy to make them believe that they are defeated and returning home. The Trojans take the wooden horse to inside the wall, and celebrate their victory with feast. At night, Odysseus and his men came out from the horse and opened the wall gate to the other Greeks who sailed back to the shore. They sack Troy, kill Priam, and end the Trojan War. The *Odyssey* is ten years of his journey returning his home of Ithaca after the war. He reunited with his son, his wife, and his aged father, although a band of suitors tries to take his wealth and to woo his wife during his long absence.

As a historian, Herodotus (484-25 B.C.), born in Halicarnassus (Bodrum, Turkey), had been in exile from Persian rule, traveling throughout Asia Minor, Babylonia, Egypt, and Greece. About 447 B.C., he went Athens where he won a good reputation from distinguished men of Greece. Herodotus settled in southern Italy in 443 B.C., and devoted his remaining life to writing of the *History of the Persian Wars*, which is regarded as “the first real history in western civilization.” His *History* consists of nine books: the earlier books deal with history, customs, traditions, and geography of the ancient world such as Lydians, Scythians, Medes, Persians, Assyrians, and Egyptians; and last three books discuss about the wars between Greece and Persia in the early fifth century B.C. He used many works of his predecessors, but his knowledge gained from his extensive travels supplemented his writing. There are many sobering morality tales to be enjoyed; “there are numerous depictions of savage and barbaric acts, of arrogance and hubris winning out over caution, of rage, envy, lust, greed, corruption, insanity, and other human failings that make up the fabric of history...there are also tales of love, passion, suffering, spirited debate, invention and invention, heroism, devotion to duty, determination, and self-sacrifice-tales which can inspire and guide us even after these many centuries.”

He also provides information about the nature of the world and the status of science during his lifetime, often engaging in private speculation. The contents include (i) Persian expansions; (ii) Egyptian and African history, customs, and geography; (iii) Persian conquest of Egypt and 20 Persian Satrapies; (iv) Darius failed to conquer Scythia, but invaded Greek Colonies in Libya; (v) Persia conquered Thrace and Pannonia, and Athens faced conflict with Darius; (vi) Upon Ionian revolt, the Persians invaded but the Greeks defeated them; (vii) Xerxes succeeded Darius, invaded Thrace and Thessalonica, but their ships met shipwrecks on the coast of Magnesia; (viii) the Greeks won the battle of Salamis in 490 B.C.; (ix) Winning the battle at Plataea, the Greeks attacked Thebes, won the battle at Mycale, and sieged Sestos.
Chapter IV. Economic Thought and Other Intellectual Developments

Thucydides (460-00 B.C.), son of an aristocratic family of Athens, joined the Peloponnesian War as one of generals of the Athenian fleet in 424 B.C., but failed to reinforce Amphipolis, which was captured by the Spartans. The Athenian Assembly sent him into exile abroad for over twenty years until he was recalled in 404 B.C. His exile helped him to write the History of the Peloponnesian War that gave him a fame of the greatest historian of the ancient world. “He saw war and politics in purely rational terms, as the activities of human beings. He examined the long-range and immediate causes of the Peloponnesian War in a clear, methodical, objective fashion. Thucydides placed much emphasis on accuracy and the precision of his facts.” His work covers the first conflict between Athens and Sparta (431-21 B.C.), the Sicilian expedition of the Athenians (415-13 B.C.), and the renewed war between them (413-04 B.C.). He saw that the primary cause of the Peloponnesian War was the growth in power of Athens, and the alarm which this inspired in Sparta. Thucydides emphasizes the development of military technologies like the modern theorist Alfred T. Mahan who wrote The Influence of Sea Power upon History. He describes various innovations in the conduct of siege-works or naval warfare, resulted from the development of piracy and coastal settlements in earlier Greece. Particularly, “Book Two follows with a description of the strategies adopted by both sides. Athens depended on their ability to outlast the Spartans with their money and sea power. Meanwhile, the Spartans attempted to convince cities to revolt by telling them that they were fighting for a “free Greece” and trying to draw the Athenians from their city. It also includes an account of the plague that struck Athens at this time and its consequences. Book Two includes the first major speech of the History in Pericles’ funeral oration. This was groundbreaking not only in its departure from traditional structure, but also in its content. He praises the city in order to praise the dead, and in doing so delivers a rousing and beautiful address that outlines Athenian character and aspiration. He also discusses what might have happened had Pericles not perished during the plague.”55

Xenophon (430-354 B.C.) wrote the Hellenica (Greek history) that became a major primary source for events in Greece from 411 to 362 B.C.56 Being considered to be the continuation of History of the Peloponnesian War by Thucydides, it recounts the last seven years of that war as well as its aftermath. “This continuity, however, does not apply to the depth of the analysis, because Xenophon lacks the objectivity of his predecessor. The Anabasis is his story of the march to Persia to aid Cyrus, who enlisted Greek help to try and take the throne from Artaxerxes, and the ensuing return of the Greeks, in which Xenophon played a leading role; which occurred between 401 and 300 B.C.57 Xenophon wrote Agesilaus that is the biography of Agesilaus II, king of Sparta and companion of Xenophon; Constitution of Sparta that describes the Spartan government and institutions; Memorabilia and Apology in defenses of Socrates. In addition, he wrote Symposium and Oeconomicus as discussed previously; Hiero as a dialogue of tyrant of Syracuse; and some short treatises. Polybius of Megalopolis (200-18 B.C.) was a Greek historian of the Hellenistic period. He was born at the moment when the Romans had defeated Carthage and started to focus on Greece. “Polybius’ family played a role in the resistance, and after 168, he was brought as a political prisoner to Italy, where he lived for eighteen years. In Rome, he was introduced to the cultural circle of the family of the Cornelii Scipiones, and he accompanied Scipio Aemilianus on his campaigns. Moreover, Polybius made some voyages himself: for example, he crossed the Alps to find out how Hannibal had invaded Italy, and sailed along the coast of western Africa. This gave him a good knowledge of the inside dealings of Roman politics, which make his Histories one of the most important sources for the study of the rise of Rome. Because later generations did not appreciate the Greek language of the age of Polybius, he never became a classic author, and a great part of the Histories is now lost.”58 His ideas in it concerning the separation of powers in government were later used by Montesquieu in his Spirit of the Laws.
**Literature in Ancient Greece:** The fables, composed in prose or verse conveying moral truth, appeared in Greece about six hundred years B.C. Aesop, who was special among all men in the qualities of his mind, told many beast fables to his master, and circulated them orally. In the long period of time, his fables were orally transmitted like at his time. A collection of his fables were written in Greek verse and later in Latin verse in *Aesop’s Fables.* “The best-known fables of modern Europe have come from a Latin edition by the Byzantine monk Maximus Planudes.” Another famous collection of beast fables is the *Panchatantra* that is an ancient Indian collection of inter-related animal fables in verse and prose, arranged within a frame story. On the other hand, as religion failed to unify Greece, athletics periodically succeeded: under the rubric of athletics, to worship of health, beauty, and strength became the religion of the Greeks. “Ancient war depended upon physical vigor and skill, and these were the original aim of the contests that filled Hellas with the noise of their fame.” Hence, Greek games were private, local, municipal, and Pan-Hellenic throughout the year. Moreover, the sources of Greek art were “the impulses to representation and decoration, the anthropomorphic quality of Greek religion, and the athletic character and ideal.” Meantime, the Greek pottery including vases comprises a large part of the archaeological record with beautiful paintings on it; the sculpture is used to depict the battles, mythology, and rulers of the land; and the Greek architecture is best known from its temples as well as the open-air-theatre, with the earliest dating from around 350 B.C. Music was an integral part of life in the ancient Greek world, and the term covered not only music but also dance, lyrics, and the performance of poetry. “A wide range of instruments were used to perform music which was played on all manner of occasions such as religious ceremonies, festivals, private drinking parties, weddings, funerals, and during athletic and military activities.” The Apollonian dance was ceremonial with guitars, and the Dionysian dance was passionate with breathtaking moves.

Pindar (522-443 B.C.) was an ancient Greek lyric poet who was born in a village in Boeotia. He was stung on the mouth by a bee in his youth, which was the reason he became a poet of honey-like verses. Pindar studied the art of lyric poetry in Athens; and about twenty years old, he was commissioned by the ruling family in Thessaly to compose his first victory ode. “Soon he was handsomely commissioned to write odes in honor of princes and rich men; he was the guest of noble families…and for a time lived as royal bard at the courts of Alexander I of Macedon and others. Usually his songs were paid for in advance.” The form of his poems consists of three parts. “First came the statement of the theme – the name and story of the athlete who had gained the prize, or of the nobleman whose horse had drawn their chariot to victory. In general, Pindar celebrates the wisdom of man, his beauty, and the splendor of his fame…The second part of a Pindaric ode was a selection from Greek mythology. Here Pindar was discouragingly lavish…He had a high conception of the gods, and honored them as among his best clients…The third and concluding section of a Pindaric ode was usually a word of moral counsel…He was satisfied to urge his victorious athletes or princes to be modest in their success, and to show respect for the gods, their fellow men, and their own best selves.” On the other hand, the theatre of Dionysus is major open-air theatre: this was used for festivals in honor of the god Dionysus for a religious celebration. The great theatre is open to the sky with 15,000 seats, rising in a fanlike semicircle of tiers toward the Parthenon, face Mt. Hymettus and the sea. The Greeks created and developed drama: with four festivals in Athens, the god Dionysus was honored with an unusual festival called the city Dionysia. Educating citizens with their entertainment, Greek tragedies derived its themes mostly from tragic heroes of Homer, and were presented with a trilogy, a set of three plays, at the city Dionysia, where drama is presented for three days with five plays each day. Three tragedies and a satire play by one poet, and a comedy by another. The performance begins early in the morning and continues till dusk. There were four major drama-writers as below.
Aeschylus (525-456 B.C.) was the first of the three ancient Greek tragedians whose plays can still be read or performed, the other being Sophocles and Euripides. In his real life, he successfully fought against the Persians at Marathon in 490 B.C., at Salamis in 480 B.C., and some other battles in later years. Aeschylus was the first Greek dramatist and a tragic poet of Athens: his writings is largely based on inferences from his surviving plays. “According to Aristotle, he expanded the number of characters in plays to allow conflict among them whereas characters previously had interacted only with the chorus.” He wrote seventy to ninety tragedies among which only seven have survived. His Oresteia is the complete trilogy of Greek dramas, related to Agamemnon, king of Mycenae, his wife Clytemnestra, their son Orestes, and their associates. Of his trilogy, the first play Agamemnon: while Agamemnon is away at the Trojan War, his wife takes a lover and conspires with him to murder her husband upon his return. The second play, The Libation Bearers: Orestes laments the death of his father and avenges by slaying his mother and her lover with the help of others. The final play, The Furies: It relates to trial and absolution. Orestes says “It is thine hour, Apollo – speak the law, averring if this deed were justly done; for done it is, and clear and un-denied. But if to thee this murder’s cause seem right or wrongful, speak – that I to these may tell.” Aeschylus also wrote a play of The Persians, in which Xerxes invites the gods' enmity for his hubristic expedition against Greece in 480 B.C.: the drama is focused on the defeat of Xerxes' navy at Salamis. On learning of the Persian defeat, “Darius condemns the hubris behind his son’s decision to invade Greece. He particularly rebukes an impious Xerxes’ decision to build a bridge over the Hellespont to expedite the Persian army’s advance. Before departing, the ghost of Darius prophesies another Persian defeat at the Battle of Plataea (479 B.C.)...The rest of the drama consists of the king alone with the chorus engaged in a lyrical kommos that laments the enormity of Persia’s defeat…Aeschylus was not the first to write a play about the Persians - his older contemporary Phrynichus wrote two plays about them.”

Sophocles (496-06 B.C.) was born in Colonus Hippius in Attica as a son of wealthy sword manufacturer and received the best aristocratic education of the time. In 480 B.C. Sophocles was chosen to lead the paean, celebrating the Greek victory over the Persians at the Battle of Salamis. He held a high office under Pericles; served as one of Treasurers of Athens in 443 B.C.; became one of the generals who commanded the Athenian forces in Pericles’ expedition against Samos in 430 B.C.; and was appointed to the Committee of Public Safety voting for the Oligarchical constitution. “Sophocles' first artistic triumph was in 468 B.C., when he took first prize in the Dionysia theatre competition over the reigning master of Athenian drama, Aeschylus.” In addition to wealth, Sophocles had genius, beauty, and good health; writing 113 plays, among which seven complete plays and fragments of numerous other plays have been preserved. His Oedipus the King was the most famous of Greek drama. An oracle says that Laius and his queen Jocasta would have a son who would slay his father and marry his mother. To avoid fulfilment, he was exposed on the wilds, but rescued by Polybius, king of Corinth, having no child. Polybius raised him such as his heir to the throne. Upon his inquiry to Apollo, Oedipus became to know his fate. On the way leaving Corinth, he met Laius with four armed men and slew him and three others. The Thebans gave the vacant throne to Oedipus who correctly answered to a riddle. He married Jocasta who produced four children to him. As they knew what Oedipus had done, Jocasta hanged herself, and Oedipus lost his sight and intends to end his life. Most of his plays show an undercurrent of early fatalism and the beginnings of Socratic logic as a mainstay for the long tradition of Greek tragedy. “The Theban plays consist of three plays: Oedipus the King, Oedipus at Colonus, and Antigone. All three plays concern the fate of Thebes during and after the reign of King Oedipus. They have often been published under a single cover. However, he wrote the three plays for separate festival competitions, many years apart.”
Chapter IV. Economic Thought and Other Intellectual Developments

Euripides (485-06 B.C.) was born in Salamis and his family fled for refuge during the naval war with the Persians. His father had property and prominent in the Attic town of Phyla, and his mother was of noble family. He received proper education, and his plays were performed in the Attic Drama Festival in 454 B.C. and won the first prize in 442 B.C. He created more realistic characters and his plots were more complex with living situations. He wrote seventy-five plays, among which eighteen plays survive: The Bacchae, the greatest of all his plays, was written in a year or two before he died. “The Bacchae is concerned with two opposite sides of man’s natures: There is the rational and civilized side, which is represented by the character of Pentheus, the king of Thebes, and then there is the instinctive side, which is represented by Dionysus. This side is sensual without analysis, it feels a connection between man and beast, and it is a potential source of divinity and spiritual power.”

Dionysus, son of Zeus, enters in power into a human body by appearing in the disguise of a young man leading a group of oriental women from Lyida into Greece, since his mother’s family – the royal house of Thebes - has denied his divine birth. He represents both a civilized man and a beast in a man, which are an integral element of human nature. Cadmus, the founder of Thebes, has handed over the throne to his daughter’s son Pentheus who is a fighter against God. He tries to hunt Dionysus, but the hunter is hunted by the god making Agaue kill his son Pentheus: the anger of Dionysus destroyed the house of Cadmus. Dionysus punishes Agaue and her sisters to leave Thebes for exile, and makes Cadmus and his wife change their forms to a serpent and a snake. The lesson was that a mortal man should not fight against a god, and the wise man should preserve a smooth-tempered self-control. In his Medea, “The plot centers on the barbarian protagonist as she finds her position in the Greek world threatened, and the revenge she takes against her husband Jason who has betrayed her for another woman.” His Hippolytus terrifies the power of erotic love: humans should perform their duties the gods with avoidance of companionship for fear of their destructive power.

Aristophanes (450-385 B.C.) is believed to be born in Athens at the time between Socrates and Plato’s birth and presumably received good education. Although its first comedy appeared in Sicily in about 484 B.C., Greek comedy developed later than its tragedy, and his play could be a good example of old comedies. Aristophanes used “grotesque masks and obscene jokes to entertain the Athenian audience” in his plays, but his comedy was used to attack or satirize both politicians and intellectuals. In The Clouds, Aristophanes characterized the philosopher Socrates “as the operator of a thought factory where people could learn deceitful ways to handle other people.” In his Lysistrata performed in 411 B.C., Aristophanes sent effective messages through a comic to the Athenians against the Peloponnesian War. In his Birds, Pisthetaerus and Euelpides meet Tereus, who was once a man but is a bird now. They plan to build an aerial city between earth and heaven, where the birds have the supreme power under the new order. “They start building the city, which they named Nephelococcygian. Many visitors come to check the city out, and he chases them all away. After the visitors their wall is finished. It’s a massive wall that can let two chariots pass each other, but the most significant thing is that the birds built the whole wall all by themselves! After this though, a messenger comes with news that a god has passed through the gates and is inside their city. The immortal finally appears and is Iris. She thinks Pisthetaerus is crazy when he tries to stop her and says that she is breaking many of their laws. She leaves to tell her father of the news and the people offer Pisthetaerus a golden crown. After that incident, some people come to have some wings. Prometheus comes by later and says that Zeus is done for as there is no man that is sacrificing to the gods, all the humans love the birds. Some gods come later and they offer peace with Pisthetaerus and the birds as they want no war. Pitheraerus agrees for peace if Zeus hands his scepter to the birds and lets Basileia marry Pisthetaerus. The gods return later with what Pisthetaerus demands, and they get married.”
Chapter IV. Economic Thought and Other Intellectual Developments

Education and Rhetoric in Ancient Greece: Athens provides public gymnasia with loose supervision over teachers, but education remains under private enterprise without public schools or state universities. Some scholars like Plato advocate state education, but the Athenians believe that competition provides better education. (i) Elementary: Ancient children were taught at home, this was only education available to most people, especially the poor. The upper social classes would receive formal elementary education by hiring tutor or sending them to a public school. (ii) Gymnasium: The gymnasium had been primarily an athletic institution with reading, writing, and arithmetic, but evolved into a secondary school teaching music, physical exercise, and literature (later drawing and painting were added). The gymnasium completed the majority of post-elementary education in Athens. (iii) Secondary: “After turning fourteen years old, boys from wealthy families had the option of attending secondary school. A secondary school might have been a permanent one, or it could have been received from traveling teachers such as the Sophists, or other philosophers like Zeno of Elea and Anaxagoras of Clazomenae. Secondary education included subjects such as natural science (biology and chemistry), rhetoric (the art of speaking or writing effectively), geometry, astronomy and meteorology.” There was no secondary education for respectable ladies, while education for girls was largely confined to home affairs. Boys reaching the age of sixteen should join physical exercises for a military purpose. (iv) Post-secondary: At age eighteen, they are enrolled into Athenian soldier youth and are required to join two years of training in the duties of citizenship and war. They live and eat together, and wear the same uniform. In the first year, they receive military training and hear lectures on literature, music, geometry, and rhetoric; and in the second year, they are assigned to garrison duties in the frontier region. Receiving balanced education and training between mental and physical for two years, they take the oath of the young men of Athens. Athenian leaders encouraged poor fathers to provide their sons with a vocational education such as trade or skills.

