Charlemagne, Early Medieval Europe and the Holy Roman Empire
* The Fall of Rome

- I'm guessing most of us have heard the saying, 'When the cat's away, the mice will play!'

- Although it's usually used to describe things like students when the teacher leaves the room, or workers slacking off while the boss is on vacation, today we're going to use it as a historical metaphor for the rule of the über famous Charlemagne, the man who pulled Western Europe from chaos, and united it under his ruling thumb.

  - In doing this, Charlemagne will be our cat, and the unruly people groups of Europe will be our mice.

  - As we take a look at our cat and his mice, we'll also undercover the role feudalism played in their interactions.

- Before we get to our big cat, let's grasp an understanding of feudalism.

  - **Feudalism** is a system of government in which power is based on land ownership. In this system, all land is officially owned by the sovereign but divided among the nobility.
* The Fall of Rome

- Although feudalism is usually linked to the time of Charlemagne, its roots go back to the 5th century fall of Rome when the people groups of Europe, or tribes, began fighting for domination.

  - To say the least, it was a violent and dangerous time, and although the leaders of these tribes were usually referred to as kings, their power was not absolute, and they were always in danger of being overthrown by a challenger.

  - In other words, they were a bit closer to kittens than big cats!

- Birth of European Feudalism

  - To gain some semblance of control, these kings began giving **fiefs** or portions of land to the nobility.

  - Those given the land came to be known as **vassals**.

  - In return for the gift of land, the vassals would offer the king their allegiance.
* The Fall of Rome

- Yes, they would raise armies to protect their land but their first official duty was to fight for the king should challengers arise.

- In order to make their lands productive and profitable, vassals would also offer protection to the peasantry who farmed the land.
  - These peasants gained the name **serfs**.
    - Obviously, the life of the serf was far from glamorous, but it was protected.
    - In short, that's what the whole feudal system was about: offering protection in a very chaotic time, making it possible to govern and protect large territories in the absence of a centralized government.

- Although feudalism did offer some stability, it had one very large drawback.
  - Since each noble raised an army to defend his own fief, the nobility became very powerful.
* The Fall of Rome

- As their power increased, they began warring among themselves.
- With this, Western Europe found itself continually in turmoil.

* Europe Under Charlemagne

- Enter Charlemagne, our big cat.
  - Charles was born in modern day Belgium, near the town of Liege, to Pepin Martel, the oldest son of the Charles Martel that defeated the Saracens at the Battle of Tours, on April 2, 742
    - His father and grandfather had held the title Maior Domo, or Mayor of the Palace, under the Merovingian Kings.
    - However, by the time of Charles, I, the Mayor of the Palace had effective power over the monarchy, and the King was merely a figurehead.
* Europe Under Charlemagne

- When Childebert, III became King, Pepin Martel was Mayor of the Palace, but just the existence of Childebert on the throne caused a great deal of controversy in the Franks about who should actually be King.

- So, Pepin wrote to Pope Stephen in Rome, asking him to clarify.
  - Stephen said that God would not allow a people to be governed by someone who did not have the power and authority to back up his rule, and thus ordered Childebert into a monastery, ending the Merovingian line.
  - He then came to Paris personally and crowned Pepin King of the Franks

- Pepin had two sons, Charles and Carloman.
  - Charles was much older than Carloman, and had accompanied his father into battle on several occasions.
  - When Pepin died, the Frankish tradition declared that the kingdom be divided between his sons.
* Europe Under Charlemagne

- Charles received the north west of the kingdom, and Carloman the south east bordering Italy and the Lombards.

- Charles and Carloman were not very friendly to each other, and if their mother Bertrada had not been alive to mediate, they would have most likely killed each other.

- Charles first wife, Desiderata, was a daughter of the Lombard King.

- However, with the emergence of the Lombards as the only power in Italy to rival the Pope, Pope Stephen, III convinced Charles to dissolve their marriage after only a year.

- Desiderata returned to her father.

  - This angered the Lombards, who were then ready to assist Carloman in overthrowing his brother, but mysteriously, Carloman died.

  - Carloman’s wife and son fled to the Lombard court as they were afraid that Charles had somehow been involved.
* Europe Under Charlemagne

• Now that he was sole King he continued to use the system of feudalism, he made sure his mice were under his firm control.

• To understand how he did this, we'll focus on two main things: his military conquests and his divine rights as king.

  • To understand the significance of Charlemagne's military conquests, let's remember Western Europe had pretty much been in chaos since the 5th century fall of Rome.

  • It was a time in which might made right, and lucky for Charlemagne, he proved to have the most might.

• As king of the Franks, or modern-day France, Charlemagne wielded an impressive fighting machine.

  • This fighting machine was on full display with the Lombards of Northern Italy, and it was his fight with them that led to the unification of most of Europe.
• Despite the reason for disliking the Lombards because they shielded his nephew, a rival claimant to the throne, the real fight with the Lombards began with The Roman Emperor Constantine the Great who proclaimed the religion of Christianity to be the official religion of the empire in 315, and had invited bishops across the empire to the first ecumenical council in Nicaea the same year, where they established Christ’s divinity, set the date for Easter, and determined the standard church teaching on the nature of Christ as part of the trinity, and not one of three separate entities (Arianism).

• Once the Bishops had debated and discussed the decisions made at the council, they drafted a document based on the majority viewpoint, that stated these.

  • All of the Bishops were expected to sign it.

  • Those who did not, were told by Constantine, who was present at the council, that they would be exiled from the empire and lose their bishoprics if they did not.
Europe Under Charlemagne

- Only three of the 318 Bishops present did not sign the paper, and, true to his word, they were summarily exiled.