Rhetoric has its origins in Mesopotamia, found in the Akkadian and later Assyrian writings. In ancient Egypt, rhetoric had existed since the Middle Kingdom period during 2080-1640 B.C. Rhetoric apparently came into use in the circle of Socrates in the fifth century and first appears in Plato's dialogue Gorgias, probably written about 385 B.C. It “specifically denotes the civic art of public speaking as it developed in deliberative assemblies, law courts, and other formal occasions under constitutional government in the Greek cities, especially the Athenian democracy. As such, it is a cultural subset of a more general concept of the power of words and their potential to affect a situation in which they are used or received.” As the available and effective means of persuasion, “Rhetorics typically provide heuristics for understanding, discovering, and developing arguments for particular situations, such as Aristotle's three persuasive audience appeals, logos, pathos, and ethos. The five canons of rhetoric, which trace the traditional tasks in designing a persuasive speech, were first codified in classical Rome: invention, arrangement, style, memory and delivery. Along with grammar and logic, rhetoric is one of the three ancient arts of discourse.” (i) Rhetoric is a civic art concerned itself with persuasion in public and political settings such as assemblies and court, so it is believed that rhetoric has the power to shape communities, with great impact on civic life. (ii) Rhetoric is a course of studies: the study of rhetoric trains students to speak or write effectively, as well as critically understand and analyze discourse. Rhetoric education focused on five particular canons: invention, arrangement, style, memory, and delivery. (iii) The relationship between rhetoric and knowledge is characteristic for the nature of human understanding, and reflects two closely related but adversarial traditions. “Rhetoric is concerned with the influence on our beliefs or behaviors with the available means, usually in order to achieve certain effects, such as consensus on some issue. Knowledge, on the other hand, is concerned with the justification of our beliefs with the available evidence or good reasons.”
Chapter IV. Economic Thought and Other Intellectual Developments

The first written manual of Greek Rhetoric is attributed to Corax and his pupil Tisias. “Their work, as well as that of many of the early rhetoricians, grew out of the courts of law; Tisias, for example, is believed to have written judicial speeches that others delivered in the courts. Teaching in oratory was popularized in the 5th century B.C. by itinerant teachers known as sophists, the best known of whom were Protagoras (c.481-420 B.C.), Gorgias (c.483-376 B.C.), and Isocrates (436-338 B.C.).” Isocrates was born to a wealthy family in Athens and received a first-rate education. “He was greatly influenced by his sophist teachers, Prodicus and Gorgias, and was also closely acquainted with Socrates. After the Peloponnesian War, his family lost its wealth, and Isocrates was forced to earn a living. His professional career is said to have begun with logography: he was a hired courtroom speech-writer. Athenian citizens did not hire lawyers; legal procedure required self-representation. Instead, they would hire people like Isocrates to write speeches for them. Isocrates had a great talent for this since he lacked confidence in public speaking. His weak voice motivated him to publish pamphlets and although he played no direct part in state affairs, his written speeches influenced the public and provided a significant insight into major political issues of the day. Around 392 B.C. he set up his own school of rhetoric (Athens had no standard curriculum for higher education) that proved to be not only an influential teacher, but a shrewd businessman. His fees were unusually high, and he accepted no more than nine pupils at a time. Many of them went on to be philosophers, legislators and historians.”

In 346, when Athens came to terms with Philip, Isocrates, now ninety, addressed an open letter to the Macedonian King. “He foresaw that Philip would make himself master of Greece, and begged him to use his power not as a tyrant, but as the unifier of autonomous Greek states in a war for the liberation of Greece from the King’s Peace, and of Ionia from Persian rule. The war party denounced the letter as a surrender to despotism, and for seven years Isocrates held his pen. He spoke once more in 339, addressing his pamphlet to the Greeks.”

Demosdenes (382-322 B.C.) was born to a wealthy sword-maker of the Athenian countryside and became a statesman and orator of ancient Athens. “His orations constitute a significant expression of contemporary Athenian intellectual prowess and provide an insight into the politics and culture of ancient Greece during the 4th century B.C. Demosthenes learned rhetoric by studying the speeches of previous great orators. He delivered his first judicial speeches at the age of 20, in which he argued effectively to gain from his guardians what was left of his inheritance. For a time, he made his living as a professional speech-writer (logographer) and a lawyer, writing speeches for use in private legal suits.”

“He seems to have been able to manage any kind of case, adapting his skills to almost any client, including wealthy and powerful men. It is not unlikely that he became a teacher of rhetoric and that he brought pupils into court with him. However, though he probably continued writing speeches throughout his career, he stopped working as an advocate once he entered the political arena.” In his time, different political goals developed around personalities. Instead of electioneering, Athenian politicians used litigation and defamation to remove rivals from government processes. “Often they indicated each other for breaches of the statute laws, but accusations of bribery and corruption were ubiquitous in all cases, being part of the political dialogue. The orators often resorted to character assassination tactics, both in the courts and in the Assembly.”

His orations were not successful, but established himself as an important political personality and broke with Eubulus’ faction; which became his political foundation in the future. In 352, Athenian troops successfully opposed to Philip, but in 348 after Macedonian victories, Athens sued for peace with Macedon. Demosthenes sought to preserve Athenian freedom and to establish an alliance against Macedon. After the death of Alexander, he again urged the Athenians to seek independence from Macedon, but Antipater sent his men to track Demosthenes down: he took his own life, in order to avoid being arrested.”
Hellenistic Science and Literature: (a) Astrology began as a study as soon as human beings made conscious attempts to measure, record, and predict seasonal changes by reference to astronomical cycles. Astronomical observation begins with the early civilization of Mesopotamia, where the patterns formed by stars in the galaxy are recognized and named in the third millennium B.C. Similarly, their sky watchers identify the five wonder stars. The Babylonians in the eighteenth century are the first great astronomers, introducing the minutes and seconds of modern astronomical measurement derived from their number system. “They realize that the zodiac – the sequence of constellations along which the sun and the planets appear to move in their passage through the heavens – can serve as a yardstick of celestial time if divided into recognizable and equal segments. The select twelve segments. They select twelve constellations to represent these segments, many of them identified by the names of animals. The Greeks later provide the term for the zodiac when they describe it as the animal circle. The zodiac links constellations with times of the year; and the constellations have their own links with the gods. Scientific observation of star positions merges with speculation about divine influence.”

From the sixth century B.C., the Greeks make significant advances in the field of astronomy and astrology based on a system of time measurement according to the constellations: “each decan was associated with ten degrees of the zodiac.” By the time of Aristotle, science was separated from philosophy, and in the Hellenistic age, scientific investigation and empirical research tended to be established in the cities of Alexandria and Pergamum, while Athens remained the center of philosophy. The Ptolemaic was the most efficiently organized government in the Hellenistic world. The population of Alexandria about 200 B.C. was from four to five hundred thousand of Macedonians, Egyptians, Jews, Persians, Anatolians, Syrians, Arabs, and Negroes; at the top were the Macedonians and the Greeks. Ptolemy financed the museum and library in Alexandria, and established the new university near the royal palaces consisting of a general mess hall, a lecture hall, a court, a cloister, a garden, an astronomical observatory, and the great library. The museum hosted astronomers, writers, mathematicians, and physicians; receiving salary from the royal treasury for their researches and experiments. It was the largest contribution to history of civilization for the Ptolemies to establish the library and museum in Alexandria.

Aristarchus of Samos (310-230 B.C.) presented a heliocentric view of the universe: the earth rotates around the sun which remains stationary with fixed stars. He was the first to attempt to determine dimensions and distances from the earth to the sun and moon in his in his treatise The Dimensions and Distances of Sun and Moon: “the sun is at a much greater distance from the earth and the moon, and the sun must, therefore, be many times larger than the moon and the earth” which is the closest to modern astronomers in spirit and approach to the solution of astronomical problems.” Eratosthenes (275-194 B.C.) was born in Cyrene and spent most of his life working in Alexandria becoming head of the Library of Alexandria. He produced works on geography, mathematics, philosophy, chronology, literary criticism, and grammar as well as writing poetry. “His most lasting work was in geography, the most notable his measurement of the circumference of the earth. This work was of the first attempts to put geographical studies on a proven mathematical basis.” Claudius Ptolemy (A.D. 90-168) lived in Alexandria and wrote several scientific treatises: the Almagest is mathematical; the Geography discusses geography; and Apotelesmatika is astrological. In Almagest, he had developed arithmetical techniques for calculating astronomical phenomena. Ptolemy “claimed to have derived his geometrical models from selected astronomical observations by his predecessors spanning more than 800 years, though astronomers have for centuries suspected that his models' parameters were adopted independently of observations.” The Almagest is the critical source of information on ancient astrology and with most influential scientific text of all time through the Middle Ages and early Renaissance until Copernicus.
(b) **Mathematics**: Pythagoras (580?-500? B.C.) was both a philosopher and a mathematician as discussed in Chapter III. The Pythagoreans studied odd and even, and prime and square numbers; which concept became the ultimate principle of all proportion, order, and harmony in the universe; which established a scientific foundation for mathematics. In geometry, the Pythagoreans discovered the hypotenuse or Pythagorean Theorem, which states that the square of the hypotenuse of a right triangle is equal to the sum of the squares of the other two sides. Euclid (330-275 B.C.) was probably educated by Plato and lived in Alexandria during the reign of Ptolemy I, where he taught geometry and founded the school of mathematics. His major work is *The Elements* which became the standard textbook for geometry used up to present times. His other works include the *Data* as a collection of geometrical theorems; the *Phenomena* as a description of the heavens; the *Optics* as magnitudes of distances; the *Division of the Scale* as a mathematical discussion of music; and several others. Archimedes (287-12 B.C.) was born in the city of Syracuse, Sicily; educated in Alexandria, Egypt; and devoted his entire life to research and experiment. He worked on mathematics and physics, calculated the value of Phi, invented screw to pump water out of mines, and discovered specific gravity. “Once, when Marcellus, the Roman general, was assaulting Syracuse by land and sea, first by his engines he drew up some merchant-vessels, lifted them up against the wall of Syracuse, and sent them in a heap against the bottom, crews and all. When Marcellus had withdrawn his ships a little distance, the old man gave all the Syracusans power to lift stones large enough to load a wagon and, hurling them one after the other, to sink the ships.” Apollonius (262-190 B.C.) was born in Perga of Turkey, educated in Alexandria, and wrote on arithmetical calculation and on statistics. His *Treatise on Conic Sections* introduces the terms parabola, ellipse, and hyperbola; providing a foundation for mathematicians coming later. He applied geometric models to the movement of planets in astronomy.

(c) **Medicine**: Although ancient Egyptian and Babylonian records show evidences of medical practices, early Greek medicine, found in the *Hippocratic Corpus*, marks the beginning of western medicine. Hippocrates (460?-377 B.C.) was born in the island of Cos, Asia Minor, where he learned, practiced, and taught medicine. He moved to Thessaly about 430 B.C., where he lived the rest of his life. He firstly separated medicine from philosophy “by stressing natural explanations and natural cures for disease.” As the most celebrated physician of the Periclean age, his medicine considers three steps: “close observation of symptoms, and openness to ideas from all sides, and willingness to explain the causes of disease.” He introduces the humoral theory between individual and environment. His four humors covers the four elements of earth, air, fire, and water; the four seasons; the four qualities of hot, cold, wet, and dry; the four ages of man; and the four mental states. He views that health exists when these humors were present in the body in proper proportion to each other. “But there was a natural tendency in the organism to heal itself….Finding its humors in a state of dyscrasia, it proceeded to bring them back to the proper proportion. The process of cure was known as *pepsis*, usually translated *coction*; this was a kind of cooking or ripening of crude matter; it was carried on by means of the ‘innate heat’ and resulted in a restoration of eucrasia, and an elimination of the excess matter, or waste products.” Herophilus (335?-280? B.C.) was born in Chasledon of Turkey and educated in Alexandria. He was the father of scientific anatomy because he was the first who used di-section of human body. He identified that the brain is the center of the nervous system, and arteries contain blood. Erasistratus (304?-250? B.C.) was born in Iulis in Greece, educated in Alexandria, and became the court physician of Seleucid I of Syria. Later he founded the school of anatomy in Alexandria. He discovered the process of digestion, clarified the relations between sensory and motor nerves, and understood the circulation of blood through body. He believed that the nerves carry nervous spirit from the brain, and that the arteries carry animal spirit created by the heart.
(d) Literature: A large quantity of literature were produced in the Hellenistic age, particularly in Egypt under the Ptolemaic rulers. Theocritus (315-250 B.C.) was born in Syracuse, Sicily; and lived on the island of Kos and on the court of Ptolemy II in Alexandria as a member of the Pleiad of the Alexandrian poets. His thirty idylls (little poems) and twenty-four short epigrams have been preserved: his idylls deal with erotic and pastoral themes expressing his love of nature and of pastoral life; but others are related to city life or mythological themes. He followed a view that “Homer could never be superseded and urged writers to stick to well-composed, short poems instead.” Apollonius of Rhodes (295?-215 B.C.), born in Alexandria, served as director of the Library of Alexandria. When he lived in Rhodes for part of his life, he adopted “Rhodes” as his surname. He wrote Argonautica which is only extant Greek epic between Homer and the later Roman Empire. “It tells of Jason’s successful expedition with the Argonauts to recover the Golden Fleece from Colchis on the Black Sea. Medea, a young Colchian princess, falls in love with Jason and helps him survive the ordeals imposed by her father.” Menander (342-291 B.C.) was born and educated in Athens, and wrote more than one hundred comedies. Fragments of his seven original plays were found in Egypt including The Arbitration, The Rape of the Ringlets, and Samia. A hero fall in love with a prostitute who turns out to be the lost daughter of a rich family, and the hero marries her and they live happily at the end. Polybius (203-120 B.C.), born in Megalopolis in Greece, was sent to Rome as hostage with other Achaeans after the Roman conquest of Macedonia, and became a tutor for sons of a Roman general, one of whom became Scipio Africanus the Younger. As their close friend, Polybius was present at the destruction of Carthage in 146 B.C. In later years, he devoted his life to writing of The Histories (40 volumes) describing the growth of Rome from a city state to a world empire from 221 to 146 B.C., which shows how and why the civilized states fell under the Roman rule.

(e) Technology: Ancient Greek technology developed during the fifth century B.C., continuing up to and including the Roman period, and beyond. “Inventions that are credited to the ancient Greeks include the gear, screw, rotary mills, screw press, bronze casting techniques, water clock, water organ, torsion catapult, the use of steam to operate some experimental machines and toys, and a chart to find prime numbers. Many of these inventions occurred late in the Greek period, often inspired by the need to improve weapons and tactics in war. However, peaceful uses are shown by their early development of the watermill, a device which pointed to further exploitation on a large scale under the Romans. They developed surveying and mathematics to an advanced state, and many of their technical advances were published by philosophers, like Archimedes and Heron.” Water technology would include “groundwater exploitation, construction of aqueducts for water supply, storm water and wastewater sewerage systems, flood protection and drainage, construction and use of fountains, baths and other sanitary and purgatory facilities, and even recreational uses of water.” “The Greeks developed extensive silver mines at Laurium, the profits from which helped support the growth of Athens as a city-state. It involved mining the ore in underground galleries, washing it and smelting it to produce the metal. Elaborate washing tables still exist at the site, which used rain water held in cisterns and collected during the winter months. Mining also helped to create currency by the conversion of the metal into coinage.” The Greeks failed in developing their technology because of the low status of people providing labor. “Manual labor was despised, and anyone applying science to it was likely to lose status in society, removing much of incentive to seek technological innovation. A sophisticated tunnel built for an aqueduct in the sixth century B.C. by the engineer Eupalinos and Samos has led to some reevaluation of the skills of the Greeks. They made cranes as well so they could lift heavy objects.” Ancient Suez Canal opened by Greek engineers under Ptolemy II, and there were the lighthouse of Alexandria, alarm clock, and odometer indicating the distance traveled by vehicle in the third century.
Chapter IV. Economic Thought and Other Intellectual Developments

5. Other Intellectual Developments: Roman Civilization

The union of Greek and Roman cultures was completed as a Greco-Roman civilization. Upper-class Romans spoke Greek fluently, and sent their children to Athens for higher education. In writing of history, Sallust (86-35 B.C.) was well known historian who was on the Caesar’s side. He wrote the War with Jugurtha discussing the Roman war with African king, and the War with Catiline dealing with the political war between Cicero and Catiline. In charge of Catiline for his conspiracy against Rome, it had been criticized that Cicero missed a due process required by law to remove his political enemy. Caesar (100-44 B.C.) wrote The Gallic War regarding his conquest of Gauls during 58-51 B.C. which is a highly useful source of history. It discusses in part about his second expedition to Britain: “The commander-in-chief, with five legions and a contingent of horse equal to that left on the Continent… The whole fleet reached the shore of Britain.” Livy (59 B.C.–A.D. 17) was a historian writing The History of Rome from its Foundation to 9 B.C., but only 35 of 142 books have survived although brief summaries of lost books are available from other authors. Celebrating the greatness of Rome, his books remained the standard Roman history for a long time despite lack of factual accuracy. Tacitus (56-120) wrote the Annals and History, covering the history of Rome from the death of Augustus to A.D. 96, but the greater part of the latter was lost. His work Germany is important as a source of early German history. About money, it is described that “Of lending money on interest and increasing it by compound interest they know nothing.” Plutarch (46-127) learned mathematics and philosophy in Athens, traveled to Alexandria and Italy, and sojourned in Rome. He wrote the Parallel Lives, the biographies of numerous heroes of the Greeks and Romans by portraying their character based on ethics and virtue. Cato the Elder (234-149 B.C.) and a century later Varro (116-27 B.C.) wrote the same topic of treatise On Agriculture which was a technical manual for farming.

Meanwhile, Plautus (254-184 B.C.) and Terence (185-59 B.C.) wrote their plays by using plots from the Greek new comedy. The Greek format was incorporated with Latin reality by appealing to the Roman masses of “drunkenness, gluttony, and womanizing.” Catullus (87-54 B.C.) wrote a variety of Latin lyric poems including numerous love verses to his lover Clodia, and his simple passion influenced onto later Latin poets. In the Augustan age, Virgil (70-19 B.C.), who welcomed the rule of Augustus, wrote epic poems Eclogues and Georgics by using Greek models. Following Homer’s Iliad, he wrote The Aeneid, a mythological epic in twelve books describing hero Aeneas: it starts with “The Trojans, after a seven years’ voyage, set sail for Italy, but are overtaken by a dreadful storm, which Aeolus raises at Juno’s request. The tempest sinks one, and scatters the rest. Neptune drives of the winds, and calms the sea. Aeneas, with his own ship, and six more, arrives safe at the African port.” His friend Horace (65-8 B.C.) wrote a series of poem Satires which revealed human weakness such as sexual immorality, greediness, and job dissatisfaction. His final work Epistles was a letter of verse portraying his good friends, society, and life of the countryside. Ovid (43 B.C.–A.D. 18) wrote a series of love poems such as the Amores, Cures for Love, and On Facial Treatment for Ladies. His Art of Love implicated the sexual scandal of emperor’s daughter Julia. The Metamorphoses was a series of mythological tales pursuing transformation of chaos into order. In the silver age, Petronius (27–66 A.D.) wrote the Satyricon, a collection of harmonious satires probably in sixteen books, of which only last two incompletely remain. It is a story of a young man with his two male companions who engaged in homosexual relations. Juvenal (55-128) wrote five books of Satires attacking “the affections of Roman women, the abuse of slaves, the excesses of emperors, the eastern and Greek immigrants, his own poverty, and the inequities of Roman society,” but no basic critique of his society was provided for any kind of reforms. Above books are discussed further one by one in this section.
Chapter IV. Economic Thought and Other Intellectual Developments

Photo IV-5-1. Model of Crane Lifting Column: Roman Civilization,
Accessed 8 March 2018,
https://previews.agefotostock.com/previewimage/medibigoff/e823a1d4a0f7756f74542b02502a3c/dae-99016936.jpg

Photo IV-5-2. The Gallo-Roman Harvesting Machine
Accessed 8 March 2018,
https://upload.wikimedia.org/wikipedia/commons/b/b0/M%C3%A4hmaschine.jpg
Chapter IV. Economic Thought and Other Intellectual Developments

Roman Historiography: Before the second Punic War, there was no historiography in Rome, but after, it was needed to commemorate this important occasion; so Q. Fabius Pictor took up the task and wrote a history of Rome in Greek, not in Latin. It was followed by Timaeus writing a history of Rome with a negative view of Rome. Cato the Elder was the first historian writing history in Latin as appeared in his Origines. “The Romans enjoyed serious endeavors and so the writing of historiography became very popular for upper class citizens who wanted to spend their time on worthwhile, virtuous, “Roman” activities. As leisure time was looked down upon by the Romans, writing history became an acceptable way to spend retirement. Almost as soon as historiography started being used by the Romans, it split into two traditions: the annalistic tradition and the monographic tradition.” The former wrote histories year by year, while the latter wrote histories not from the beginning but by important subcategories. “The historiography we most readily identify with the Romans, coming from sources such as Caesar, Sallust, Livy, Tacitus, and other minor authors, owes much to its early roots and Greek predecessors. However, contrary to the Greek form, the Roman form included various attitudes and concerns that were considered strictly Roman. As the recording of Roman history began to evolve and take shape, many characteristics came to define what we know today as Roman historiography, most notably the strong defense of and allegiance to the Roman state and its wide variety of moral ideals, the factional nature of some histories, the splitting of historiography into two distinct categories, the Annals and the Monograph, and the rewriting of history to suit the author’s needs.”

Major extant historians of the time include Julius Caesar writing The Gallic Wars; Livy writing 142 books such as The History of Early Rome and The Second Punic War; Sallust The Conspiracy of Catiline and The Jugurthine War; Tacitus the Histories and Annals; Suetonius The Twelve Caesars; Plutarch with The Plutarch’s Lives; Procopius the History of Wars and the Secrete History.

(a) Julius Caesar (100-44 B.C.): “The Gallic Wars were a series of military campaigns waged by the Roman proconsul Julius Caesar against several Gallic tribes. Rome’s war against the Gallic tribes lasted from 58 to 50 B.C. and culminated in the decisive Battle of Alesia in 52 B.C., in which a complete Roman victory resulted in the expansion of the Roman Republic over the whole of Gaul. The wars paved the way for Julius Caesar to become the sole ruler of the Roman Republic. Although Caesar portrayed this invasion as being a preemptive and defensive action, most historians agree that the wars were fought primarily to boost Caesar’s political career and to pay off his massive debts. Still, Gaul was of significant military importance to the Romans, as they had been attacked several times by native tribes both indigenous to Gaul and farther to the north. Conquering Gaul allowed Rome to secure the natural border of the river Rhine.”

Beginning with the Helvetian campaign in Gaul in Book I, “Book II covers the events of a year later, 57 B.C.: now Caesar battles the Belgae in northern Gaul, and Publius Crassus battles the maritime states on the coast of Gaul. These two operations significantly extend the area of Rome’s influence, and the Roman Senate and the populace acknowledge Caesar’s achievement by celebrating a thanksgiving of fifteen days. Book III finds Caesar, during 56 B.C., sending Servius Galba to open a toll-free route through the Alps. But, after this is done, Servius is attacked by the Seduni and Veragri tribes, and after defending himself, finally moves his legions back to safer territory for the rest of the winter. Meanwhile, the Veneti, one of the coastal tribe subdued by Crassus the previous year, begin a rebellion that spreads through the area, so Caesar decides to move against them; his navy wins a major sea battle that ends the rebellion. Other parts of his army, under the direction of Titurius Sabinus and Publius Crassus, defeat the Venelli and their allies under Viridovix, and the tribes of Aquitania. Caesar then subdues the Morini and the Menapii tribes. Book IV concerns the Usipetes and the Tenceteri, two German tribes driven from their homes by the Suebi in 55 B.C. The tribes cross the Rhine in search of new territory, but are defeated finally when Caesar drives them...
out and moves his own army into Germany for the first time. Then, because some of the Gallic tribes have received military aid from Britain, Caesar decides to make a brief trip across the channel, something no Roman force has done before. He twice defeats the Britons, then returns to Gaul to quell the Morini rebellion and accepts the surrender of the Menapii. Afterward, the Senate decrees a thanksgiving of twenty days… Book V, chronicling the events of 54 B.C., tells of Caesar’s return to Britain with a fleet estimated at 600 ships. He fights his way to the Thames, then moves back to the coast and defeats the British force, commanded by Cassivelaunus. After his return to Gaul, there is a revolt of the Belgae precipitated by Ambiorix and Catuvolcus. Ambiorix successfully tricks and destroys the Roman legion commanded by Sabinus and Cotta. The Nervii attack another Roman camp, but the commander, Cicero, holds them off until Caesar arrives with reinforcements. Labienus defeats a large Gallic force led against him by Indutiomarus, leader of the Treveri. Book VI, the shortest of the books in the Gallic Wars, relates Caesar’s adventures during 53 B.C. and also concerns itself with giving us an idea of the different cultures of the Germans and the Gauls. As for the battle narrative itself, it concerns an early revolt of several tribes, quelled by Caesar and Labienus. Also, Caesar again crosses the Rhine, but the Suebi retreat into their forests and he decides against pursuing them and returns to Gaul, where he defeats the rebel Eburones forces under Ambiorix. Finally, Book VII… in 52 B.C., Caesar manages to withstand the revolt of fourteen of the Gallic tribes. Many, of course, do not freely join the rebellion, but are drawn in by political intrigues of various kinds; even the usually faithful Aedui turn against Rome. Caesar’s forces take a number of enemy strongholds… but they are almost defeated at Gergovia. The Gallic revolt spreads and reaches its greatest dimension under the leadership of Vercingetorix, an Arvernian warrior of great power whose father had been chieftain of Gaul. In a major battle at Alesia, the Roman forces defeat Vercingetorix’ army and the revolt ends. Rome once more proclaims a thanksgiving of twenty days to honor Caesar.”

(b) Livy (59 B.C.- A.D. 17): Livy was born as Titus Livius in Patavium, now Padua in Italy. He probably went to Rome in the 30s B.C., where he was educated in philosophy and rhetoric. “It seems that Livy had the financial resources and means to live an independent life. He devoted a large part of his life to his writings, which he was able to do because of his financial freedom.” He was familiar with the emperor Augustus and the imperial family. “Considering that Augustus came to be known as the greatest Roman Emperor in the eyes of the Romans, being a historian under Augustus was very beneficial to Livy’s career even after his death. It is said that Livy was the one who encouraged the future emperor Claudius, who was born in 10 B.C., to explore the writing of history during his childhood. Livy himself was married and had at least one daughter and one son.” Among 142 Books of his History of Rome from its Foundation, Book 1 is Rome under the Kings; Book 2 The Beginnings of the Republic; Book 3 The Patrician at Bay; Book 4 War and Politics; and Book 5 The Capture of Rome; and Book 45. Hegemony of Rome in the East. For Book 46-142, no copies of original source text exist unfortunately. In Book 1, Livy writes that “The study of history is the best medicine for a sick mind; for in history you have a record of the infinite variety of human experience plainly set out for all to see; and in the record you can find for yourself and your country both examples and warnings: fine things to take as models, base things, rotten through and through, to avoid. I hope my passion for Rome’s past has not impaired by judgment; for I do honestly believe that no country has ever been greater or purer than ours or richer in good citizens and noble deeds; none has been free for so many generations from the vices of avarice and luxury; nowhere have thrift and plain living been for so long held in such esteem. Indeed, poverty, with us, went hand in hand with contentment. Of late years, wealth has made us greedy, and self-indulgence has brought us, through every form of sensual excess, to be, if I may so put it, in love with death both individual and collective.”
Writing on the War with Hannibal (Books 21-30), Book 21 writes the first part of the war: “the beginning of the Second Punic War, and how Hannibal, the general of the Phoenicians, crossed the river Ebro in violation of the treaty. Besieging Saguntum, a city belonging to allies of the Roman People, he captured it in the eighth month. These injuries led to the dispatch of ambassadors to the Carthaginians, to complain. On their refusing satisfaction, war was declared against Carthage. Hannibal, after surmounting the passes of the Pyrenees, traversed Gaul…and arrived at the Alps…in the course of which he also defeated in several battles the Gallic mountainers, when they blocked his way, he descended into Italy and routed the Romans in a cavalry battle near the river Ticinus. In this battle Publius Cornelius Scipio was wounded and was saved by his son, who later received the name of Africanus. Again a Roman army was routed near the river Trebia. After this Hannibal crossed the Apennines, with great distress to his soldiers, because of violent storms. In Spain Gnaeus Cornelius Scipio fought successfully against the Phoenicians and captured the enemy’s general, Mago.” Book 30 writes the last part of the war: “Scipio in Africa defeated the Carthaginians and the same Syphax, King of Numidia, and Hasdrubal in a number of battles with the aid of Masinissa…The consequence of Scipio’s many victories was that the Carthaginians, driven to despair, recalled Hannibal to the defense of the state. And he, withdrawing from Italy in the sixteenth year, crossed over to Africa and endeavored by a conference to make peace with Scipio; and as there was no agreement on the peace terms, he was vanquished in battle. The Carthaginians sued for peace and it was granted them…Returning to the city Scipio celebrated a most splendid and distinguished triumph…Whether Scipio Africanus received that cognomen first from his popularity with the soldiers or from fickle favor of the people is not known. Certainly he was the first commander-in-chief to be distinguished by the name of a nation he had conquered. Mago was wounded in a war in which he had come in conflict with Romans in the land of the Insubrians, and while returning to Africa…he died of his wound.”

(c) Sallust (86-35 B.C.) was born to a provincial plebeian family at Amiternum in Central Italy, and was a popularis who opposed to the old Roman aristocracy throughout his career, and later a partisan of Julius Caesar. Possibly receiving good education in Rome, Sallust entered public life and my have won election as quaestor in 55 B.C. though not clear. “From the beginning of his public career, Sallust operated as a decided partisan of Julius Caesar, to whom he owed such political advancement as he attained. In 50 B.C., the censor Appius Claudius Pulcher removed him from the Senate on the grounds of gross immorality (probably really because of his opposition to Milo and Cicero). In the following year, perhaps through Caesar’s influence, he was reinstated. During the Civil War of 49-45 B.C. Sallust acted as Caesar’s partisan, but his role was not significant. In 48 B.C. he was probably made quaestor by Caesar to re-enter the Senate. In the late summer 47 B.C., a group of soldiers rebelled near Rome, demanding their discharge and payment for service. Sallust was sent with other senators to persuade them, but two senators were killed and Sallust escaped death. In 46 B.C., he served as a praetor and accompanied Caesar in his African campaign, which ended in the decisive defeat of the Pompeian war party. As a reward for his services, though not participated in military operations, Sallust was appointed to governor of the province of Africa Nova. Sallust then retired from public life and devoted himself to historical literature. “Sallust was primarily influenced by the Greek historian Thucydides and amassed great (and ill-gotten) wealth from his governorship of Africa.” The Conspiracy of Catiline is one of his three surviving works. It is about the conspiracy in 63 B.C. of Sergius Catiline, in which Sallust describes him as the deliberate foe of law, order and morality. It is not surprising to consider that that Catiline had supported the party of Sulla who was opposed by him. The Jugurthine War is about Rome’s war against the Numidians from 111 to 105 B.C. It introduced Marius and Sulla to the Roman political scene and the beginning of their rivalry.
(d) Tacitus (A.D. 56-117) was a senator and a historian of the Roman Empire. He was born to an equestrian family from the province of northern Italy, though not clear. As a young man, Tacitus studied rhetoric in Rome to prepare for law and politics. In 77 or 78 he married a daughter of the famous general Agricola. He started his career under Vespasian, but entered political life as quaestor under Titus in 81 or 82, becoming praetor in 88 and a quindecimvir, a member of the priestly college. He gained fame as a lawyer and an orator. He served in the provinces from around 89 to 93 either in command of a legion or in a civilian post. He survived Domitian reign of terror (81-96), which gave him the hatred of tyranny which is evident in his works. “From his seat in the Senate he became suffect consul in 97 during the reign of Nerva, being the first of his family to do so. During his tenure he reached the height of his fame as an orator when he delivered the funeral oration for the famous veteran soldier Lucius Verginius Rufus. In the next year he wrote and published the Agricola and Germania, announcing his beginnings of the literary endeavors that would occupy him until his death. Absenting from public life, he returned during Trajan's reign. In 100, he prosecuted Marius Priscus (proconsul of Africa) for corruption. Priscus was found guilty and sent into exile.” While he wrote the Histories and the Annals, he held the highest civilian governorship, that of the Roman province of Asia in Western Anatolia."^87

Tacitus wrote The Histories during 100-110, which covers the year of the Four Emperors (Galba, Otho, Vitellius and Vespasian),^88 following the downfall of Nero, the rise of Vespasian, and the rule of the Flavian Dynasty (69-96) up to the death of Domitian. Tacitus viewed that “because imperial power was based on the support of the legions, an emperor could not be chosen not only at Rome, but anywhere in the empire where sufficient legions were massed.” Galba's pure respect for formality and lack of political realism rendered him unable to control events. Unlike Galba, “Nerva adopted Trajan, who was able to keep the legions unified, to keep the army out of imperial politics, to stop disorder among the legions, and thus to prevent rival claimants to the throne. Tacitus was sure that only the monarchical emperor could maintain peace, the fidelity of the armies, and the cohesion of the empire.” Discussing Augustus's rise to power, “Tacitus says that after the battle of Actium the unification of the power in the hands of a prince was necessary to keep the peace. The prince ought not to be a tyrant, like Domitian, nor a fool, like Galba. He should be able to keep the imperium safe, while saving the prestige and the dignity of the Senate (Seneca addresses the same point). Tacitus, without any illusions, considered the rule of the adoptive Emperors the only possible solution to the problems of Empire."^89

The Annals is Tacitus' final work, dealing with the five decades from reign of Tiberius in A.D. 14 to the death of Nero in A.D. 68. It is an important source to modern understanding of the history of the Roman Empire in first century, and it represents the “pinnacle of Roman historical writing”. Modern historians believe that Tacitus could access to the Roman senate’s records as a Roman senator, which providing a solid basis of his work. “Augustus gave and warranted peace to the state after years of civil war, but on the other hand he shows us the dark side of life under the Caesars. The history of the Empire is also the history of the sunset of the political freedom of the senatorial aristocracy, which he saw as morally decadent, corrupt, and servile towards the emperor. During Nero's reign there had been a widespread diffusion of literary works in favor of this suicidal exitus illustrium virorum (end of the illustrious men). Again, as in his Agricola, Tacitus is opposed to those who chose useless martyrdom through vain suicides. In the Annals, Tacitus further improved the style of portraiture that he had used so well in the Historiae. Perhaps the best portrait is that of Tiberius, portrayed in an indirect way, painted progressively during the course of a narrative, with observations and commentary along the way filling in details. Tacitus portrays both Tiberius and Nero as tyrants who caused fear in their subjects. But while he views Tiberius as someone who had once been a great man, Tacitus considers Nero as simply despicable."^90
Chapter IV. Economic Thought and Other Intellectual Developments

(e) **Suetonius** (A.D. 69-122) was probably born in Italy, came from a family of moderate social position that his father was a tribune of equestrian rank, and that he was educated when school of rhetoric flourished in Rome. He was a close friend of senator and letter-writer Pliny the Younger. He may serve on Pliny’s staff when Pliny was Proconsul of Bithynia Pontus (northern Asia Minor) between 110 and 112. Under Trajan he served as secretary of studies and director of imperial archives. Under Hadrian, he became the Emperor’s secretary, but was dismissed for an affair with the Empress. *The Twelve Caesars* is his only extant work except for some fragments, written in Hadrian’s time, it is a collective biography of the Roman Empire’s first leaders from Julius Caesar to Domitian. It tells the tale of each Caesar’s life according to a set formula. “He used the imperial archives to research eyewitness accounts, information, and other evidence to produce the book; however, critics say the book was founded on gossip and citations of historians who had lived in the time of the early emperors, rather than on primary sources of that time. Though he was never a senator. Suetonius took the side of the Senate in most conflicts with the princeps, as well as the senators' views of the emperor. This resulted in biases, both conscious and unconscious. Suetonius lost access to the official archives shortly after beginning his work. He was forced to rely on second-hand accounts when it came to Claudius and does not quote the emperor. Despite this, it provides valuable information on the heritage, personal habits, physical appearance, lives and political careers of the first Roman Emperors. It mentions details that other sources do not. For example, Suetonius is the main source on the life of Caligula, his uncle Claudius, and the heritage of Vespasian. Suetonius made a reference in this work to Chrestus, which may refer to Christ. During the book on Nero, Suetonius mentions a sect known as the Christians (see Historicity of Jesus). Like many of his contemporaries, Suetonius took omens seriously and carefully includes reports of omens portending Imperial births, accessions and deaths.”91