- Since that time, it was recognized that the true head of the Christian church in the empire was the emperor.

- This established two precedents in the church, for one, Christianity became a large part of the definition of what being Roman was; and for the other, that the church was dependent on the empire.

- These two sets of circumstances established a sense of security in the hierarchy of the church, and the feeling by the populace that the church was really just an extension of the bureaucracy of the empire.

- Thus, when the empire fell in the west, many people looked to the church for not just spiritual guidance, but also for civic and governmental guidance because they were what remained of the empire.
Europe Under Charlemagne

- Many of the new Germanic governments also acceded to the church as the professional bureaucrats, and many of them became Christian themselves to take advantage of the church’s service in governing their new kingdoms, and to their new, formerly Roman citizen, subjects, being Christian and allowing the church to help them, gave their new governments legitimacy.

- The church is where the literacy of the former empire was in large part held, it was church men that could read and write, and thus their services were highly valued by the mostly illiterate German rulers and populace.

  - Despite this, however, the church was always Roman, and looked to the empire for its leadership.

  - However, now the empire was centered in Constantinople, with the Eastern Roman Empire.

- North of the Danube River, in modern Austria, a small Germanic tribe that was part of the Suebi, who had served under Odoacer, bided their time while the Goths waged countless wars throughout the Italian peninsula to control what was once Rome.
Prior to 554 A.D., the only thing keeping them out of the rich and lush paradise of Italy had been Justinian, I’s reconquest of the western Roman empire, but now Justinian was dead, and there was no interest in the east of maintaining most of what he had recovered.

They had found it too be too expensive.

So, as the last of the Roman legions left Italy, this new Germanic tribe, who had been very successful in subduing lesser tribes on their side of the Danube, now crossed into Italy, joined by Saxons, Bulgars, Thuringians, Herols, Gepids and Ostrogoths, who remembered the stories of the riches of Rome, and wanted their share of this lush landscape.

These were the Lombards, and they conquered Italy, almost unopposed.

Italy was now, for the most part, a Lombard kingdom. The king of the Lombards even changed his title to King of Italy.

In order to maintain control of the entire peninsula under one king proved to be extremely difficult, however.
* Europe Under Charlemagne

- So, the King only exercised nominal control over the south of Italy, where he created two duchies that were to report to him, but rarely did, preferring to war amongst themselves, and with the King.

- Byzantium still exercised a great deal of control on the peninsula, however, in two main ways.

  - For one, they controlled the islands of Sardinia and Sicily, the foot of the boot of Italy, the City Of Rome, and its surrounding shore line, and a few mile passageway between Rome and the City of Ravenna and its outlying coastal areas.

  - The Emperor was also still in control of the Church.

    - This however, was about to change.

- When the Lombards were warring amongst themselves, there was always a constant threat that the connection between Rome and Ravenna, the last vestiges of the empire in Italy, would be severed if the south were to succeed.
Europe Under Charlemagne

- The Bishop of Rome, also known in Latin as Popa Roma, “The Father of Rome,” was very active in trying to maintain peace between the two factions of north and south.

  - They were so active that they even managed to convert the Lombard King Liutprand to orthodox Christianity, and away from Arianism in 712 A.D.

    - This in turn led to Liutprand obtaining the necessary resources to establish a certain amount of control over the duchies of the south, and the connection between Rome and Ravenna was saved.

    - But only for a time.

- In Constantinople, a continuing religious fight that had been going on for centuries since Christ died was about to gain a new face, or lack of one.

  - This fight was over the use of icons in the church.

    - The Byzantine Emperor Leo, III, was an extreme iconoclast who outlawed the use of icons, that he saw as the worship of graven images, within Christendom.
Europe Under Charlemagne

- While usually obedient to the Emperor, this time, Pope Gregory, III refused to follow this edict from Constantinople.

- Icons in the west were seen as essential to Christianity

- Most of the population in Western Europe was illiterate, and icons provided them a means of interpreting and understanding the Bible and engaging with their religion.

- Since the church had supported King Liuptrand, he, in turn, felt he needed to support the church against the Byzantine emperor who threatened the Pope because of his refusal to accede to his iconoclast dictate.

- As a result, he attacked the Byzantine holdings of Ravenna, and the corridor between Rome and the city, and captured them.
* Europe Under Charlemagne

- Rather than being pleased with this feat in his support, Pope Gregory, III became very worried that the northern portion of the kingdom of Lombardy was becoming much too powerful, and may eclipse the north and force them to obey him.

- The Pope felt that a unified Lombard Kingdom would make him a slave to the dictates of the Lombard king, and so it was in his best interests to keep the northern and southern Lombards weak and fighting amongst each other.

- He could count on no help from the Emperor in Byzantium, and so needed to turn elsewhere to look for imperial protection and guidance.
As a result, since the papacy had crowned his father King, when invited to protect the church by the new pope, Leo, III, Charles Martel, II agreed and attacked Liuptrand and the Lombards, conquering their kingdom and naming himself King of the Lombards.

However, many citizens in Rome itself were unhappy with being cut off from Byzantium and now being subject to a Germanic prince, Christian or not.

As a result, while Leo, III rode through the streets of Rome, a mob formed hurling insults at him, and even attacking him physically.

For weeks, the mob controlled the city while Pope Leo remained locked inside the Vatican for protection.
* Europe Under Charlemagne

- He sent a letter to his protector begging for help, and soon Charles and his army were in Rome itself putting down the revolt.

- The church had found its protection, and now saw a chance to legitimize it for the “Romans.”

- Within the week, the Christmas mass was being held, and Charles was invited to a large public mass presided over by Pope Leo, III

- The pope asked Charles to kneel before him, and assuming he was going to receive a blessing, did so.

- However, instead of a blessing, the pope placed a crown upon his head and proclaimed him Emperor of a new Holy Roman Empire.
*Europe Under Charlemagne*

- From that time, Charles Martel, II became known as Charles the Great, Carlos Magnus in Latin, and Charlemagne in French.

- Since Constantine, the church had been under the civil authorities, as it was the Emperor who selected and approved of Bishops, and to whom the church turned to resolve not only temporal, but also spiritual issues (viz a viz Nicea).

- But, now with the crowning of Charles as Holy Roman Emperor, and his renaming to Carlos Magnus, or the Frankish Charlemagne, it was the Church that had assumed control over the secular world.

- What was also remarkable about Charlemagne’s ascension to the Holy Roman Empire was that it was neither holy, as a great chunk of it was not even Christian, it was certainly not Roman as it contained many more Germans, and it was not really an empire, as it did not economically impose its will on its subject peoples.

- Charlemagne did, however, unite most of western Europe for the first, and only time, up to the present European Union, under one ruler.
Europe Under Charlemagne

- He also ignited the Carolingian Renaissance, inviting scholars from throughout the western world and funding their studies, as well as arts, invention, architecture and science and literature.

  - He was a man obsessed with learning himself.

- So, through brute force and determination, he conquered the Lombards of modern-day Italy, the Avars of Austria and Hungary, the areas of Bavaria, the Germanic Saxons, and many others.

  - Not only would Charlemagne conquer a land but as a Christian king, he would force his faith upon its people.

    - For example, at the 782 **Massacre of Verdun**, it is believed he ordered the slaughter of about 4,500 Saxons.

    - Those who survived his tyranny were eventually forced to be baptized into Christianity or face death.
* Europe Under Charlemagne

- He defeated and included all of Italy into his empire, and it extended northwards to Holland, where he had invaded and conquered the mighty Saxon tribes, that still worshipped in oak groves, and revered their god Woden.

- He forced them to convert to Christianity, or had them killed, such as near the city of Verdun in modern Belgium where he executed nearly 3,000 pagans in what today is known as the **“The Bloody Verdict of Verdun.”**

- While he ruled, he maintained a firm control over the empire.

  - He ruled for 13 more years after becoming Emperor.

  - In 813, Charlemagne called Louis the Pious, king of Aquitaine, his only surviving legitimate son, to his court.

  - There Charlemagne crowned his son with his own hands as co-emperor and sent him back to Aquitaine.

  - He then spent the autumn hunting before returning to Aachen on 1 November.
Europe Under Charlemagne

- In January, he fell ill with pleurisy.
- In deep depression (mostly because many of his plans were not yet realized), he took to his bed on 21 January and as Einhard tells it:
  - “He died January twenty-eighth, the seventh day from the time that he took to his bed, at nine o'clock in the morning, after partaking of the Holy Communion, in the seventy-second year of his age and the forty-seventh of his reign.”

- Although these tactics were ruthless, they worked to forcibly unite the modern day areas of Northern Spain and Italy, through France, Germany and even Poland, under one faith, thus laying the ground work for what would become the Holy Roman Empire.
- Yes, feudalism still held a part in the political landscape but Charlemagne and his Christianity prowled around as undisputed king of the system.
  - All lands were his, and no one dared try to tame him!
* Europe Under Charlemagne

- With his crowning as Emperor on in 800 AD, Charlemagne added divine right as king to his grip on the empire.

- The **Divine Right of Kings** is a political and religious ideology, which recognizes a monarch as free from earthly authority, since his right to rule has come directly from God.

- For this reason, a king is not subject to the people, the nobility or any other earthly institution.

- Shoring up matters even more for the king, the doctrine holds that any attempt to remove a king from the throne or to restrict his power is in direct violation of God's will.

  - Talk about a powerful endorsement!

- The origins of the theory are rooted in the medieval idea that God had bestowed earthly power to the king, just as He has given spiritual power and authority to the Pope.
* Europe Under Charlemagne

• Making this doctrine even more powerful for Charlemagne, we need to remember he was not only a king; he was made emperor by the Pope himself!

• Not only had God willed him to be a king, but God's mouth piece - the Pope - had made him emperor!

• Now, who would dare argue with that?

• Giving Charlemagne even more validity, the Bible was also used (or misconstrued, depending on your point of view) to push this doctrine, specifically Romans 13:1-2 which reads,

  • “Let everyone be subject to the governing authorities, for there is no authority except that which God has established. The authorities that exist have been established by God. Consequently, whoever rebels against the authority is rebelling against what God has instituted, and those who do so will bring judgment on themselves.”

• In other words, it'd be a really, really bad idea to go up against King Charlemagne, let alone Emperor Charlemagne! To do so would be to contradict the will of God.
* Europe Under Charlemagne

  • Cultural Reform

  • Using this position of power, Charlemagne continued to unify the empire through cultural reform.

  • Believing literacy could help in the process, he brought scholars to his realm to encourage education, most of whom were Irish.

  • Also, his rule saw the formation of monastic schools throughout the empire.

  • With this emphasis on education, came a flowering of culture, known as the **Carolingian Renaissance**, a period of renewed emphasis on scholarship and learning.

    • During this period the **Carolingian minuscule**, or a standardized form of writing, came into being.