(f) **Plutarch** (A.D. 46-120) was a Greek historian, biographer, and essayist. He was born to a prominent wealthy family in Chaeronea near Delphi in Boeotia, and studied mathematics and philosophy at the Academy from 66 to 67, and had a number of influential friends like senators. He travelled widely in the Mediterranean world, including major Greek cities, Sardis, Alexandria, and two trips to Rome. At some point, Plutarch took up Roman citizenship. “He lived most of his life at Chaeronea, and was initiated into the mysteries of the Greek god Apollo. However, his duties as the senior of the two priests of Apollo at the Oracle of Delphi apparently occupied little of his time. He led an active social and civic life while producing an extensive body of writing, much of which is still extant. For many years Plutarch served as one of the two priests at the temple of Apollo at Delphi, the site of the famous Delphic Oracle, twenty miles from his home. By his writings and lectures Plutarch became a celebrity in the Roman Empire, yet he continued to reside where he was born, and actively participated in local affairs, even serving as mayor.” He wrote his first biographical works the *Lives of the Roman Emperors* covering from Augustus to Vitellius. “Plutarch's best-known work is the *Parallel Lives*, a series of biographies of famous Greeks and Romans, arranged in pairs to illuminate their common moral virtues and vices. The surviving *Lives* contain 23 pairs, each with one Greek *Life* and one Roman *Life*, as well as four unpaired single *Lives*. As explained in the opening paragraph of his *Life of Alexander*, Plutarch was not concerned with history so much as the influence of character, good or bad, on the lives and destinies of men. Whereas sometimes he barely touched on epoch-making events, he devoted much space to charming anecdote and incidental triviality, reasoning that this often said far more for his subjects than even their most famous accomplishments. He sought to provide rounded portraits, likening his craft to that of a painter; indeed, he went to tremendous lengths (often leading to tenuous comparisons) to draw parallels between physical appearance and moral character. In many ways, he must be counted amongst the earliest moral philosophers.”92
Chapter IV. Economic Thought and Other Intellectual Developments

(g) Procopius (500-62), as shortly described previously, was born in Caesarea, the capital of Palestine Secunda which included the ancient land of Samaria. Although unclear, he probably belonged to the provincial senatorial aristocracy which was made up of the larger landholders whose interest clashed frequently with those of the central administration. It is most likely that he studies at the university and law school of the capital, Constantinople, where he practice law. In 527, he became secretary and legal adviser to Belisarius, Justinian's young general, who newly promoted to the command of the imperial troops stationed in the province of Mesopotamia on the eastern frontier of the Empire. He received this position because he was familiar with Aramaic, the language of the Semitic peoples of the Near East. Procopius accompanied on his campaigns in the first Persian war, against the Vandals in Africa, and against the Ostrogoths in Italy, and returned with him to Constantinople. In 542 he wrote in considerable detail about the plague that struck the city in that year. In that year, Belisarius came under suspicion of conspiring against the emperor. “There was no good basis for this charge, but he was forced to disband his personal military following and part of his property was confiscated. Many of his friends were forbidden to have any contacts with him, and Procopius was most likely one of these.” When Belisarius was restored to favor, Procopius join him on his second expedition against the Goths in Italy. In 562 he may have held the post of prefect of Constantinople in the last year of his life. The writings of Procopius are the primary source of information for the rule of the Roman Emperor Justinian I. His major work is the History of the Wars consists of eight books.93 Book I and II describe the Persian War (527-32) of the Byzantine emperors, Justin I and Justinian I; Book III and IV the Vandalic War in Africa (532-46); Book V and VI the Gothic War against the Ostrogoths (536-52) in Sicily and Italy; and the last book covers other events up to 554. Though main concerns of his works were military affairs, the books contain valuable information on other subjects.

Procopius describes the Secret History as a supplement and corrective to the first seven books of his Wars: it is highly critical and scandalous commentary on the lives of Justinian I, his wife Theodora, and the Byzantine court. “Here he claims to give the inside story of court intrigues, the real objectives of imperial policy, and the true character of those who guided the fortunes of the state. What he actually does, however, is to make a scathing, malicious, vituperative, and at times unspeakably vulgar attack upon the Emperor Justinian, his consort Theodora, her friend Antonina, the wife of Belisarius, and even Belisarius himself whom, however, he assails for weakness of character rather than evil intention or actual misdeeds.” Knowing that it was unable to engage in open criticism of the government under an autocratic regime such as the Late Roman Empire, Procopius wrote another, secret history, with strict instructions that it was not to be published until his death. The wars of Justinian attempted to restore the Roman Empire to its fourth-century dimensions by recovering Italy and the lost Western provinces from their barbarian conquerors. However, Procopius understood that the resources available to the Byzantine Empire were very much limited: the Roman population really suffered from the wars, while the imperial treasury was exhausted. “All the charges brought against Justinian for his policies and alleged injustices are summed up in the accusation that he is the Prince of the Devils whose goal is the destruction of the human race, a task in which he was aided and at times directed by his fellow demon, Theodora.”94 Moreover, Procopius criticized that both the administrative corruption and the collection of the burdensome taxes resulted in flagrant abuses and much individual hardship. He warned that future tyrants may see that those who make those errors cannot avoid retribution in the end. His On Buildings of Justinian, written during 553-55, describes the building program launched by Justinian for the Byzantine imperial capital. Unlike in Secret History, “he is presented as an idealized Christian emperor who built churches for the glory of God and defenses for the safety of his subjects and who showed particular concern for the water supply.”95
Latin Literature: Latin literature was in many ways a continuation of Greek literature, using many of the same forms. “Latin was the language of the ancient Romans, but it was also the *lingua franca* of Europe throughout the middle ages, so Latin literature includes not only Roman authors like Cicero, Virgil, Ovid and Horace, but also includes European writers after the fall of the Empire from religious writers…to secular writers.”996 “Formal Latin literature began in 240 B.C., when a Roman audience saw a Latin version of a Greek play. The adaptor was Livius Andronicus, a Greek who had been brought to Rome as a prisoner of war in 272 B.C. Andronicus also translated Homer's Greek epic the Odyssey into an old type of Latin verse called Saturnian. The first Latin poet to write on a Roman theme was Gnaeus Naevius during the 200s B.C. He composed an epic poem about the first Punic War, in which he had fought. Naevius’s dramas were mainly reworkings of Greek originals, but he also created tragedies based on Roman myths and history.”997

(a) Early Latin Literature: (i) Comedies: Plautus (254-184 B.C.), born in Sarsina in northern Italy, worked as a stage-carpenter in his early years. He had worked as a manual laborer and studied Greek drama, particularly the New Comedy of Menander, in his leisure. He wrote around 130 plays, of which 20 have survived. Terence (190-158 B.C.), probably a native of Carthage, was a slave in the family of a Roman patrician. “On account of his witty conversation and graceful manners, he became a favorite in the fashionable society of Rome and received his freedom. His work consists of two sorts: fairly close translations of Menander, and contaminations. Of the remaining three, the *Phormio* is based on a play by the Greek Apollodorus, and the others are from Menander.” Both Plautus and Terence modeled their comedies on Greek plays known as New Comedy. “Plautus scattered songs through his plays and increased the humor with puns and wisecracks, plus comic actions by the actors. Terence's plays were more polite in tone, dealing with domestic situations.” (ii) Agricultural Management: Cato the Elder (234-149 B.C.) was a Roman statesman, known for his conservatism and opposition to Hellenization. Cato received a small hereditary property in the Sabine territory where “he passed the greater part of his childhood, hardening his body by exercise, overseeing and sharing the operations of the farm, learning the way in which business was conducted, and studying the rules of rural economy.”98

He studied law and won the cases for his neighbors in the local courts. Cato went to Rome and obtained the quaestor-ship, aedile, praetor, consul, tribune, and censor. Meanwhile he served twenty-six years in the army as a fearless soldier and an able and ruthless general. Retiring from the public office, Cato made successful investments, manned his now vast farm with slaves, lent money at usurious rages, bought slaves cheap and sold them dear, and became so rich that he could afford to write books. Cato was the first great writer of Latin prose. He published his own speeches and a manual of oratory. He put his farming experiences to use in writing a treatise *On Agriculture* in 160. “It is written in a simple and vigorous style, pithily compact; Cato wastes no words, and seldom condescends to a conjunction. He gives detailed advice on buying and selling slaves, on renting land to share-croppers, on viticulture and arboriculture, on domestic management and industries, on making cement and cooking dainties, on curing constipation and diarrhea, on healing snakebite with the dung of swine, and offering sacrifice to the gods. Asking himself what is the wisest use of agricultural land, he answers, profitable cattle raising.”99 He also wrote the lost *Origines*. (iii) Latin literature, Gaius Lucilius (160-103 B.C.) created a new kind of poetry in his 30 books of Satires. He wrote in an easy, conversational tone about books, food, friends, and current events. Juvenal (unknown birth) was a Roman poet, who was active as author of the Satires in the late first and early second century B.C. “Juvenal is credited with sixteen known poems divided between five books; all are in the Roman genre of Satire, which, at its most basic in the time of the author, comprised a wide-ranging discussion of society and social mores.”
Chapter IV. Economic Thought and Other Intellectual Developments

(b) The Golden Age - Cicero: Cicero (106-43 B.C.) wrote and published historical and philosophical works in all of classical antiquity. “Cicero is generally held to be one of the most versatile minds of ancient Rome. He introduced the Romans to the chief schools of Greek philosophy and created a Latin philosophical vocabulary, distinguishing himself as a linguist, translator, and philosopher. An impressive orator and successful lawyer, Cicero probably thought his political career his most important achievement. Today, he is appreciated primarily for his humanism and philosophical and political writings. His voluminous correspondence, much of it addressed to his friend Atticus, has been especially influential, introducing the art of refined letter writing to European culture. Cornelius Nepos, the 1st-century B.C. biographer of Atticus, remarked that Cicero's letters to Atticus contained such a wealth of detail "concerning the inclinations of leading men, the faults of the generals, and the revolutions in the government” that their reader had little need for a history of the period. During the chaotic latter half of the first century B.C., marked by civil wars and the dictatorship of Gaius Julius Caesar, Cicero championed a return to the traditional republican government. However, his career as a statesman was marked by inconsistencies and a tendency to shift his position in response to changes in the political climate. His indecision may be attributed to his sensitive and impressionable personality; he was prone to overreaction in the face of political and private change.”100 Becoming a popular political leader in the period of instability, Cicero had delivered a series of 14 Philippics condemning Mark Antony during 44-43 B.C. “The first two speeches mark the outbreak of the enmity between Mark Antony and Cicero. Possibly, Cicero wanted to revive his success of the attacks on the conspiracy of Catiline; at any rate, he compares Mark Antony with his own worst political opponents Catiline and Clodius in a clever rhetorical manner. In the 3rd and 4th speeches, of 20 December 44, he tried to establish a military alliance with Octavian; the primary objective was the annihilation of Mark Antony and the restoration of the free republic; to reach this goal, he favored military means unambiguously.”

The Golden Age - Augustus: (i) Virgil (70-19 B.C.) was born in Andes near Mantua: At twelve he was sent to school at Cremona, at fourteen to Milan, at sixteen to Rome, where he studied rhetoric and allied subjects under the same man who was to teach Octavian. “Virgil tried hard to accept the philosophy of pleasure, but his rural background had ill-equipped him. He seems to have returned north after his education. Virgil was encouraged to compose Eclogues by his patronage. The Selections had published and had been well received; some versed had been recited on the stage by an actress and had been enthusiastically applauded. “The loss of his family farm and the attempt through poetic petitions to regain his property have traditionally been seen as Virgil's motives in the composition of the Eclogues.” “The ten Eclogues develop and vary pastoral tropes and play with generic expectations. Eclogues 1 and 9 address the land confiscations and their effects on the Italian countryside. 2 and 3 are highly pastoral and erotic, discussing love, both homosexual and panerotic. Eclogue 4, addressed to Asinius Pollio, the so-called "Messianic Eclogue" uses the imagery of the golden age in connection with the birth of a child (who the child is has been highly contested). 5 and 8 describe the myth of Daphnis Pollio, the so-called "Messianic Eclogue" uses the imagery of the golden age in connection with the birth of a child (who the child is has been highly contested). 5 and 8 describe the myth of Daphnis Pollio, the so-called "Messianic Eclogue" uses the imagery of the golden age in connection with the birth of a child (who the child is has been highly contested). 5 and 8 describe the myth of Daphnis Pollio, the so-called "Messianic Eclogue" uses the imagery of the golden age in connection with the birth of a child (who the child is has been highly contested). 5 and 8 describe the myth of Daphnis Pollio, the so-called "Messianic Eclogue" uses the imagery of the golden age in connection with the birth of a child (who the child is has been highly contested). 5 and 8 describe the myth of Daphnis Pollio, the so-called "Messianic Eclogue" uses the imagery of the golden age in connection with the birth of a child (who the child is has been highly contested). 5 and 8 describe the myth of Daphnis Pollio, the so-called "Messianic Eclogue" uses the imagery of the golden age in connection with the birth of a child (who the child is has been highly contested). 5 and 8 describe the myth of Daphnis Pollio, the so-called "Messianic Eclogue" uses the imagery of the golden age in connection with the birth of a child (who the child is has been highly contested). 5 and 8 describe the myth of Daphnis Pollio, the so-called "Messianic Eclogue" uses the imagery of the golden age in connection with the birth of a child (who the child is has been highly contested). 5 and 8 describe the myth of Daphnis Pollio, the so-called "Messianic Eclogue" uses the imagery of the golden age in connection with the birth of a child (who the child is has been highly contested).
Horace (65-8 B.C.) was the leading Roman lyric poet during the time of Augustus. He was born at Venusia in Samnite south of Italy. His father was a captive slave, who gained his freedom and improve his social position. His father spent a small fortune on his son’s education, eventually accompanying him to Rome to oversee his schooling and moral development. The poem later tribute to him in a poem. “Horace left Rome, possibly after his father’s death, and continued his formal education in Athens, a great center of learning in the ancient world, where he arrived at nineteen years of age, enrolling in The Academy. Founded by Plato, The Academy was now dominated by Epicureans and Stoics, whose theories and practices made a deep impression on the young man from Venusia. Meanwhile he mixed and lounged about with the elite of Roman youth, such as Marcus, the idle son of Cicero, and the Pompeius to whom he later addressed a poem. It was in Athens too that he probably acquired deep familiarity with the ancient tradition of Greek lyric poetry, at that time largely the preserve of grammarians and academic specialists.” During the civil war, Horace was recruited for military service. At the battle, he fled without his shield. “Octavian offered an early amnesty to his opponents and Horace quickly accepted it. On returning to Italy, he was confronted with yet another loss: his father's estate in Venusia was one of many throughout Italy to be confiscated for the settlement of veterans. Horace later claimed that he was reduced to poverty and this led him to try his hand at poetry.” He wrote two books of Satires: “Horace's Hellenistic background is clear in his Satires, even though the genre was unique to Latin literature. He brought to it a style and outlook suited to the social and ethical issues confronting Rome but he changed its role from public, social engagement to private meditation.” In his Odes 1 to 3, “The fragmented nature of the Greek world had enabled his literary heroes to express themselves freely and his semi-retirement from the Treasury in Rome to his own estate in the Sabine hills perhaps empowered him to some extent also yet even when his lyrics touched on public affairs they reinforced the importance of private life.”

Albius Tibullus (54-19 B.C.), like Virgil, lost his ancestral lands when the Civil War reached his home town of Pedum near Tibur, and became a poet who wrote some books of poet. Sextus Propertius (49-15 B.C.) was born and raised in Umbria. As a boy, his father died and the family lost land as part of confiscation. Later he met Cynthia, the older woman, who would inspire him to express his poetic genius. He published a first book of love elegies in 25 B.C., the Cynthia Monobiblos that attracted the attention of Maecenas, a patron of arts. He wrote four poem books. Publius Ovidius Naso (43 B.C. - A.D. 18), known as Ovid, was born in an Apennine valley east of Rome, to an important equestrian family. He was educated in rhetoric in Rome under the famous teachers with his brother. He was not the argumentative pole of rhetoric, so travelled leisurely to Athens, the Near East, and Sicily, and return, joined the loosest circles in the capital. He began to write poems and became one of the three canonic poets alongside with Virgil and Horace. His Ars Amatoria (The Loves) is “a collection of three books of love poetry in elegiac meter, following the conventions of the elegiac genre developed by Tibullus and Propertius. The books describe the many aspects of love and focus on the poet's relationship with a mistress called Corinna. Within the various poems are several which describe events in the relationship, thus presenting the reader with some vignettes and a loose narrative.” The Ars Amatoria (The Art of Love) also is a didactic elegiac poem in three books which sets out to teach the arts of seduction and love. The Remedia Amoris (The Cure for Love) purposes a cure for the love which Ovid teaches in Ars Amatoria and is primarily addressed to men. His Metamorphoses consisting of 15 books, which contents include the divine comedy, the avenging gods, the pathos of love, and Rome and the deified ruler. Despite his literary success, Ovid was banished to Tomis on the Black Sea in A.D. 8 by the exclusive intervention of Augustus. Ovid’s Ars Amatoria concerned the crime of adultery, as the emperor’s granddaughter Julia was banished around the same time because of her adultery.\footnote{102}
Chapter IV. Economic Thought and Other Intellectual Developments

(c) **The Imperial Period:** From the death of Augustus in AD 14 until about 200, Roman authors emphasized style and tried new and startling ways of expression. (i) **Seneca (4 B.C.-65 A.D.):** During the reign of Nero from 54 to 68, the Stoic philosopher Seneca wrote a number of dialogues and letters on such moral themes as mercy and generosity. His *Natural Questions* of A.D. 65 is not a systematic work, but a collection of facts of nature from various writers, Greek and Roman, many of which are curiosities. “The first book deals with meteors, halos, rainbows, mock suns, etc.; the second of thunder and lightning; the third of water; this book contains, by the way, the description of the Roman heat exchangers, which were called dracones, or miliaria; almost at the end, a hair-raising description of the deluge. A very interesting note in this book, is that ancient rivers were not as pristine as we tend to think; for instance, the Alpheus became incredibly filthy when thousands of people congregated on its banks for the Olympic Games. The fourth book speaks of hail, snow, and ice; the fifth of winds; the sixth of earthquakes and the sources of the Nile; and the seventh of comets.”¹⁰³ Seneca’s nephew Lucan wrote the *Pharsalia* in about 60, an epic poem describing the civil war between Caesar and the forces of the Roman Senate led by Pompey. In Book I, “After a brief introduction lamenting the idea of Romans fighting Romans and an ostensibly flattering dedication to Nero, the narrative summarizes background material leading up to the present war and introduces Caesar in northern Italy. Despite an urgent plea from the Spirit of Rome to lay down his arms, Caesar crosses the Rubicon, rallies his troops and marches south to Rome, joined by Curio along the way. The book closes with panic in the city, terrible portents and visions of the disaster to come.” In Book X, “Caesar arrives in Egypt, where he is beguiled by the Pharaoh’s sister Cleopatra. A banquet is held; Pothinus…plots an assassination of Caesar but is killed in his surprise attack on the palace. A second attack comes from Ganymede, an Egyptian noble, and the poem breaks off abruptly as Caesar is fighting for his life.”¹⁰⁴