    • This form of writing would set the groundwork for the modern European printed alphabet, yet another success attributed to Charlemagne.
* Europe Under Charlemagne

- Cultural Reform

  - When we stop to consider all this man did in terms of conquest, rule, and culture it's no wonder he was a legend in his own time - and almost seen as a god after his death.

  - Perhaps nothing drives this point home more, than the 11th century Song of Roland, an epic, yet rather fictional, poem highlighting the rule of Charlemagne.

    - In it Charlemagne, the Holy Roman Emperor, was elevated to near god status, as a man beyond mortal wisdom.

    - In short, a Medieval Superman, or perhaps villain, depending on which side of the fence you stand.

  - With this, Charlemagne went from being a controlling cat to a full blown lion.

  - With his military and his divine right as king, not many dared to challenge his vicious roar.
* Europe After Charlemagne

- Unfortunately (or fortunately, depending on which point of view you have), despite his god-like hold on Europe, Charlemagne's rule was not eternal.

- He succumbed to death in the year 814 AD, and like the old saying goes, with the cat away, the mice began to play!
  - In other words, tribes again began to war, and nobles began fighting for more territories.

- Charlemagne’s empire lasted only another generation in its entirety; its division, according to custom, between Louis's own sons after their father's death laid the foundation for the modern states of France and Germany.
  - That son, who ruled as co-Emperor with Charlemagne from 813 to Charlemagne’s death, was Louis, known as the Pious
    - Louis had been the King of Aquitaine prior to this, as his father had planned on dividing the empire between his three sons, as was the Frankish custom, and wanted each son to grow up in and rule their respective territories.
* Europe After Charlemagne

- Louis’ brothers Charles the Younger and Pepin died before their father, and thus Left Louis as the sole heir to the imperial throne

- Louis would not be as lucky, as most of his reign was marked by wars between him and his sons

  - After his father’s death. Louis was crowned the Emperor by Pope Stephen, IV, who had succeeded Leo, III, when he visited Reims, thus solidifying the position of the Pope and the church in the imperial succession and validity.

  - For many years there was peace as Louis had apportioned acceptable parts of the empire to each if his three sons, and they were satisfied.

    - His oldest son, Lothair was crowned co-emperor in Aachen by Louis and was promised the succession to most of the Frankish territories and would be the overlord of his brothers and cousins.

    - Pepin was proclaimed King of Aquitaine
* Europe After Charlemagne

- And Louis the Younger was proclaimed King of Bavaria

- If one of the subordinate kings died, he was to be succeeded by his sons.
  - If he died childless, Lothair would inherit his kingdom.
  - In the event of Lothair dying without sons, one of Louis the Pious' younger sons would be chosen to replace him by "the people".
  - Above all, the Empire would not be divided: the Emperor would rule supreme over the subordinate kings, whose obedience to him was mandatory.

- These plans fell apart however, when in 823 Louis had another son with a second wife, whom he named Charles.
  - In 829 Louis gave Charles Alemannia, and made him King there.
  - This, of course, took territory away from the other sons, particularly Lothair.
* Europe After Charlemagne

- It was not long before Lothair raised an army and marched on his father.

- However, Louis had promised Pepin and Louis the Younger (also known as Louis the German, since most of his territories were in Germany) more land to maintain their loyalty to their father.

- Together, they forced Lothair to accept Louis sovereignty over them, and Louis forgave Lothair.
  
  - Only two years later, however, Pepin disobeyed his father and left his court.
  
  - Thinking he was going to rouse up his nobles in rebellion, Louis mustered an army to pursue him.
  
  - Louis the German joined his brother though, and thwarted their father’s plans.
* Europe After Charlemagne

• In retaliation, Emperor Louis divided his realm again giving Charles the Kingdoms of Aquitaine, and depriving Pepin in any share of his inheritance.

• He was much kinder to the younger Louis.

• While these events were occurring, Lothair was secretly collaborating with Pope Gregory, IV, who had become Pope over Louis; objections.

• When Pope Gregory came to Louis camp to mediate, he began to sow dissension in the ranks of his army, and overnight he lost most of his followers.

• Louis ordered the rest to go home so as not to lose their lives in what was apparently a lost cause.

• Lothair imprisoned the Emperor, his step mother, and his younger brother Charles.
* Europe After Charlemagne

- Then, with Pope Gregory’s support, called a synod of Bishops to name his supporters as Bishops, and to hear the forced confession of his father to crimes he did not commit, and vote that by the right of God, Lothair should be crowned Emperor.

- Many of Lothair’s barons found this repugnant, and switched sides to Louis, allowing him to be freed, and to even pursue his son back into Italy.

- A new synod deposed his appointments to the bishopric, and Lothair himself fell ill.

- He sued his father for peace, and Louis restored Pepin and Louis, but denied Lothair all but Italy, giving the rest of his former territories to Charles.

- In 837, Louis crowned Charles King over all of Allemania and Burgundy and gave him a portion of his brother Louis’ land.
* Europe After Charlemagne

- Louis the German rose up in revolt, and Louis the Pious then gave all of Louis the German’s land, except for Bavaria to Charles.

- When Pepin died in 838, Louis gave Charles Pepin’s kingdom of Aquitaine as well, disinheriting Pepin’s young son, Pepin, II.

- As Louis the German and his large allied army marched on his father, for the first time in a long time, Lothair allied with his father, and together they beat Louis back, and Louis the Pious reapportioned his kingdom yet again.

- Louis the German retained Bavaria, Pepin, II remained disinherited, which left an eastern and a western half to be divided between Lothair and Charles, and he gave Lothair his choice.

- Lothair chose the eastern half which included Italy, and the western where the heart of the Kingdom of the Franks lie went to Charles.
• When Louis the Pious was dying in 840, he sent the imperial insignia to Lothair, who, disregarding the various partitions, claimed the whole of the Empire.

• Negotiations with his brother Louis the German and his half-brother Charles, both of whom resisted this claim, were followed by an alliance of the younger brothers against Lothair.

  • A decisive battle was fought at Fontenay-en-Puisaye on 25 June 841, when, in spite of his and his allied nephew Pepin II of Aquitaine's personal gallantry, Lothair was defeated and fled to Aachen.

• With fresh troops he began a war of plunder, but the forces of his brothers were too strong, and taking with him such treasure as he could collect, he abandoned his capital to them.

• He met with the leaders of the Stellinga in Speyer and promised them his support in return for theirs, but Louis and then the native Saxon nobility put down the Stellinga in the next years.
Europe After Charlemagne

- The Stellinga ("companions, comrades") was a movement of frilingi (freemen) and Iazzi (freedmen), the lower two of the three Saxon non-slave castes, between 841 and 845.
  - Its aim was to recover those rights the two castes had possessed before their conversion from Germanic paganism in the 770s.
  - At that time they had still possessed political privileges, but Charlemagne, having won over to his cause the Saxon nobility, had reduced them to mere peasants.
  - The Stellinga thus despised the Lex Saxonom (law of the Saxons), which had been codified by Charlemagne, preferring to live in accordance with ancient and unwritten tribal custom.
  - The movement was violently resisted by the uppermost caste, the nobiles (nobility), not always with the support of the Frankish kings.
• Peace negotiations began, and in June 842 the brothers met on an island in the Saône.

• They agreed to an arrangement which developed, after much difficulty and delay, into the Treaty of Verdun, signed in August 843.

• By this, Lothair received the imperial title as well as northern Italy and a long stretch of territory from the North Sea to the Mediterranean, essentially along the valleys of the Rhine and the Rhône.

• He soon ceded Italy to his eldest son, Louis, and remained in his new kingdom, engaging in alternate quarrels and reconciliations with his brothers and in futile efforts to defend his lands from the attacks of the Northmen (as Vikings were known in Frankish writings) and the Saracens.
Europe After Charlemagne

- In 855 he became seriously ill, and despairing of recovery renounced the throne, divided his lands between his three sons, and on the 23rd of September entered the monastery of Prüm, where he died six days later.
  - He was buried at Prüm, where his remains were found in 1860.
  - Lothair's kingdom was divided between his three sons—
    - the eldest, Louis II, received Italy and the title of emperor;
    - the second, Lothair II, received Lotharingia;
    - the youngest, Charles (the Bald), received Provence.
  - As the Carolingian Dynasty divided their lands amongst each succeeding generation, and fought amongst each other, their power diminished, and eventually other nobles nominally under them, taking the example of the Carolingians, consolidated their power and the accepted end of the Carolingian dynasty came with the coronation of Robert II of France as junior co-ruler with his father, Hugh Capet, the first of the Capetian dynasty of French Kings.
* Europe After Charlemagne

- Deprived of the strong centralizing force of Charlemagne's rule and facing the new threat of Viking invasions from the north, the people of Europe began scurrying like mice, trying to find protection from the coming storm.

- Ironically, just as it had done at the fall of Rome, Western Europe turned back to feudalism.

- This time the continent sank even deeper into the feudal system, trading allegiance for protection in a time of chaos that would last until the dawning of the Renaissance.

* The Vikings

- A Misunderstood People

  - When we think of Vikings, we tend to think of bearded, axe-wielding barbarians raping and pillaging their way along the coast of Northern Europe.

  - It is hard to imagine that these savage people might have had any lasting impact on Western Civilization besides, perhaps, the terror of their memory.
* The Vikings

- **A Misunderstood People**
  - And indeed, that terror alone would change the course of history in profound ways.
  - Yet in at least one respect, the Vikings were ahead of their time.
  - They were the first world explorers and had colonized the New World nearly 500 years before Columbus first set sail.

- **The Viking Longship**
  - Yet history does not remember the Vikings for their exploration but for their barbarity.
    - This is not surprising, as most of our accounts of the Vikings come from the victims of their raids.
    - And indeed, Viking raids were a quick and brutal affair.
      - The Vikings did not come to conquer, they came to steal everything of value and leave.
The Vikings

The Viking Longship

We can learn a lot about how these raids went by looking at the heart of Viking culture: the longship.

As the name implies, the Viking longship was a long ship with banks of oars on either side and sometimes a sail.

Viking longships were capacious, able to hold a large company of warriors and whatever booty they might acquire.

Viking longships had a shallow draft, allowing them to pull right up to the coast or even up a river for an amphibious assault.

Viking longships were symmetrical, allowing them to reverse direction without turning around.

This feature probably evolved from the need to navigate around icebergs in the frozen water of the North; however, it proved equally useful for making a quick getaway after a raid.
*The Vikings*

- **The Viking Longship**
  - So, imagine waking up one morning to see Viking longships approaching.
    - You immediately know you're doomed.
    - You could send for help to your neighbors, but there's no way they will arrive in time since the Vikings can just pull their longships ashore.
    - And because the Vikings are here to raid, not to conquer, they're not going to sit around and wait for an army to come fight them.
    - Even if a neighbor came to your aid, the Vikings would just row their symmetrical boats back out to sea and go raid your neighbor's undefended land.
  - In short, if you get raided by Vikings, you're on your own.
* The Vikings

• The Impact of Viking Raids
  
  • For these reasons, Viking became a word of terror for the people of Northern Europe, and many historians tend to treat Vikings as mere disruptions to civilization.