(ii) **Gaius Petronius (27-66 A.D.):** a Roman courtier during the reign of Nero, published the *Satyricon* in about 60 that was the first Latin novel, which was a collection of satires, probably sixteen books, of which only the last two remain, themselves incomplete.¹⁰⁵ It is different from the formal verse satires written Juvenal or Horace. The work contains a mixture of prose and verse, serious and comic elements, erotic and decadent passages. It describes the adventures of various low-class characters in absurd, extravagant, and dangerous situations, often in the world of petty crime. “The story begins in a brothel, where Encolpius meets Ascylos, who has taken refuge there from a lecture on philosophy. Their escapades among the towns and trolleys of southern Italy form the thread of the wandering narrative; their rivalry for the handsome slave boy Giton unites and divides them in picaresque romance. At last they come to the house of the merchant Trimalchio; and the rest of the extant working is given over to describing the most astounding dinner in literature.” Trimalchio is an ex-slave who has made a fortune, has bought enormous latifundia, and lives a luxurious life. Describing forty many pages of dinner, it is a powerful and savage satire; realistic only in its details, and probably true of only a small segment of Rome life.¹⁰⁶ Quintilian (35-100) was a rhetorician from Hispania. In the chaotic year of 69, he opened a public school of rhetoric in Rome: among his students were Pliny the Younger and perhaps Tacitus. He spent his retirement time in writing the *Institute of Oratory* published in 95, consisting of twelve-volume textbook on the theory and practice of rhetoric, which also deals with the foundational education and development of the orator himself.¹⁰⁷ Aulus Gellius (125-180) was born to a good family, possibly of African origin, and brought up in Rome. He travelled much, especially in Greece, and resided for a considerable period in Athens. He studied rhetoric and rhetoric, and enjoyed the friendship and instruction of prominent people. Returning to Rome, he held a judicial office. He published the *Attic Nights* that is valuable for the insight they afford into the nature of the society and pursuits of those times, and for its many excerpts from works of lost ancient authors.¹⁰⁸
Roman Science and Technology: Durant describes the status of Roman science as follows: “There were a few men of scientific mind and interest in Rome, like Varro, Agrippa, Pomponius Mela, and Celsus; but they were scarce outside of geography, horticulture, and medicine. For the rest, science had not yet detached itself from magic, superstition, theology, and philosophy; it consisted of collected observations and traditions, seldom of fresh inquiry into facts, and rarely of experiment. Astronomy remained as Babylonia and Greece, had left it. Time was still told by water clocks and sundials, and by the great obelisk that Augustus had stolen from Egypt and set up in the Field of Mars; its shadow, falling upon a pavement marked off in brass, indicated both the hour and the season. Day and night were variably defined by the rising and setting of the sun; each had twelve hours, so that an hour of the day was longer, and an hour of the night shorter, in summer than in winter. Astrology was almost universally accepted. Pliny noted that in his time (A.D. 70) both earned and simple believed that a man’s destiny was determined by the star under which he was born. They argue plausibly that vegetation, and perhaps the mating season in animals, depend upon the sun’ that the physical and moral qualities of people are affected by climatic factors themselves determined by the sun; and the individual character and fate, like these general phenomena, are the result of celestial conditions inadequately known. Astrology was rejected only by the skeptics of the later Academy, who denied its pretended knowledge, and by the Christians, who scorned it as idolatry. Geography was studied more realistically, for navigation’s sake. Pomponius Mela published maps on which the surface of the globe was divided into a central torrid zone and north and south temperate zones. Roman geographers knew Europe, southwestern and southern Asia, and northern Africa; or the remainder they had vague ideas and fantastic legends. Spanish and African skippers reached Madeira and the Canary Island, but no Columbus rose to test Seneca’s dream,” putting it within the scope of his Natural Questions.

Natural History: Gaius Plinius Secundus (A.D. 23-79), known as Pliny, was born in Como technically old Gaul. His father took him to Rome to be educated. He joined the army at about age 23 as a junior officer, as was the custom for young men of equestrian rank. His interest in Roman literature attracted the attention and friendship of other men of letters in the higher ranks, with whom he formed lasting friendships. Through his military service, he became familiar with commanders in the praetorium. “At the very end of AD 69, after a year of civil war consequent on the death of Nero, Vespasian, a successful general, became emperor. Like Pliny, he had come from the middle, or equestrian, class, rising through the ranks of the army and public offices and defeating the other contenders for the highest office. His main tasks were to reestablish peace under imperial control and place the economy on a sound footing. He needed in his administration all the loyalty and assistance he could find. Pliny, apparently trusted without question, perhaps (reading between the lines) recommended by Titus, was put to work immediately and was kept in a continuous succession of the most distinguished procuratorships, according to Suetonius. A procurator was generally a governor of an imperial province. The empire was perpetually short of, and always was seeking, office-holders for its numerous offices.” Pliny spent some time in African Province, most likely as a procurator; next was the procuratorship of Hispania. During his stay in Hispania, he became familiar with the agriculture and especially the gold mines of the north and west of the country. His last position seems to be the procurator of Gallia Belgica. Pliny allowed home in Rome around 74, and officially released his Natural History in 77. His routine was: before daybreak he used to wait upon Vespasian, and then proceed to execute the orders he had received. “Though busy nearly all his life as soldier, lawyer, traveler, administrator, and head of the western Roman fleet, he wrote treatises on oratory, grammar, and the javelin, a history of Rome, another of Rome’s wars in Germany, and sole – sole survivor of this flood – thirty-seven books of natural history.” The Natural History that became a model for all other encyclopedias.
The Natural History is divided into 37 books, organized into ten volumes which include astronomy, mathematics, geography, ethnography, anthropology, human psychology, zoology, botany, agriculture, horticulture, pharmacology, mining, mineralogy, sculpture, painting, and precious stones. His purpose in writing the Natural History was to cover all learning and art so far as they are connected with nature or draw their materials from nature. He says that my subject is a barren one – the world of nature, or in other words life; and that subject in its least elevated department, and employing either rustic terms or foreign, nay barbarian words that actually have to be introduced with an apology. Moreover, there is not one of us who has made the same venture, nor yet one Roman who has tackled single-handed all departments of the subject.” “In the preface, the author claims to have stated 20,000 facts gathered from some 2,000 books and from 100 select authors. The extant lists of his authorities cover more than 400, including 146 Roman and 327 Greek and other sources of information. The lists generally follow the order of the subject matter of each book.” In a major section of the Natural History, “Books XX to XXX, discusses matters related to medicine, especially plants that yield useful drugs. Pliny lists over 900 drugs, compared to 600 in Dioscorides, 550 in Theophrastus, and 650 in Galen. The poppy and opium are mentioned; Pliny notes that opium induces sleep and can be fatal. Diseases and their treatment are covered in book XXVI. Pliny addresses magic in Book XXX. He is critical of the lies of the Magi, attacking astrology, and suggesting that magic originated in medicine, creeping in by pretending to offer health. He names Zoroaster of Ancient Persia as the source of magical ideas. He states that Pythagoras, Empedocles, Democritus and Plato all travelled abroad to learn magic, remarking that it was surprising anyone accepted the doctrines they brought back, and that medicine and magic should have flourished simultaneously at the time of the Peloponnesian War.”

In Medicine. Pedanius Dioscorides (40-90), born in Anazarbus, in Cilicia (now in Turkey), served in the Roman Army of Nero, studied plants and developed the herbal pharmacology, and practiced medicine in Rome. He travelled all over the Greek and Roman world to seek medical substances. He wrote the five volumes On Medical Matters, the first authoritative text on botany and pharmacology, which was the most influential herbal books in history. His books remained in use until about 1600. Greek medicine reached the peak in Galen (129-216) who was born in Pergamum, Asia Minor, then part of the Roman Empire. He received excellent education of the time, and at the age of twenty he had become a therapeutes (attendant or associate) of the god Asclepius in the local temple for four years. After his father’s death, he entered medical studies abroad in Smyrna, Corinth, Alexandria, and other medical centers of over twelve years. In Alexandria, he learned anatomy, surgery, drugs, and Hippocratic medicine at least four years. Returning home in 157, Galen practiced as a physician for the gladiators. In 162, he moved to Rome where he practiced many operations including brain and eye surgeries, and earned fame. In 169, Marcus Aurelius appointed him as the physician to Commodus, and he lived in Rome until he died. Galen wrote not only on anatomy, physiology, general medicine, but also on logic. His diagnostic methods included palpation, pulse-taking, and inspection of urine. Restoring anatomy, Galen identified the system of human body, and performed a series of experiments on the spinal cord using animals, and investigated stress-related illness by sound observation and logical explanation. His On the Natural Faculties, Galen defined genesis, growth, and nutrition having various subservient to them, which requires natural balance: the unity of organism and the interdependence of its parts. With the rise of Christianity, medical knowledge and healing activity closely engaged with ecclesiastical communities. The learned medicine was supplemented by religious healing called miraculous cures. Conquering the Middle East from the second half of the seventh to the ninth century, the Muslims translated Galen’s works into Arabic, learned and adopted Greek medicine, and added their own observations and treatment.
Chapter IV. Economic Thought and Other Intellectual Developments

Roman technology is the engineering practice supporting Roman civilization and making the expansion of Roman commerce and Roman military possible for nearly a thousand years. “The Roman Empire had one of the most advanced set of technologies of its time, some of which was lost during the turbulent eras of Late Antiquity and the early Middle Ages. Gradually, some of the technological feats of the Romans were rediscovered and/or improved upon, while others went ahead of what the Romans had done during the Middle Ages and the beginning of the Modern Era. Several Roman technological feats in different areas like civil engineering, construction materials, transport technology, and some inventions such as the mechanical reaper, were surprising achievements until the 19th century. The Romans achieved high levels of technology in large part because they borrowed and absorbed the culture of the pre-existing peoples.”

(i) The energy constraints: “All technology uses energy to transform the material into a desirable object or uses some form of mechanics combined with another form to make something better. The cheaper energy is, the wider the class of technologies that are considered economic. This is why technological history can be seen as a succession of ages defined by energy type i.e. human, animal, water, peat, coal, and oil. The Romans used water power, and watermills were common throughout the Empire, especially to the end of the 1st century A.D. They were used for cereals milling, sawing timber and crushing ore. They exploited wood and coal for heating. There were huge reserves of wood, peat and coal in the Roman Empire, but they were all in the wrong place. Wood could be floated down rivers to the major urban centers but otherwise it was a very poor fuel, being heavy for its caloric value. If this was improved by being processed into charcoal, it was bulky. Nor was wood ever available in any concentration. Diocletian’s Price Edict can give us a glimpse of the economics of transporting wood…Room heating was normally better done by charcoal braziers than hypocausts.”

(ii) Craft basis: “Roman technology was largely based on a system of crafts, although the term engineering is used today to describe the technical feats of the Romans. The Greek words used were mechanic or machine-maker or even mathematician which had a much wider meaning than now. There were a large number of engineers employed by the army. The most famous engineer of this period was the Greek Apollodorus of Damascus. Normally each trade, each group of artisans—stonemasons, glass blowers, surveyors, etc.—within a project had its own practice of masters and apprentices, and many tried to keep their trade secrets, passing them on solely by word of mouth, a system still in use today by those who do not want to patent their inventions. Writers such as Vitruvius, Pliny the Elder and Frontinus published widely on many different technologies, and there was a corpus of manuals on basic mathematics and science such as the many books by Archimedes, Ctesibius, Euclid and so on. Not all of the manuals which were available to the Romans have survived, as lost works illustrate.”

(iii) Engineering and construction: “The Romans made great use of aqueducts, dams, bridges, and amphitheatres. They were also responsible for many innovations to roads, sanitation, and construction in general. Roman architecture in general was greatly influenced by the Greeks and Etruscans. Many of the columns and arches seen in Roman architecture were adopted from the Greek and Etruscan civilizations present in Italy. In the Roman Empire, cements made from pozzolanic ash/pozzolana and an aggregate made from pumice were used to make a concrete very similar to modern Portland cement concrete. In 20s BC the architect Vitruvius described a low-water-content method for mixing concrete. The Romans found out that insulated glazing (or double glazing) improved greatly on keeping buildings warm, and this technique was used in the construction of public baths. Another truly original process which was born in the empire was the practice of glassblowing, which started in Syria and spread in about one generation in the empire. There were many types of presses to press olives. In the 1st century AD, Pliny the Elder reported...
the invention and subsequent general use of the new and more compact screw presses. However, the screw press was almost certainly not a Roman invention. It was first described by the Greek mathematician and engineer, Hero of Alexandria, but may have already been in use when he mentioned it in his Mechanica III. Cranes were used for construction work and possibly to load and unload ships at their ports, although for the latter use there is according to the “present state of knowledge” still no evidence.\footnote{5} Most cranes were capable of lifting about 6–7 tons of cargo, and according to a relief shown on Trajan's column were worked by tread-wheel.\footnote{113}

(iv) Aquedocts: “The Romans constructed numerous aqueducts to supply water. The city of Rome itself was supplied by eleven aqueducts made of limestone that provided the city with over 1 million cubic metres of water each day, sufficient for 3.5 million people even in modern day times,\footnote{6} and with a combined length of 350 kilometres (220 mi). Water inside the aqueducts depended entirely on gravity. The raised stone channels in which the water travelled were slightly slanted. The water was carried directly from mountain springs. After it had gone through the aqueduct, the water was collected in tanks and fed through pipes to fountains, toilets, etc. The main aqueducts in Ancient Rome were the Aqua Claudia and the Aqua Marcia. Most aqueducts were constructed below the surface with only small portions above ground supported by arches. The longest Roman aqueduct, 178 kilometres in length, was traditionally assumed to be that which supplied the city of Carthage. The complex system built to supply Constantinople had its most distant supply drawn from over 120 km away along a sinuous route of more than 336 km.”\footnote{114}

(v) Bridges and dams: “Roman bridges were among the first large and lasting bridges built. They were built with stone and/or concrete and utilized the arch. Built in 142 B.C., the Pons Aemilius, later named Ponte Rotto is the oldest Roman stone bridge in Rome, Italy. The biggest Roman bridge was Trajan's bridge over the lower Danube, constructed by Apollodorus of Damascus, which remained for over a millennium the longest bridge to have been built both in terms of overall and span length. They were most of the time at least 60 feet above the body of water... They also built many dams for water collection, such as the Subiaco Dams, two of which fed Anio Novus, one of the largest aqueducts of Rome. They built 72 dams in just one country, Spain and many more are known across the Empire, some of which are still in use.”\footnote{115}

(vi) Mining: “The Romans also made great use of aqueducts in their extensive mining operations across the empire, some sites such as Las Medulas in north-west Spain having at least 7 major channels entering the minehead. Other sites such as Dolaucothi in south Wales was fed by at least 5 leats, all leading to reservoirs and tanks or cisterns high above the present opencast. The water was used for hydraulic mining, where streams or waves of water are released onto the hillside, first to reveal any gold-bearing ore, and then to work the ore itself. Rock debris could be sluiced away by hushing, and the water also used to douse fires created to break down the hard rock and veins, a method known as fire-setting.”\footnote{116}

(vii) Sanitation: “The Romans were one of the first known civilizations to invent indoor plumbing. The Roman public baths, or \textit{thermae} served hygienic, social and cultural functions. The baths contained three main facilities for bathing. After undressing in the apodyterium or changing room, Romans would proceed to the tepidarium or warm room. In the moderate dry heat of the tepidarium, some performed warm-up exercises and stretched while others oiled themselves or had slaves oil them. The tepidarium’s main purpose was to promote sweating to prepare for the next room, the caldarium or hot room. The caldarium, unlike the tepidarium, was extremely humid and hot. Temperatures in the caldarium could reach 40 degrees Celsius (104 degrees Fahrenheit). Many contained steam baths and a cold-water fountain known as the labrum. The last room was the frigidarium or cold room, which offered a cold bath for cooling off after the caldarium. The Romans also had flush toilets.”\footnote{117} Roman military technology is discussed later.

474  \textit{Book I. From the Beginning to the Rise of Islam}
Education in Ancient Rome: The Roman education system was based on the Greek system. “Due to the extent of Rome's power, the methodology and curriculum used in Roman education was copied in its provinces, and thereby proved the basis for education systems throughout later Western civilization. Organized education remained relatively rare, and there are few primary sources or accounts of the Roman educational process until the 2nd century A.D. Due to the extensive power wielded by the paterfamilias over Roman families, the level and quality of education provided to Roman children varied drastically from family to family.” However, the Roman educational system gradually found its final form. “Following various military conquests in the Greek East, Romans adapted a number of Greek educational precepts to their own fledgling system. Roman students were taught in similar fashion to Greek students, sometimes by Greek slaves who had a penchant for education. But differences between the Greek and Roman systems emerge at the highest tiers of education. Roman students that wished to pursue the highest levels of education went to Greece to study philosophy, as the Roman system developed to teach speech, law and gravitas...Progression depended more on ability than age with great emphasis being placed upon a student's ingenium or inborn gift for learning, and a more tacit emphasis on a student's ability to afford high-level education.” The Romans were exposed to strong influence of Greek thought and lifestyle. Following the Punic Wars, “The new educational system began to center more on the one encountered by the Romans with the Hellenistic Greeks and prominent centers of learning such as Alexandria later on. It was becoming a literary educational system.” The Greeks had an ideal situation for the foundation of literary education. However, “The absence of a literary method of education from Roman life was due to the fact that Rome was bereft of any national literature. The military arts were all that Rome could afford to spend time studying. When not waging war, the Romans devoted what time remained to agriculture. The concern of Rome was that of survival, whether through defense or dominion.”

Men like Cato the Elder adhered to this Roman tradition and took their roles as teachers very seriously. “Cato the Elder not only made his children hardworking, good citizens and responsible Romans, but "he was his (son's) reading teacher, his law professor, his athletic coach. He taught his son not only to hurl a javelin, to fight in armor, and to ride a horse, but also to box, to endure both heat and cold, and to swim strongly. Job training was also emphasized, and boys gained valuable experience through apprenticeships. Mothers, though, cannot be overlooked for their roles as moral educators and character builders of their children. Cornelia Africana, the mother of the Gracchi, is even credited as a major cause of her sons’ renowned eloquence.” Let’s dig deeper into Roman education. “The main point of education in Rome was for young males to learn how to be good, intelligent citizens who could contribute to and lead the community. The skill of public speaking was the most valued skill that a Roman male learned. The goal of education for females was to learn how to be proper wives. The education of a female was taken much less seriously than that of a male. Before about 300 B.C., education took place primarily in the home. The father taught his sons what he knew in Roman law, history, customs, and physical training. If the father knew how to read and write, he would pass this on to his sons also. Most often, the father would teach his sons his trade. If the father was a carpenter, he would teach his sons carpentry and they would follow in his footsteps as adults. Between 300 and 200 B.C., the Romans began to adopt the Greek system of education. With the Greek system, there were three levels of education: primary school (ludus), grammar school (grammaticus) and secondary school (rhetoric). School was not free and therefore was only available to the wealthy. Children from poor families continued to be taught in their homes by their father. Gifted, educated (and usually Greek) slaves taught some wealthy children in their homes. Wealthy children who were schooled outside of the home would go to the home of a tutor who would "group-tutor" many students.”
(a) **The Parents’ Role**: “Before age six, the mother was in charge of the discipline and education of boys and girls. At age six, the father took over his sons’ studies. The father supervised and monitored his sons’ progress in school. The father also provided his son with moral education, specifically reverence for the gods and religion, respect for the law, obedience to authority, family honor and truthfulness. The father was also usually in charge of his sons’ physical education. Physical training was important because many males served in the military after their formal education was over. Physical education was oriented toward military preparedness: training in arms, toughening of the body, swimming across cold and rapid streams, and horsemanship. If there was ever a war, fathers wanted their sons to be prepared to fight and be victorious in it.”