  • Yet it was in this disruptive role that the Vikings had, perhaps, their most profound impact on Western civilization.

  • The Vikings essentially turned the tide in Europe from centralized imperialism to decentralized feudalism.

  • Viking raids began stepping up around the end of the 8th century, just as Charlemagne was trying to unite Europe into the Carolingian Empire.

    • This centralized empire was not suitable to deal with the amphibious raids of the Vikings.

    • Try as he might, Charlemagne could not possibly hope to defend thousands of miles of coastline from Viking invasions.
The Vikings

- The Impact of Viking Raids

  - Moreover, since the shallow Viking longships could travel upriver, not even the inland empire was safe, as the Vikings proved quite clearly a century later by laying siege to Paris in 885.

  - Charlemagne's empire was so short-lived because it could not provide the most basic services an empire is supposed to provide its subjects: peace and protection.

  - As Charlemagne's empire fell apart, Europeans needed to find a new way to protect themselves against these Viking raiders, something local and small enough to be responsive but powerful enough to protect the people and their property.

  - This marks the birth of **feudalism**, a system in which local lords tax their people to support small armies and build fortifications.

    - Though feudalism would eventually be used against the common people, giving it the negative connotation it has even today, at its inception feudalism actually was meant to protect the people from invading Vikings.
* The Vikings

• The Viking Age

• Though the Vikings clearly earned their reputation as vicious warriors, it is worth noting that the Vikings were more than just raiders; they were also traders.

• Starting from Scandinavia, the Vikings had established numerous trading colonies across Northern Europe.

• In the late 8th century, they settled in the British Isles, establishing footholds in Scotland, Ireland and England.

• In the 9th century, a group of Vikings called the Rus built a colony to serve as a hub for the lucrative slave market.

• The names stuck in more ways than one: the Rus gave their name to Russia, while the people they enslaved still bear the name Slav.

• In the beginning of the 10th century, the French attempted to pay off the Vikings by giving them Normandy.
* The Vikings

  • The Viking Age

    • This Viking colony would in turn conquer England as well as parts of southern Italy and the Holy Land!

    • In many ways, the history of the Vikings continues on in the history of Normandy and England.

  • Yet the Vikings did not stop there.

    • By the end of the 10th century, they had colonized Iceland and Greenland, and sometime around the beginning of the 11th century, they found their way to the New World, establishing colonies in Newfoundland, Labrador and perhaps even New England.

  • So maybe the Vikings weren't barbarians as they're often depicted.

    • In terms of trade, the Vikings built and maintained a trade empire that even Charlemagne would have envied.

    • In terms of exploration, the Vikings were about 500 years ahead of the rest of Europe.
The Technology Behind the Armored Knight

The Armored Knight: Symbol of an Age

When you hear the word 'medieval,' what's the first thing that comes to mind?

- If you're like me, you think of armored knights charging a field with lances lowered.

The armored knight encapsulates a great deal of medieval society.

- In a world of illiteracy and squalor, the knight was the greatest technological achievement of his time.

  - He was the height of medieval military technology, combining the protection of armor with the speed and maneuverability of the horse.

  - In an age in which military might was the primary vehicle of political power, knights were near the top of the socioeconomic ladder.

  - They were the aristocracy of their time.
* The Technology Behind the Armored Knight

- **The Armored Knight: Symbol of an Age**
  - Lands and titles were granted to knights in exchange for military service.
  - It could be said that Charlemagne created the feudal system for the sole purpose of producing these incredible fighting machines.
  - So let us examine the technology behind these awesome warriors.

- **Heavy Cavalry Tactics**
  - To understand the military technology of the armored knight, we must first have a clear picture of what these knights were designed to do.
    - The point of the knight is to charge into the enemy line wielding a long spear or a lance.
    - Done alone, this tactic would be suicidal.
    - But if you take a few hundred knights, you can form them into a wedge.
* The Technology Behind the Armored Knight

• Heavy Cavalry Tactics

• You then send that wedge of knights charging into the enemy with their lances lowered.

• Usually, the mere sight of tons of steel and murderous flesh hurtling toward them is enough to put defenders to flight.

• Failing that, the knights would crash into the enemy ranks, shattering their formation and giving your foot soldiers a chance to close in and finish them off.

• This tactic requires the solution of several technical problems.

• The first is obvious: how do you keep your knight and his mount alive?

• The enemy isn't just going to wait for your knights to hit them. They're going to shoot arrows at them, and they're going to form a wall of spears to withstand the charge.

• So what do you do?
The Technology Behind the Armored Knight

- Heavy Cavalry Tactics
  - The answer to this problem is armor.

- Armor: Chain Mail to Plate
  - Armor went through a lot of changes in Medieval Europe.
    - After the collapse of the Roman Empire, metal became much more scarce.
      - Mining is a labor-intensive process, and medieval lords had far less manpower at their disposal compared with the armies of slaves available to the Roman Empire.
      - Medieval smiths had to find ways to make the most out of little bits of metal.
        - The first solution was chain mail, a sort of armor made from interlinking rings of metal.
* The Technology Behind the Armored Knight

• Armor: Chain Mail to Plate

• This created a sort of metal fabric, which was flexible and maneuverable.

• This flexibility made chain mail ideal for protecting joints and limbs, but it also proved a weakness.

• Chain mail acted as a sort of hard skin.

• This made it an excellent protection from small piercing attacks from arrows and slashing attacks from swords.