(b) **The Ludus (Primary School)**: As the father took over his sons’ education, “boys and some girls (with their father’s permission) would go to the ludus or primary school. The children were given a personal slave, called a paedogogus, who would accompany them to school and was in charge of their behavior and appearance. A tutor called a litterator taught the children reading, writing and especially arithmetic. The school day started before dawn and the children would bring candles to work until daybreak. The length of the school year varied from school to school but it always started on March 24. The children would write on wax tablets that could be melted and reused. They used the tablets to practice their handwriting and their arithmetic.”

(c) **The Grammaticus (Grammar School)**: “At about age 11, the boys would go on to the grammar school, or grammaticus. Roman girls would rarely continue formal schooling after the ludus because they usually married around age twelve and had little need for a formal education. In the grammaticus, boys would learn Latin, Greek grammar and literature. They also read and recited texts aloud with special attention on pronunciation and enunciation. Because the Romans admired Greek culture so much, the Greek language was given priority in the grammaticus. A full knowledge of Greek showed that you were refined and cultivated. Roman boys liked to show off with their Greek skills much in the same way that we do with French. Almost of the great works of philosophy and many of the works of literature were in Greek, so it was absolutely necessary for the boys to learn the language. Many young boys learned Greek from the Greek slaves in their household and could speak it before they could speak Latin.”

(d) **The Rhetoric (Secondary School)**: “When boys turn 15 years old, they then studied at a rhetoric school, which was really not a school at all just lessons with a tutor, called a rhetor. The rhetor instructed the boys in writing and giving speeches and preparing to take part in public life. A common exercise was to give the students themes (quaestiones, which were abstract general themes and cause, which were themes related to particular people and situations) and the students had to give a speech about the theme. The point was for the males to become good persuasive speakers who would be able to influence a crowd with their speeches.”

(e) **After Graduation**: Formal education ended at 16, when the males had a kind of graduation ceremony. “From then on, they were allowed to wear the adult dress, a white, woolen toga because the male was now considered part of the community. The male was usually apprenticed for one year to an old male friend of the family who had political (or military, if the boy wanted to be a soldier) experience, usually a former political leader. This one-year period was meant to help ease the transition between the strict structure of childhood and the freedom and responsibility of adult, public life. After this one year, males sometimes went into military service, or otherwise began full public life as a citizen of Rome.” In conclusion, “The education of males in ancient Rome was very successful because the students weren’t just limited to just one subject or trade but were required to learn many subjects and thereby were well-rounded and had a lot of overall knowledge. While women and the poor did not really benefit from the Roman system of education, the general population of males did receive a sound education from the Roman system.”
Chapter IV. Economic Thought and Other Intellectual Developments

6. The Roman Military Structure and Campaigns

The Roman military was to preserve its political system against all of internal and external threats. The political system was formed through competition within the ruling elite of society, so politics controlled the roles of the Roman military. Under the Roman kingdom, a person’s social standing and wealth determined their political and military role: a rich man had a greater voting rights and greater standing within the military than a poor man had. In the Republic, the tradition of social class continuously determined military duty despite structural changes; but the lower ranks were less politicized and based upon a mix of social class, age, and military experience rather than social class alone. Non-citizen soldiers could obtain Roman citizenship after 25 years of their military service. “In the Republic, military service made a person of the equestrian class eligible for wide range of profitable postings: military triumphs boosted a person’s career, and military service became a pre-requisite for a number of political posts. Intended initially to ensure that all political leaders had shown dedication and duty serving in the military, the effect was to cause military experience to become of paramount importance to a Roman’s political career, with the eventual consequence that armies would become tools for the political goals of their generals, rather than neutrally aligned forces of the state. At the highest level, two consuls were elected each year to head the government of the state and simultaneously were appointed the commanders-in-chief of the Roman army, and would be assigned a consular army and an area in which to campaign.”127 Marius land reform was challenged by Sulla, whose six legions marched to Rome, though forbidden by law. Similarly, Caesar crossed the Rubicon River and his armies marched upon Rome for his own purposes. After his assassination, his grand-nephew Octavian succeeded Caesar’s heritage: he controlled two army legions first, and later obtained loyalty of other legions stationed in frontiers of Roman provinces for his political stability.

“The Roman senate and emperors were not blind to the possibility of rebellion by its troops as generals could gain the loyalty of his officers through a mixture of personal charisma, promises and simple bribes; once the general and officers had a unity of purpose the rigid discipline of the military meant that the troops would normally follow. Only later seemingly did the situation reverse and the soldiers began to dictate action to the officers and generals, raising generals to Emperors even when the generals themselves were completely lacking such ambition or wishes. However, the state saw itself as relatively safe from such rebellions in the early imperial period. The reason for this safety from rebellion is that for a rebellion to be successful it was necessary for a usurper to gain control of a certain percentage of the army in order to stand some chance of success. Sulla and Caesar had managed such actions because the consular system of that period had concentrated in their hands a large proportion of the small number of armies in service of the state at the time. In the expanding empire, legions under generals were spread out across the extent of the Roman borders and it was not easy for one man to seize control of a great part of them, perhaps only commonly being in control of two or so legions. However, later larger-scale wars necessitated the concentration of greater military power in the hands of generals. There is evidence of emperors holding some members of generals’ families as hostage to ensure their loyalty.”128 After the assassination of Commodus, Severus created a military monarchy, followed by a military anarchy: the empire was sold at auction to the highest bidder under the Praetorian Guard. In 284, Diocletian ended chaos, and divided the empire into four regions, ruled by each army commander; in 324 Constantine became the sole emperor, founding the second senate at Constantinople. The expansion of the Roman army required more man power, which allowed to recruit more Germanic soldiers into the army. Hence, the western empire was ultimately destroyed by Odoacer, who was an appointed general of the foederati troops of Rome, proclaimed himself King of Italy.

Book I. From the Beginning to the Rise of Islam
Chapter IV. Economic Thought and Other Intellectual Developments

Photo IV-6-1. Third-Century Roman Soldiers Battling Barbarian Troops (250-260)
https://upload.wikimedia.org/wikipedia/commons/thumb/8/8a/Grande_Ludovisi_Altemps_Inv8574.jpg/1280px-Grande_Ludovisi_Altemps_Inv8574.jpg, accessed 8 March 2018

Photo IV-6-2. The Remains of Vercovicium on Hadrian's Wall
Near Housesteads, England, accessed 8 March 2018,
Military of Ancient Rome: The Romans were engaged in almost continuous warfare: the Roman state existed to support and finance the Roman military. Over 1,300 years, their military campaign stretched as far East as Parthia (now Iran), as far South as Africa (now Tunisia), and as far North as Britannia (now England). The Roman military changed substantially throughout centuries in terms of goals and objectives, military structure, manpower, expenditures and finance, weapons and equipment, and strategies and campaigns. (a) Human Resources: According to Edward Gibbon, the size of the Roman army was 375,000 men at the Empire’s territorial peak in the time of the Roman Emperor Hadrian. The number was doubled at the time when the Empire was divided into East and West including vast numbers of foederati. “Initially, Rome’s military consisted of an annual citizen levy performing military service as part of their duty to the state. During this period, the Roman army would prosecute seasonal campaigns against largely local adversaries. As the extent of the territories falling under Roman suzerainty expanded, and the size of the city’s forces increased, the soldier of ancient Rome became increasingly professional and salaried. As a consequence, military service at the lower levels became progressively longer-term. Roman military units of the period were largely homogeneous and highly regulated. The army consisted of units of citizen infantry known as legions as well as non-legionary allied troops known as auxilia….Military service in the later empire continued to be salaried yearly and professionally for Rome’s regular troops. However, the trend of employing allied or mercenary troops was expanded such that these troops came to represent a substantial proportion of Rome’s forces. At the same time, the uniformity of structure found in Rome’s earlier military forces disappeared. Soldiery of the era ranged from lightly armed mounted archers to heavy infantry, in regiments of varying size and quality. This was accompanied by a trend in the late empire of an increasing predominance of cavalry rather than infantry troops, as well as an emphasis of more mobile operations.”

(b) Funding and Expenditures: “During the time of expansion in the Republic and early Empire, Roman armies had acted as a source of revenue for the Roman state, plundering conquered territories, displaying the massive wealth in triumphs upon their return and fueling the economy to the extent that historians such as Toynbee and Burke believe that the Roman economy was essentially a plunder economy. However, after the Empire had stopped expanding in the 2nd century C.E., this source of revenue dried up; by the end of the 3rd century C.E., Rome had ceased to vanquish. As tax revenue was plagued by corruption and hyperinflation during the Crisis of the Third Century, military expenditures began to become a crushing burden on the finances of the Roman state. It now highlighted weaknesses that earlier expansion had disguised. By 440 C.E., an imperial law frankly states that the Roman state has insufficient tax revenue to fund an army of a size required by the demands placed upon it.” Moreover, “Several additional factors bloated the military expenditure of the Roman Empire. First, substantial rewards were paid to barbarian chieftains for their good conduct in the form of negotiated subsidies and for the provision of allied troops. Secondly, the military boosted its numbers, possibly by one third in a single century. Third, the military increasingly relied on a higher ratio of cavalry units in the late Empire, which were many times more expensive to maintain than infantry units. As military size and costs increased, new taxes were introduced or existing tax laws reformed in the late Empire to finance it, even though more inhabitants were available within the borders of the late Empire, reducing the per capita costs for an increased standing army was impractical. A large number of the population could not be taxed because they were slaves or held Roman citizenship, both of which exempted them from taxation. Of the remaining, a large number were already impoverished by centuries of warfare and weakened by chronic malnutrition. Still, they had to handle an increasing tax rate and so they often abandoned their lands to survive in a city.”
Chapter IV. Economic Thought and Other Intellectual Developments


(c) Military Capabilities: As appeared in Map IV-6-1, the Roman army, in the first century, linearly deployed its twenty-five legions in the frontier regions along the Rhine-Danube line by roughly two-thirds and the eastern border of Persia, Syria, and Egypt by one-third. With this linear deployment, the Roman army did not keep strategic reserve after the Social War. Therefore, it restructured into two forces in the later Roman period: border defense troops and mobile field armies. On the other hand, as part of power projection, the Roman military frequently removed foreign rulers by force or intimidation and replaced them with puppets. In the military engineering, the Roman army built an extensive and well-maintained road network, as well as its absolute command of the Mediterranean for much of its history, enabled a primitive form of rapid reaction, also stressed in modern military doctrine, although because there was no real strategic reserve, this often entailed the raising of fresh troops or the withdrawing of troops from other parts of the border. However, border troops were usually very capable of handling enemies before they could penetrate far into the Roman hinterland. The Roman military had an extensive logistical supply chain. There was no specialized branch of the military devoted to logistics and transportation, although this was to a great extent carried out by the Roman Navy due to the ease and low costs of transporting goods via sea and river compared to over land. Roman cities had a civil guard to maintain peace, but they were forbidden to be armed at militia levels due to fear of rebellions or other uprisings. The military engineering was of a scale and frequency far beyond that of any of its contemporaries. Indeed, it was in many ways “institutionally endemic in Roman military culture, as demonstrated by the fact that each Roman legionary had as part of his equipment a shovel, alongside his gladius (sword) and pilum (spears).” Roman soldiers were trained to build quickly. Roman military engineering took both routine and extraordinary forms: as part of the former, “Proactive military engineering took the form of the regular construction of fortified camps, in road-building, and in the construction of siege engines.”

Book I. From the Beginning to the Rise of Islam
(d) **Objectives, Strategies, and Campaigns:** “Rome was established as a nation by making aggressive use of its high military potential. From very early on in its history it would raise two armies annually to campaign abroad. The Roman military was far from being solely a defense force. For much of its history it was a tool of aggressive expansion. The Roman army had derived from a militia of mainly farmers and gain of new farm lands for the growing population or later retiring soldiers was often one of the campaign's chief objectives. Only in the late Empire did the preservation of control over Rome's territories become the Roman military's primary role. The remaining major powers confronting Rome were the Kingdom of Aksum, Parthia and the Hunnic Empire. Knowledge of China, the Han Dynasty at the times of Mani, existed and it is believed that Rome and China swapped embassies about 170 C.E.” The hierarchy of Roman military strategy contains its grand strategy, operational strategy, and military tactics. The military grand strategy is formed to achieve political goals such as consolidation of the peninsula, expansion of territory, and defense of sovereign lands. “Early indications for a Roman grand strategy emerged during the three Punic wars with Carthage, in which Rome was able to influence the course of the war by selecting to ignore the armies of Hannibal threatening its homeland and to invade Africa instead in order to dictate the primary theatre of war. In the Empire, as the need for and size of the professional army grew, the possibility arose for the expansion of the concept of a grand strategy to encompass the management of the resources of the entire Roman state in the conduct of warfare: great consideration was given in the Empire to diplomacy and the use of the military to achieve political goals, both through warfare and also as a deterrent. The contribution of actual (rather than potential) military force to strategy was largely reduced to operational strategy - the planning and control of large military units. Rome’s grand strategy incorporated diplomacy through which Rome might forge alliances or pressure another nation into compliance, as well as the management of the post-war peace.”

Roman military campaigns are discussed separately later.

(e) **Weapons and Equipment:** Roman arms were uniformly produced from either bronze or, later, iron so that Roman military technology saw little radical change in technological level. But “Roman arms and armor was developed, discarded, and adopted from other peoples based on changing methods of engagement. It included at various times stabbing daggers and swords, stabbing or thrusting swords, long thrusting spears or pikes, lances, light throwing javelins and darts, slings, and bow and arrows.” Their equipment was produced in large numbers to established patterns and used in an established way. “According to Hugh Elton, Roman equipment (especially armor) gave them a distinct advantage over their barbarian enemies. who were often, as Germanic tribesmen, completely unarmored. However, Luttwak points out that whilst the uniform possession of armor gave Rome an advantage, the actual standard of each item of Roman equipment was of no better quality than that used by the majority of its adversaries. The relatively low quality of Roman weaponry was primarily a function of its large-scale production, and later factors such as governmental price fixing for certain items, which gave no allowance for quality, and incentivized cheap, poor-quality goods. The Roman military readily adopted types of arms and armor that were effectively used against them by their enemies. Initially Roman troops were armed after Greek and Etruscan models, using large oval shields and long pikes. On encountering the Celts they adopted much Celtic equipment and again later adopted items such as the gladius (the primary sword for foot soldiers) from Iberian peoples. Later in Rome’s history, it adopted practices such as arming its cavalry with bows in the Parthian style, and even experimented briefly with niche weaponry such as elephants and camel-troops. Besides personal weaponry, the Roman military adopted team weaponry such as the ballista and developed a naval weapon known as the corvus (a Roman military boarding device used in naval warfare during the First Punic War against Carthage), a spiked plank used for affixing and boarding enemy ships.”
Chapter IV. Economic Thought and Other Intellectual Developments

Figure IV-6.1. High Command Structure of the East Roman Army, accessed 8 March 2018, https://en.wikipedia.org/wiki/Late_Roman_army#/media/File:East_Roman_army_command_structure.svg

Figure IV-6.2. High Command Structure of the West Roman Army, accessed 8 March 2018, https://en.wikipedia.org/wiki/Late_Roman_army#/media/File:West_Roman_army_command_structure.svg

N.B. Locations given are the usual winter quarters at this time. "Main troop grade" indicates the status of the majority of the regiments in the corps. Reporting relationships as in A.H.M. Jones Later Roman Empire (1984) pp 100 and 609. Figures in brackets are approximate estimates of corps strength. Total army strength ca. 150,000 (about 20 units are duplicated). Assumptions of unit sizes: In comitatenses, legionaries 1,000 men; vexillations and auxilia 500; pseudocomitatenses as in limenitales; legionaries 500; other units 250. Based on the "Notitia Dignitatum". The western section of the "Notitia" was drawn up after the major barbarian invasion of Gaul in 406 AD; this explains why the "limited" forces on the Rhine are very low. Many of their units were drafted into the field army of Gaul as an emergency measure.
The Structural Change of the Roman Military: The structure and constitutions of the Roman military had transformed from its origins around 800 B.C. to its final dissolution in A.D. 476 with the fall of the Western Roman Empire. The Roman armed forces were split into the Roman army and navy, though their two branches were less distinct than those in present time. We can consider the four phases of structural changes of the Roman military system. In the first phase, “The army was derived from obligatory annual military service levied on the citizenry, as part of their duty to the state. During this period, the Roman army would wage seasonal campaigns against largely local adversaries.” In the second phase, as the Roman controlled territories were expanded and the size of the forces increased, “the soldiery gradually became salaried professionals. As a consequence, military service at the lower levels became progressively longer-term. Roman military units of the period were largely homogeneous and highly regulated. The army consisted of units of citizen infantry known as legions as well as non-legionary allied troops known as auxilia. The latter were most commonly called upon to provide light infantry, logistical, or cavalry support.” In the third phase, at the peak of the Roman Empire, “forces were tasked with manning and securing the borders of the vast provinces which had been brought under Roman control. Serious strategic threats were less common in this period and emphasis was placed on preserving gained territory. The army underwent changes in response to these new needs and became more dependent on fixed garrisons than on march-camps and continuous field operations.” In the fourth phase, as the empire began to struggle with its enlarged territories, the trend of employing allied or mercenary elements was expanded so that those troops came to represent a substantial proportion of the armed forces. Accordingly, the structural uniformity of the Roman military established in the early period disappeared. “Soldiery of the era ranged from lightly armed mounted archers to heavy infantry, in regiments of varying size and quality.” In the late empire, there appeared an increasing trend of cavalry with more mobile operations.