• However, it did little to protect its wearer from the pierce of a lance, since the links would either bunch together or tear under the tremendous force.

• Chain mail was also useless against blunt force, since the flexible mail would just as easily form around your collapsing skull.
* The Technology Behind the Armored Knight

- **Armor: Chain Mail to Plate**

  - As metal became more plentiful and new techniques found their way to Europe, Europeans began supplementing chain mail with plate armor.

  - The long, rigid nature of the plates helped overcome some of the limitations of chain mail.

    - Rather than simply crumpling on impact like mail, a plate can deflect, or turn, a blow.

    - Failing that, a plate at least spreads the damage out over a larger area rather than passing an impact directly to its wearer like the mail would do.

  - Europeans experimented with a variety of methods, including scale armor, a type of armor made of overlapping plates, and the coat of plate, or brigandine, in which metal plates were sewn into a sturdy fabric.

    - Though these armors still offered some flexibility, their many seams meant that they were riddled with weak points, and their small plates could only do so much to turn a blow.
* The Technology Behind the Armored Knight*

- **Armor: Chain Mail to Plate**

  - The final solution was full plate armor.

  - These are the suits of armor you see standing in museums.

  - Unlike mail, plate armor has a structure all its own.

    - That means that a blow is spread across the entire plate, dampening its impact on the wearer.

    - More importantly, this structure means that you can design plate armor in such a way that it turns a blow aside rather than having to absorb it.

  - Of course, full plate also has its limitations.

    - First of all, it's not very flexible.

      - You can't put plate over a joint without severely limiting a knight's movement.
The Technology Behind the Armored Knight

- Armor: Chain Mail to Plate
  - However, a charging knight doesn't really need all that great a range of movement.
    - He doesn't need to do backflips.
    - Heck, he doesn't even need to walk, really.
    - He just needs to sit on a horse and point his lance in the right direction.
  - The second disadvantage to plate is that it makes the knights even heavier.
    - Plate did not replace chain mail but rather supplemented it.
    - Most knights still wore a full coat of mail beneath their plate to protect the few vulnerable places on the plate, especially around joints.
* The Technology Behind the Armored Knight

• Armor: Chain Mail to Plate
  • These limitations combined to make the knight himself incredibly heavy and nearly immobile.
  • He would depend upon his horse for mobility and maneuverability.

• Staying on the Horse: The Stirrup & the High-Cantled Saddle
  • However, the dependence on the horse raised new technical problems.
    • How do you keep this awkward, heavily armored warrior from falling off his horse?
    • He has to hold a heavy lance several meters long on top of a charging horse. How will he keep his balance?
    • He's going to charge that lance into a crowd of men. How do you keep him from being thrown off the saddle at impact?
The Technology Behind the Armored Knight

- Staying on the Horse: The Stirrup & the High-Cantled Saddle

  - And then he's going to lay about the enemy with a sword. How do you keep him from overbalancing and falling off?

  - Luckily for knights, over the centuries a series of technologies had developed that, when combined, would allow knights to stay on their horses.

  - These technologies all centered on the saddle, where the rider meets the horse.

    - The saddle has taken many forms throughout history.

      - It started out just as a pad for the horse's back.

      - Around 500 BC, the nomads of the Eurasian Steppe began making saddles with a raised ridge at the back, called a cantle, to keep riders from sliding off the back.

      - They also developed the pommel to give riders something to grab onto to maintain their balance.
The Technology Behind the Armored Knight

• Staying on the Horse: The Stirrup & the High-Cantled Saddle

• Around 200 BC, the Chinese began making saddles with a solid wooden core, or saddle tree, to better distribute the weight on the horse's back.

• Sometime in the following centuries, someone, probably another Asian Steppe nomad, came up with the stirrup.

• The stirrup is a solid loop hanging from either side of the saddle where a rider could put his feet.

• These technologies had found their way to Eastern Europe as early as the 6th century, where they were put to use by the Byzantines to great effect.

• A couple centuries later, Western Europeans began to adapt these technologies for their knights.

• To help the knight keep his balance during the charge, they raised the pommel and cantle.

• This also kept the knight from being unseated on impact.
*The Technology Behind the Armored Knight*

- **Staying on the Horse: The Stirrup & the High-Cantled Saddle**
  - Stirrups were also helpful in both of these regards.
    - Yet the real strength of the stirrup arose after impact, when knights would lay about the enemy with their swords and foot soldiers would try to pull them down.
      - The stirrup gave the knight a solid platform to stick his feet into.
      - This allowed him to wield his weapons with deadly accuracy without overbalancing and kept foot soldiers from pulling him from his saddle.
- **Steer with Your Legs, Fight with Your Hands**
  - So, we've got our knight protected. We've got him on the horse.
    - Just one teensy technical problem remained: How do you get a horse to charge into a wall of pikes?
The Technology Behind the Armored Knight

- Steer with Your Legs, Fight with Your Hands

  - Horses have a certain sense of self-preservation.

  - You can cover them with all the armor you like; the horse is not smart enough to realize that he is protected.

  - To persuade a horse to run headlong into a pike line, you need to goad it forward.

  - A charging knight cannot be bothered with a flail, nor can he be troubled to steer his horse with reigns.

  - His hands are busy killing people.

  - The solution was the spur.

  - A spur is a pointy thing attached to a rider's heels.

  - They come in several forms, starting with a spike and culminating in the round rowel spur we see in western movies.
* The Technology Behind the Armored Knight

- **Steer with Your Legs, Fight with Your Hands**
  
  - Whatever their shape, spurs allow the rider to give his horse a sharp poke with either foot.
  