The structure of the Roman military can be traced as follows. (i) **Tribal forces** (800-578 B.C.): The earliest Roman army existed in the 8th century B.C., when the Romans settled on the fortified hilltop with a small force, whose activities were limited mainly to “raiding and cattle rusting with the occasional skirmish-like battle.” The army consisted of 3,000 infantry and 300 horsemen, one-third of them came equally from each of three founding tribes. The greater mass of foot-soldiers were javelin-throwers with a smaller number of archers. The cavalry was smaller in number from the richest citizens, and the army had an earliest form of chariots. By the early 7th century B.C., the Etruscans dominated the region with the iron-Age civilization conquering Rome. (ii) **Etruscan-model hoplites** (578-315 B.C.): The second Etruscan king, Servius Tullius, took the first census of all citizens, which required different levels of compulsory military service based on socio-economic classes. “The equestrians, the highest social class of all, served in mounted units known as *equites*. The first class of the richest citizens served as heavy infantry with swords and long spears (resembling hoplites), and provided the first line of the battle formation. The second class were armed similarly to the first class, but without a breastplate for protection, and with an oblong rather than a round shield. The second class stood immediately behind the first class when the army was drawn up in battle formation. The third and fourth classes were more lightly armed and carried a thrusting-spear and javelins. The third class stood behind the second class in battle formation, normally providing javelin support. The poorest of the propertied men of the city comprised the fifth class. They were generally too poor to afford much equipment at all and were armed as skirmishers with slings and stones. They were deployed in a screen in front of the main army, covering its approach and masking its maneuvers. Men without property, who were thereby excluded from the qualifying social classes…were exempted from military service on the grounds that they were too poor to provide themselves with any arms whatsoever.”
(iii) **Manipular legion** (315-107 B.C.): As a result of Roman defeats in the Second Samnite War during 326-304 B.C., the army formed a legion with around 5,000 men. The manipular army, based on units called maniples, is used to contrast the later legionary army of the empire that was based on cohort units. It was based partially upon social class and partially upon age and military experience. Normally a single unit was raised each year, but in 366 B.C. two legions were raised in a year for the first time. Maniples were units of 120 men each drawn from a single infantry class. “The maniples were typically deployed into three discrete lines based on the three heavy infantry types of hastati, principes and triarii.” The hastati formed the first rank in battle formation: they were armed with a sword known as a gladius and two throwing spears known as pilum. The principes formed the second rank of soldiers back from the front of a battle line. They were heavy infantry soldiers armed and armored as per the hastati. The triarii formed the third rank which were the last remnant of hoplite-style troops in the Roman army. The heavy infantry of the maniples were supported by a number of light infantry and cavalry troops. After the Second Samnite War, the navy formed with over 400 ships on the Carthaginian pattern accommodating up to 100,000 sailors and troops for battle. The decline in population with the huge losses in various wars brought the middle to collapse, so that its military became proletarianized.

(iv) **Marian legion** (107-27 B.C.): The reforms of Gaius Marius in 107 B.C. allowed that all citizens became eligible for entry into the Roman army regardless of their wealth or social class. This removed the distinction between hastati, principes and triarii. “Legionary infantry formed a homogeneous force of heavy infantry. These legionaries were drawn from citizen stock; by this time, Roman or Latin citizenship had been regionally expanded over much of ancient Italy and Cisalpine Gaul. Lighter citizen infantry, such as the velites and equites, were replaced by non-citizen auxilia that could consist of foreign mercenaries. After Marius, the legions were drawn largely from volunteer citizens rather than citizens conscripted for duty. Volunteers came forward and were accepted not from citizens of the city of Rome itself but from the surrounding countryside and smaller towns falling under Roman control.” The higher level officers and commanders of the Roman army were still drawn exclusively from the Roman aristocracy. “The legions of the late Republic were, structurally, almost entirely heavy infantry. The legion's main sub-unit was called a cohort and consisted of approximately 480 infantrymen. The cohort was therefore a much larger unit than the earlier maniple sub-unit, and was divided into six centuries of 80 men each.” Each legion was partnered with an equal number of allied (non-Roman) auxiliae troops.

(v) **Imperial legions and reformation of the auxilia** (27 B.C.-A.D. 117): In order to prevent Roman generals to threat the imperial throne, Augustus removed the need for such emergency armies as Marius, Sulla, or Caesar used, by increasing the size of the standing armies to a size sufficient to provide territorial defense on their own, and creating both the Praetorian Guard and the Cohortes unbanae, which served as a police force and counterbalanced the former. The actual structure of the cohort army remained much the same as in the late Republic, but the imperial legions were recruited solely on a voluntary basis and from a much wider base of manpower – from Roman colonies in the provinces. Therefore, the auxilia were reorganized and a number of allied troops were formalized into standing units similar to legions: never became standardized in their equipment as the legions, but the size of the units at least was standardized to some degree. “Cavalry were formed into either an ala quingenaria of 512 horsemen, or an ala millaria of 1,000 horsemen. Likewise, infantry auxilia could be formed into a cohors quingenaria of 500 men or a cohors millaria of 1,000 men. Mixed cavalry/infantry auxiliaries were typically formed with a larger proportion of foot than horse troops: the cohors equitata quingenaria consisted of 380 foot and 120 horsemen, and the cohors equitata millaria consisted of 760 foot and 240 horsemen.” As the borders had remained fixed, legions became stationed in largely fixed locations.
(vi) **Barbarization of the army** (117-253): “By the time of the emperor Hadrian the proportion of Italians in the legions had fallen to just ten percent and provincial citizens now dominated. This low figure is probably a direct result of the changing needs of military staffing: a system of fixed border defenses (Latin: *limes*) were established around the Empire's periphery under Hadrian, consolidating Trajan's territorial gains. These called for troops to be stationed permanently in the provinces, a prospect more attractive to locally-raised rather than Italian troops. The higher prestige and pay to be found in the Italian dominated Praetorian Guard must also have played a role. The majority of the troops in the legions at the start of the 3rd century A.D. were from the more Romanized (though non-Italian) provinces, especially Illyria. As the century progressed, more and more barbarians were permitted to settle inside of, and tasked with aiding in the defense of, Rome's borders. As a result, greater numbers of barbarous and semi-barbarous peoples were gradually admitted to the army.” The barbarization of the lower ranks was paralleled by the concurrent barbarization of its command structure. Despite creation of more *auxilia*, the legions still made up around one half of the Roman army at this point. (vii) **Successive crises** (238-359): From the third century onwards, the Roman frontiers were intensely threatened by both Germanic tribes and Persian armies. “In response, the Roman army underwent a series of changes, more organic and evolutionary than the deliberate military reforms of the Republic and early Empire. A stronger emphasis was placed upon ranged combat ability of all types, such as field artillery, hand-held *ballistae*, archery and darts. Roman forces also gradually became more mobile, with one cavalryman for every three infantryman, compared to one in forty in the early Empire.” There was a diverse range of cavalry regiments, but the proportion of cavalry did not change between early third and early fourth centuries. Around this time, larger groups of *barbari* began to settle in Roman territories, and they made contracts to provide services for the Roman army.

(viii) **Comitatenses and limitanei** (284-395): Diocletian and Constantine restructured the Roman army. “The major development from the army of the principate was the formal division of the army into two parts, the field army (*comitatenses*) and the border troops (*limitanei*). The border troops were organized to defend provinces and were stationed around the edges of the Empire. In the mid-fourth century there were three regional armies (Gaul, Illyricum, the East), each commanded by a magister militum, and a praesental army attached to each emperor. In the late fourth century a series of smaller local field armies was created (e.g. in Britain, Africa and Thrace). These field armies moved to deal with crises as they occurred. The entire establishment was c. 450,000 men, but each field army could deploy 30-40,000 men. For offensives, praesental armies sometimes reinforced regional armies.” However, the Empire had become chronically deficient in raising sufficient troops from amongst its own population. “As an alternative, taxation raised internally was increasingly used to subsidize growing numbers of barbarian recruits. The Romans had, for some time, recruited individual non-Roman soldiers into regular military units. In 358 A.D., this practice was accelerated by the wholesale adoption of the entire Salian Franks people into the Empire, providing a ready pool of such recruits. In return for being allowed to settle as *foederati* in northern *Gallia* on the near side of the Rhine, the Franks were expected to defend the Empire's territories in their territory and provide troops to serve in Roman units. In 376, a large band of Goths asked Emperor Valens for permission to settle on the southern bank of the Danube River on terms similar to the Franks. The Goths were also accepted into the empire as *foederati*; however, they rebelled later that year and defeated the Romans at the Battle of Adrianople. The heavy losses that the Roman military suffered during this defeat ironically forced the Roman Empire to rely still further on such *foederati* troops to supplement its forces. In 382, the practice was radically extended when federated troops were signed up *en masse* as allied contingents of *laeti* and *foederati* troops separate from existing Roman units.”
Chapter IV. Economic Thought and Other Intellectual Developments

(ix) **Collapse in the West and Survival in the East** (395-476): The *comitantes* was the non-federated mobile field army that was eventually divided into a number of small field armies: “a central field army under the emperor's direct control, known as the *comitatenses palatina* or *praesentalis*, and several regional field armies.” The latter gradually degraded into low-quality garrison units similar to the *limitanei* that they either supplemented or replaced. However, by the fifth century, the Western Roman Empire used *foederati*, rented barbarian mercenaries, as part of main forces significantly. “As the 5th century progressed, many of the Empire's original borders had been either wholly or partially denuded of troops to support the central field army. In 395, the Western Roman Empire had several regional field armies in Italy, Illyricum, Gallia, Britannia and Africa, and about twelve border armies. By about 430, two more field armies were established in Hispania and Tingitania but the central government had lost control of Britannia as well as much of Gaul, Hispania, and Africa. In the same period, the Eastern Roman Empire had two palatine field armies (at Constantinople), three regional field armies (in the East, in Thrace, and in Illyricum) and fifteen frontier armies. As Roman troops were spread increasingly thin over its long border, the Empire's territory continued to dwindle in size as the population of the empire declined. Barbarian war bands increasingly began to penetrate the Empire's vulnerable borders, both as settlers and invaders. In 451, the Romans defeated Attila the Hun, but only with assistance from a confederation of *foederati* troops, which included Visigoths, Franks and Alans. As barbarian incursions continued, some advancing as far as the heart of Italy, Rome's borders began to collapse, with frontier forces swiftly finding themselves cut off deep in the enemy's rear.”

The barbarian troops paid by Rome became a perpetual threat the empire, causing revolt from 409 onwards, and finally unseated the last emperor of the Western Roman Empire in 476, while the Easter Roman forces defended the Byzantine Empire until its fall in 1453.

(x) **Roma Military Frontiers and Fortification**: The Roman Empire reached the peak of its territorial expansion by the early second century, rather than constantly expanding their borders as earlier in the Empire and Republic. The Romans solidified their strategic position with a serious fortification along the defense line. Hadrian (117-138) spent half of his reign, touring the empire and advocating for the construction of forts, towers, and walls all across the edges of the empire. The Hadrian’s Wall, called *Limes Britannicus*, was a defensive fortification in Roman Britain that began in 122 as shown in Photo IV-6-2. A series of naval ports in Britain was also built along the south east coast, initially to combat piracy but later to protect from raiding and the threat of invasion from Saxons. In continental Europe, the borders were set along the Rhine-Danube line. The *Limes Germanicus* running across the line of the Rhine-Danube consists of the Lower Germanic Limes, the Upper Germanic Limes, and the proper Rhaetian Limes. “In Dacia, the limes between the Black Sea and the Danube were a mix of the camps and the wall defenses: the *Limes Moesiae* was the conjunction of two, and sometimes three, lines of *vallum*, with a Great Camp and many minor camps spread through the fortifications.” The eastern borders changed many times, “of which the most enduring was the Euphrates River; bordering the Parthian Empire in modern Iran and western Iraq. Rome advanced beyond the Euphrates for a time upon defeating their rivals, the Parthians in 116 A.D., when Trajan captured Ctesiphon, and established new provinces in Assyria and Babylonia. Later that year he took the Parthian capital, Susa, deposed the Parthian King Osroes I. However, the Romans did not Romanize the entire Parthian Empire, leaving Parthiaspates as a puppet king on the throne to rule over former Parthian lands with the exclusion of modern Iraq, which became Assyria and Mesopotamia.” The southern borders were “the deserts of Arabia and the Sahara that represented a natural barrier to prevent expansion. The Empire controlled the Mediterranean shores and the mountains opposite. The western borders were mainly protected by the Atlantic coast and unfortified.”

486
Historical Phases of the Roman Army: (a) Early Roman Army (to 300 B.C.): From the very beginning until c. 550 B.C., "there was probably no national Roman army, but a series of clan-based war-bands which only coalesced into a united force in periods of serious external threat. Around 550 B.C....it appears that a universal levy of eligible adult male citizens was instituted. This development apparently coincided with the introduction of heavy armor for most of the infantry. Although originally low in numbers, the Roman infantry was extremely tactical and developed some of the most influential battle strategies to date. The early Roman army was based on a compulsory levy from adult male citizens which was held at the start of each campaigning season, in those years that war was declared. There were probably no standing or professional forces. During the Regal Era (to c. 500 B.C.), the standard levy was probably of 9,000 men, consisting of 6,000 heavily armed infantry (probably Greek-style hoplites), plus 2,400 light-armed infantry (rorarii, later called velites) and 600 light cavalry (equites celeres). When the kings were replaced by two annually elected praetores in c. 500 B.C., the standard levy remained of the same size, but was now divided equally between the Praetors, each commanding one legion of 4,500 men. It is likely that the hoplite element was deployed in a Greek-style phalanx formation in large set-piece battles. However, these were relatively rare, with most fighting consisting of small-scale border-raids and skirmishing. In these, the Romans would fight in their basic tactical unit, the centuria of 100 men. In addition, separate clan-based forces remained in existence until c. 450 B.C. at least, although they would operate under the Praetors' authority, at least nominally. In 493 B.C., shortly after the establishment of the Roman Republic, Rome concluded a perpetual treaty of military alliance (the foedus Cassianum), with the combined other Latin city-states. The treaty, probably motivated by the need for the Latins to deploy a united defense against incursions by neighboring hill-tribes, provided for each party to provide an equal force for campaigns under unified command. It remained in force until 358 B.C."

(b) Roman Army of the mid-Republic (300-88 B.C.): The mid-Republic army adopted the manipular organization of its battle-line giving greater tactical strength and flexibility. "This structure was probably introduced in c. 300 B.C. during the Samnite Wars. Also probably dating from this period was the regular accompaniment of each legion by a non-citizen formation of roughly equal size, the ala, recruited from Rome's Italian allies, or socii. The latter were c. 150 autonomous states which were bound by a treaty of perpetual military alliance with Rome. Their sole obligation was to supply to the Roman army, on demand, a number of fully equipped troops up to a specified maximum each year. The Second Punic War (218–201 B.C.) saw the addition of a third element to the existing dual Roman/Italian structure: non-Italian mercenaries with specialist skills lacking in the legions and alae: Numidian light cavalry, Cretan archers, and slingers from the Balearic islands. From this time, these units always accompanied Roman armies. The Republican army of this period, like its earlier forebear, did not maintain standing or professional military forces, but levied them, by compulsory conscription, as required for each campaigning season and disbanded thereafter. The standard levy was doubled during the Samnite Wars to 4 legions (2 per Consul), for a total of c. 18,000 Roman troops and 4 allied alae of similar size. Service in the legions was limited to property-owning Roman citizens, normally those known as iuniores (age 16–46). The army's senior officers, including its commanders-in-chief, the Roman Consuls, were all elected annually at the People's Assembly. Only equites (members of the Roman knightly order) were eligible to serve as senior officers. Iuniores of the highest social classes (equites and the First Class of commoners) provided the legion's cavalry, the other classes the legionary infantry. The proletarii (under 400 drachmae wealth) were ineligible for legionary service and were assigned to the fleets as oarsmen. Elders, vagrants, freedmen, slaves and convicts were excluded from the military levy, save in emergencies."
(c) **Roman Army of the late Republic** (88-30 B.C.): “During the earlier phase, the normal size of the levy (including allies) was in the region of 40,000 men (2 consular armies of c. 20,000 men each). During the latter phase, with lengthy wars of conquest followed by permanent military occupation of overseas provinces, the character of the army necessarily changed from a temporary force based entirely on short-term conscription to a standing army in which the conscripts, whose service was in this period limited by law to 6 consecutive years, were complemented by large numbers of volunteers who were willing to serve for much longer periods. Many of the volunteers were drawn from the poorest social class, which until the 2nd Punic War had been excluded from service in the legions by the minimum property requirement: during that war, extreme manpower needs had forced the army to ignore the requirement, and this practice continued thereafter. Maniples were gradually phased out as the main tactical unit, and replaced by the larger cohorts in the allied *alae*, a process probably complete by the time the general Marius assumed command in 107 B.C.” As a result of the Social War (91–88 B.C.), “all Italians were granted Roman citizenship, the old allied *alae* were abolished and their members integrated into the legions. Regular annual conscription remained in force and continued to provide the core of legionary recruitment, but an ever-increasing proportion of recruits were volunteers, who signed up for 16-year terms as opposed to the maximum 6 years for conscripts. The loss of *ala* cavalry reduced Roman/Italian cavalry by 75%, and legions became dependent on allied native horse for cavalry cover. This period saw the large-scale expansion of native forces employed to complement the legions, made up of *numeri* (units) recruited from tribes within Rome’s overseas empire and neighboring allied tribes. Large numbers of heavy infantry and cavalry were recruited in Spain, Gaul and Thrace, and archers in Thrace, Anatolia and Syria. However, these native units were not integrated with the legions, but retained their own traditional leadership.”

(d) **Imperial Roman Army** (30 B.C.-A.D. 284): Returning from Egypt, Augustus dismissed 300,000 men from active service, and organized 28 legions with 150,000 men. Under Augustus, “the legions, c. 5,000-strong all-heavy infantry formations recruited from Roman citizens only, were transformed from a mixed conscript and volunteer corps serving an average of 10 years, to all-volunteer units of long-term professionals serving a standard 25-year term (conscription was only decreed in emergencies). In the later 1st century, the size of a legion’s First Cohort was doubled, increasing legionary personnel to c. 5,500. Alongside the legions, Augustus established the auxilia, a regular corps of similar numbers to the legions, recruited from the *peregrini* (non-citizen inhabitants of the empire – about 90% of the empire’s population in the 1st century). As well as comprising large numbers of extra heavy infantry equipped in a similar manner to legionaries, the auxilia provided virtually all the army’s cavalry (heavy and light), light infantry, archers and other specialists. The auxilia were organised in c. 500-strong units called *cohortes* (all-infantry), *alae* (all-cavalry) and *cohortes equitatae* (infantry with a cavalry contingent attached). Around 80 A.D., a minority of auxiliary regiments were doubled in size. Until about 68 A.D., the auxilia were recruited by a mix of conscription and voluntary enlistment. After that time, the auxilia became largely a volunteer corps, with conscription resorted to only in emergencies. Auxiliaries were required to serve a minimum of 25 years, although many served for longer periods. On completion of their minimum term, auxiliaries were awarded Roman citizenship, which carried important legal, fiscal and social advantages. Alongside the regular forces, the army of the Principate employed allied native units (called *numeri*) from outside the empire on a mercenary basis. These were led by their own aristocrats and equipped in traditional fashion. Numbers fluctuated according to circumstances and are largely unknown. As all-citizen formations, and symbolic guarantors of the dominance of the Italian master-nation, legions enjoyed greater social prestige than the auxilia. This was reflected in better pay and benefits.”

488

*Book I. From the Beginning to the Rise of Islam*
In addition, “legionaries were equipped with more expensive and protective armor than auxiliaries. However, in 212, the emperor Caracalla granted Roman citizenship to all the empire’s inhabitants. At this point, the distinction between legions and auxilia became moot, the latter becoming all-citizen units also. The change was reflected in the disappearance, during the 3rd century, of legionaries’ special equipment, and the progressive break-up of legions into cohort-sized units like the auxilia. By the end of Augustus’ reign, the imperial army numbered some 250,000 men, equally split between legions and auxilia (25 legions and c. 250 auxiliary regiments). The numbers grew to a peak of about 450,000 by 211 (33 legions and c. 400 auxiliary regiments). By then, auxiliaires outnumbered legionaries substantially. From the peak, numbers probably underwent a steep decline by 270 due to plague and losses during multiple major barbarian invasions. Numbers were restored to their early 2nd-century level of c. 400,000 (but probably not to their 211 peak) under Diocletian (r. 284–305). After the empire’s borders became settled (on the Rhine-Danube line in Europe) by 68, virtually all military units (except the Praetorian Guard) were stationed on or near the borders, in roughly 17 of the 42 provinces of the empire in the reign of Hadrian (r. 117–38). The military chain of command was relatively flat. In each province, the deployed legions’ legati (legion commanders, who also controlled the auxiliary regiments attached to their legion) reported to the legatus Augusti pro praetore (provincial governor), who also headed the civil administration. The governor in turn reported direct to the emperor in Rome. There was no army general staff in Rome, but the leading praefectus praetorio (commander of the Praetorian Guard) often acted as the emperor's de facto military chief-of-staff.”

Legionary rankers…enjoyed considerable disposable income, enhanced by periodic cash bonuses on special occasions such as the accession of a new emperor. In addition…they were given a generous discharge bonus equivalent to 13 years’ salary."

(e) The Late Roman Army and East Roman Army (284-641): “The Late Roman army is the term used to denote the military forces of the Roman Empire from the accession of Emperor Diocletian in 284 until the Empire's definitive division into Eastern and Western halves in 395. A few decades afterwards, the Western army disintegrated as the Western empire collapsed. The East Roman army, on the other hand, continued intact and essentially unchanged until its reorganization by themes and transformation into the Byzantine army in the 7th century. The term “late Roman army” is often used to include the East Roman army. The army of the Principate underwent a significant transformation as a result of the chaotic 3rd century. Unlike the Principate army, the army of the 4th century was heavily dependent on conscription and its soldiers were more poorly remunerated than in the 2nd century. Barbarians from outside the empire probably supplied a much larger proportion of the late army's recruits than in the army of the 1st and 2nd centuries. The size of the 4th-century army is controversial. More dated scholars estimated the late army as much larger than the Principate army, half the size again or even as much as twice the size. With the benefit of archaeological discoveries of recent decades, many contemporary historians view the late army as no larger than its predecessor: under Diocletian c. 390,000 (the same as under Hadrian almost two centuries earlier) and under Constantine no greater, and probably somewhat smaller, than the Principate peak of c. 440,000. The main change in structure was the establishment of large armies that accompanied the emperors (comitatus praesentales) and were generally based away from the frontiers. Their primary function was to deter usurpations. The legions were split up into smaller units comparable in size to the auxiliary regiments of the Principate. In parallel, legionary armor and equipment were abandoned in favor of auxiliary equipment. Infantry adopted the more protective equipment of the Principate cavalry.”

In the 3rd and 4th centuries, many existing border forts were upgraded and new forts were constructed with much higher defensive specifications as noted previously.
The Roman Navy: The Roman navy was instrumental in the Roman conquest in the Mediterranean basin. Primarily, the Romans were land-based people, so that their navy naturally relied on such subjects as the Greeks and Egyptians to build and man their ships. Having no logistical autonomy, the Roman navy “operated as an adjunct to the Roman army.” In the course of the First Punic War, the Roman navy was massively expanded and played a vital role for the Roman victory, which brought Roman hegemony in the Mediterranean Sea. “During the course of the First Punic War, the Roman navy was massively expanded and played a vital role in the Roman victory and the Roman Republic’s eventual ascension to hegemony in the Mediterranean Sea. In the course of the first half of the 2nd century B.C., Rome went on to destroy Carthage and subdue the Hellenistic kingdoms of the eastern Mediterranean, achieving complete mastery of the inland sea, which they called Mare Nostrum. The Roman fleets were again prominent in the 1st century B.C. in the wars against the pirates, and in the civil wars that brought down the Republic, whose campaigns ranged across the Mediterranean. In 31 B.C., the great naval Battle of Actium ended the civil wars culminating in the final victory of Augustus and the establishment of the Roman Empire. During the Imperial period, the Mediterranean became largely a peaceful ‘Roman lake’; in the absence of a maritime enemy, the navy was reduced mostly to patrol, anti-piracy and transport duties. The navy also manned and maintained craft on major frontier rivers such as the Rhine and the Danube for supplying the army.” However, in the third century, the decline of the Empire was also influential to the navy in size as well as combat ability: continuous barbarian invasions made the navy play a secondary role. “In the early 5th century, the Roman frontiers were breached, and barbarian kingdoms appeared on the shores of the western Mediterranean. One of them, the Vandal Kingdom, raised a navy of its own and raided the shores of the Mediterranean, even sacking Rome, while the diminished Roman fleets were incapable of offering any resistance.” In the late fifth century, the Western navy collapsed, while the Byzantine navy survived.

Map IV-6-2. The Roman Fleets and Major Naval Bases during the Principate
Accessed 8 March 2018,
https://en.wikipedia.org/wiki/Roman_navy#mediaviewer/File:Roman_harbors_and_fleets_Augustus-Severus.png
Chapter IV. Economic Thought and Other Intellectual Developments

(a) History of Naval Warfare: The early Republic acquired its first fleet, consisting of 20 ships, mostly like triremes, with each duumvir commanding a squadron of 10 ships, and their main task was most likely towards patrolling along the Italian coast and rivers, protecting seaborne trade from piracy. In the First Punic War (264-241 B.C.), operations in Sicily had to be supported by a fleet, but ships available by Roman allies were insufficient. The Roman Senate passed a bill to construct a fleet of 100 quinqueremes and 20 triremes. “The new fleets were commanded by the annually elected Roman magistrates, but naval expertise was provided by the lower officers, who continued to be provided by the socii, mostly Greeks….Despite the massive buildup, the Roman crews remained inferior in naval experience to the Carthaginians, and could not hope to match them in naval tactics, which required great maneuverability and experience. They therefore employed a novel weapon which transformed sea warfare to their advantage. They equipped their ships with the corvus, possibly developed earlier by the Syracusans against the Athenians. This was a long plank with a spike for hooking onto enemy ships. Using it as a boarding bridge, marines were able to board an enemy ship, transforming sea combat into a version of land combat, where the Roman legionaries had the upper hand. However, it is believed that the corvus’ weight made the ships unstable, and could capsize a ship in rough seas.” During the course of the war, Rome continued to be victorious at sea, which success Rome to push the war further across the sea to Africa and Carthage itself. In the Second Punic War (218-201 B.C.), unlike the first war, the navy played little role in both sides. “The Roman fleet was hence engaged primarily with raiding the shores of Africa and guarding Italy, a task which included the interception of Carthaginian convoys of supplies and reinforcements for Hannibal’s army, as well as keeping an eye on a potential intervention by Carthage’s ally, Philip V.” The Roman fleet was involved in the siege of Syracuse in 214-212 B.C. with 130 ships; and a decade later, a fleet of 160 vessels was assembled to support Scipio Africanus’ army in Africa in 202 B.C.

Another decisive battle of the Roman navy is the Battle of Actium in 31 B.C. “In the East, the Republican faction quickly established its control, and Rhodes, the last independent maritime power in the Aegean, was subdued by Gaius Cassius Longinus in 43 B.C., after its fleet was defeated off Kos. In the West, against the triumvirs stood Sextus Pompeius, who had been given command of the Italian fleet by the Senate in 43 B.C. He took control of Sicily and made it his base, blockading Italy and stopping the politically crucial supply of grain from Africa to Rome. After suffering a defeat from Sextus in 42 B.C., Octavian initiated massive naval armaments, aided by his closest associate, Marcus Agrippa: ships were built at Ravenna and Ostia, the new artificial harbor of Portus Julius built at Cumae, and soldiers and rowers levied, including over 20,000 manumitted slaves. Finally, Octavian and Agrippa defeated Sextus in the Battle of Naulochus in 36 B.C., putting an end to all Pompeian resistance. Octavian’s power was further enhanced after his victory against the combined fleets of Mark Antony and Cleopatra, Queen of Egypt, in the Battle of Actium in 31 B.C., where Antony had assembled 500 ships against Octavian’s 400 ships. This last naval battle of the Roman Republic definitively established Octavian as the sole ruler over Rome and the Mediterranean world. In the aftermath of his victory, he formalized the Fleet’s structure, establishing several key harbors in the Mediterranean. The now fully professional navy had its main duties consist of protecting against piracy, escorting troops and patrolling the river frontiers of Europe. It remained however engaged in active warfare in the periphery of the Empire.”

The naval power of the Vandal Kingdom under Geiseric in North Africa raided in the Western Mediterranean, which was practically uncontested after the disastrous failure of the fleets mobilized against the Vandals in 460 and 468. As the last emperor of the West was deposed, there would be no recovery. Nevertheless, in the sixth century, the Byzantine Empire established a standing navy that maintained the classical naval tradition until eleventh century.
(b) **Organization of the Navy**: (i) Crews: The Roman fleet relied on rowers of free status, and not on galley slaves. “Slaves were employed only in times of pressing manpower demands or extreme emergency, and even then, they were freed first. In imperial times, non-citizen freeborn provincial, chiefly from nations with a maritime background such as Greeks, Phoenicians, Syrians and Egyptians, formed the bulk of the fleet’s crew.” Crewmen could sign on as marines, rowers or seamen, craftsmen and various other jobs. Emperor Claudius first gave legal privileges to the navy’s crewmen to receive Roman citizenship after the 26 years of service, and with a sizable cash payment upon honorable discharge. Each ship was commanded by a *trierarchus*; squadrons, consisting of ten ships each, under a *nauarchus*; the post of *nauarchus archigubernes* functioned either as a commander of several squadrons or as an executive officer under a civilian admiral.

(ii) High command: During the Republic, command of a fleet was given to a serving magistrate or proconsul. The praefectus classis became a procuratorial position in charge of each of the permanent fleets, which were initially filled either from among the equestrian class or from the Emperor’s freedmen. (iii) Ship types: “The navy consisted of a wide variety of different classes of warships, from heavy polyremes to light raiding and scouting vessels. Unlike the rich Hellenistic Successor kingdoms in the East however, the Romans did not rely on heavy warships, with quinqueremes, and to a lesser extent quadriremes and triremes providing the mainstay of the Roman fleets from the Punic Wars to the end of the Civil Wars. The heaviest vessel mentioned in Roman fleets during this period was the hexareme, of which a few were used as flagships. Lighter vessels such as the liburnians and the hemiolia, both swift types invented by pirates, were also adopted as scouts and light transport vessels.”

(iv) Armament and tactics: “In Classical Antiquity, a ship’s main weapon was the ram, which was used to sink or immobilize an enemy ship by holing its hull. Its use, however, required a skilled and experienced crew and a fast and agile ship like a trireme or quinquereme. In the Hellenistic period, the larger navies came instead to rely on greater vessels. This had several advantages…Although the ram continued to be a standard feature of all warships and ramming the standard mode of attack, these developments transformed the role of a warship: from the old manned missile, designed to sink enemy ships, they became mobile artillery platforms, which engaged in missile exchange and boarding actions. The Romans in particular, being initially inexperienced at sea combat, relied upon boarding actions through the use of the *corvus*. Although it brought them some decisive victories, it was discontinued because it tended to unbalance the quinqueremes in high seas; two Roman fleets are recorded to have been lost during storms in the First Punic War. During the Civil Wars, a number of technical innovations, which are attributed to Agrippa, took place: the *harpax*, a catapult-fired grappling hook, which was used to clamp onto an enemy ship, reel it in and board it, in a much more efficient way than with the old *corvus*, and the use of collapsible fighting towers placed one apiece bow and stern, which were used to provide the boarders with supporting fire.”

(v) Fleets: Augustus reduced the Roman armed forces including the navy. The bulk of the fleet was soon divided into two praetorian fleets at Misenum in the west and Ravenna in the east of the Italian peninsula. The various provincial fleets were smaller than the praetorian fleets and compose mostly of lighter vessels, although these fleets took full campaigns or raids on the periphery of the Empire. On the Danube frontier, the *Classis Pannononica* and the *Classis Moesica* were broken up into several smaller squadrons, collectively termed *Classis Histrica*, authority of the frontier commanders. In the Western Europe, particularly in Gaul, several fluvial fleets had been established under the command of the *magister peditum* of the West. In the East, the *Classis Alexandria* and the *Classis Seleucena* continued to operate. (vi) Major Roman ports were Portus Julius located at Misenum; Classis near Ravenna; Alexandria; Leptis Magna; Ostia; Portus; and Port of Mainz run by river navy of the Rhine.
Chapter IV. Economic Thought and Other Intellectual Developments

War History of the Roman Military: “The Roman army battled first against its tribal neighbors and Etruscan towns within Italy, and later came to dominate the Mediterranean and at its height the provinces of Britannia and Asia Minor. As with most ancient civilizations, Rome's military served the triple purpose of securing its borders, exploiting peripheral areas through measures such as imposing tribute on conquered peoples, and maintaining internal order. From the outset, Rome's military typified this pattern, and the majority of Rome's campaigns were characterized by one of two types. The first is the territorial expansionist campaign, normally begun as a counter-offensive, in which each victory brought subjugation of large areas of territory and allowed Rome to grow from a small town to a population of 55 million in the early empire when expansion was halted. The second is the civil war, which plagued Rome from its foundation to its eventual demise.” In the Republic, the Romans were engaged in the Samnite Wars and the Pyrrhic War for consolidation of the Italian peninsula; the Punic Wars to expand it domain to Sicily, Carthage, and Spain; and the Macedonian Wars to rule the Hellenistic world in the East. There were numerous wars in the late Republic during 147-30 B.C. in which the Gallic Wars were the most significant. “The Gallic Wars were a series of military campaigns waged by the Roman proconsul Julius Caesar against several Gallic tribes. Rome's war against the Gallic tribes lasted from 58 B.C. to 50 B.C. and culminated in the decisive Battle of Alesia in 52 B.C., in which a complete Roman victory resulted in the expansion of the Roman Republic over the whole of Gaul. The wars paved the way for Julius Caesar to become the sole ruler of the Roman Republic. Although Caesar portrayed this invasion as being a preemptive and defensive action, most historians agree that the wars were fought primarily to boost Caesar's political career and to pay off his massive debts. Still, Gaul was of significant military importance to the Romans, as they had been attacked several times by native tribes both indigenous to Gaul and farther to the north. Conquering Gaul allowed Rome to secure the natural border of the river Rhine.”

In the Roman Empire, the Romans continued its expansion up to and beyond the borders of the known world. Roman armies pushed north and east out of Gaul to subdue much of Germania. “After Caesar's preliminary low-scale invasions of Britain, the Romans invaded in force in 43 A.D., forcing their way inland through several battles against British tribes.” Following a general uprising, the Romans suppressed the rebellion and went on to push as far north as central Scotland, and Roman troops built and manned Hadrian's Wall. The control of the Black Sea region with the Parthians was repeatedly gained and lost. The Jewish revolts were contained. In the second century A.D., several Germanic tribes pushed across the Danube, striking as far as Italy itself. Major wars they had created during in this period are as follows: (i) Roman-Alemannic battles: the Alemanni, a confederation of Suebian Germanic tribes on the upper Rhine River, launched major invasion of Gaul and northern Italy in 268, though they were forced back to Germany. (ii) Gothic migration: the Battle of Adrianople: In 378 A.D., the Goths defeated the Eastern Empire at the Battle of Adrianople, in which the Eastern Emperor Valens was massacred along with tens of thousands of Roman troops. In 410, Alaric of the Visigoths sacked Rome before they moved to Spain, though not successful. (iii) Frankish migration: about the same time, Franks raided through the North Sea and the English Channel. (iv) Vandal migration: Vandals pressed across the Rhine and migrated to northern Africa through Spain, and established their kingdom. (v) The rise of Persians: the Sassanid Empire continued to make war against Rome in the third century. The Romans were victorious but Emperor Julian was killed in the Battle of Samarra during the retreat. (vi) The Western Roman Empire collapsed, and had no further effective control over the scattered Western domains that could still be described as Roman. Meantime, Justinian the Great of the Eastern Roman Empire launched campaigns: his army destroyed the Vandals in North Africa, the Ostrogoths in Italy, and captured a southern part of Spain, though short lived.
Chapter IV. Economic Thought and Other Intellectual Developments

Endnotes

14 Thoughts on the Old Testament and Economics, accessed the same.
15 Thoughts on the Old Testament and Economics, accessed the same.
17 Ibid., 8-9.
21 Ibid., xiv.
22 Ibid., xix.
23 Aesop, Aesop’s Fables (Norwalk, CT: The Easton Press, 1979), 46-7.
24 Ibid., 118.
25 Lion’s Share, accessed 6 October 2014, https://en.wikipedia.org/wiki/Lion%27s_share
26 Aesop, Aesop’s Fables, 28-9.
31 Ibid., 9.
34 Ibid., 96.
Chapter IV. Economic Thought and Other Intellectual Developments

38 Ibid., 142-52.
61 Ibid., 175-94. My discussions on this page mostly owe to Cameron Hawkins’ article.
63 Ibid., 210. My discussions on this page mostly owe to Peter F. Bang’s article.
65 Ibid., 232.
67 Ibid., 284.
69 Ibid., 343.
70 Ibid., 355.
71 Will Duran, Our Oriental Heritage, The Story of Civilization 1, 251.
82 Ibid., 75-7.
Chapter IV. Economic Thought and Other Intellectual Developments

Chapter IV. Economic Thought and Other Intellectual Developments


Book I. From the Beginning to the Rise of Islam 497
Chapter IV. Economic Thought and Other Intellectual Developments


141 Late Antiquity in the Mediterranean: The Late Roman Army, accessed 1 November 2014, http://faculty.nipissingu.ca/muhlberger/ORB/LRA.HTM.


149 Roman army: Imperial Roman army, accessed the same.