  - A knight could use his spurs to drive his mount forward and to steer his mount without using his hands.
  
  - Spurs were so important to knighthood that they became a status symbol.
    
    - Knights wore gilded spurs and their squires wore spurs of silver.
    
    - A dishonored knight would have the spurs struck from his boots.
* The Decline of the Byzantine Empire

• Overview of Byzantine Empire

• In the year 1453, Turks from the Ottoman Empire captured the city of Constantinople bringing an official end to the Byzantine Empire.

• However, as we're about to learn, it was more than Turkish guns that brought an end to this grand empire.

  • For centuries, the Byzantine Empire, also known as the Eastern Roman Empire, had enjoyed prosperity.

    • Situated along profitable trade routes and protected by the Black Sea, the empire thrived.

    • For centuries, it seemed that the Roman Empire of the East would eclipse the grandeur once found in Rome.

    • However, like Rome, the Byzantine Empire would face a gradual decline, aided by internal instability and external invasion.
* The Decline of the Byzantine Empire

- Internal Instability

  - For this lesson, we'll start with internal instability.

  - In doing so, we'll blame the nobility for the empire's woes.

  - To explain, early in the empire's history, most of its population was made up of free men who were given land in turn for military service.

  - Fortunately for the empire, these men also paid taxes.

  - With this, the Byzantine Empire not only had a large tax base, but it also had a large military at its disposal.

  - However, this all changed as members of the nobility began claiming large areas of land as their own.

  - Not only did they begin swallowing up land, but they also began placing the poorer class into a state of bondage in which they were tied to the land and owed their allegiance to the noble land owner rather than the empire.
* The Decline of the Byzantine Empire

- **Internal Instability**
  
  - This has come to be known as **serfdom**.
  
  - As the peasant class was swallowed by the nobility, the tax base and the military of the Byzantine Empire began to evaporate.
  
  - As if this wasn't bad enough, the empire was then forced to depend on mercenary armies and cities from the West for protection.

  - This was especially troublesome because mercenaries were rather expensive.

  - Making matters worse, the Byzantine Empire and the cities of the West were not on the best of terms.

  - So, not only did this deplete the empire's treasury, but it also allowed Western merchants, specifically those from Venice, free access to the markets of Constantinople.

  - When the Venetians began selling goods at a cheaper price, the coffers of the empire were dealt another blow.
The Decline of the Byzantine Empire

Outside Invasion

While struggling with internal issues, the empire was also threatened by outside invasion.

In 1071, the beginning of the end began when Turks marched on the empire and handed it a devastating defeat at the Battle of Manzikert.

At the battle's end, the empire saw the loss of much of Asia Minor and the Balkans.

Oddly enough for the Byzantine Empire, not only did they have to deal with the Turks, they also faced some serious grief from the Christians of the West!

Remember those cities they didn't really get along with, but had to rely on for protection?

This came in the form of the Fourth Crusade, or Christendom's quest to free the Holy lands from Muslim control.
* The Decline of the Byzantine Empire

• Outside Invasion

• To explain this odd twist, at the very beginning of the 13th century, Christians again marched toward the Holy lands.

• However, this time they decided to make a pit stop of sorts at the city of Constantinople, Byzantium's capital.

• Upon entering the city, the Western soldiers ransacked the city, claiming it as their own.

• Although the Byzantines would eventually recover from this attack, it further drained their already depleting resources.

• Fall of Constantinople

• This leads us to the final death blow of the Byzantine Empire, the 1453 fall of Constantinople.

• Facing internal issues and outside invasion, the empire was breathing its last.
The Decline of the Byzantine Empire

Fall of Constantinople

- By the start of the 15th century, Turkish forces had clawed their way through a large part of Eastern Europe.
- With strategic wins throughout the empire, the Turks had chiseled away much of the lands once held by the Byzantine's.
  - In fact, by 1453 Constantinople was really the only place left under the empire's control.
- Secure behind the city walls, the empire waited out the attack.
- However, when the Turks descended on the city with gunpowder and cannons, the city was vanquished.
- Shortly after this loss, Constantinople was renamed Istanbul and the world said its final goodbye to the power of the Byzantine Empire.
* The Medieval Warm Period and New Agricultural Technologies

- Europe's Medieval Agricultural Revolution

  - Between the years 1050 and 1300, Europe underwent an agricultural revolution.
    - Crop yields multiplied by at least threefold.
    - Europe's population followed suit, tripling in less than three centuries.
    - The average European lifespan increased by as much as two decades.
    - Towns and cities reemerged, and with them came new crafts and a revival of trade.
    - New classes of merchants and craftsmen attained some degree of social mobility.

  - Soon the Renaissance would reawaken Europe to its glorious past, setting off a tide of technological progress from the enlightenment to the Industrial Revolution, that would eventually drag Europe from the Dark Ages and launch it into the world we live in today.
The Medieval Warm Period and New Agricultural Technologies

- Europe's Medieval Agricultural Revolution
  
  - None of this progress would have been possible without the surpluses created by Europe's medieval agricultural revolution.

  - So, what brought this revolution about?
    
    - Well, there were several factors at work:
      
      - A shift in climate made Northern Europe much warmer than it had been before.

      - A shift in political climate and the end of Viking raids brought stability to Northern Europe.

      - And, most importantly, a host of new agricultural technologies and techniques spread across Europe.

      - When combined, these factors allowed Europeans to produce unprecedented surpluses of food.
The Medieval Warm Period and New Agricultural Technologies

- The Medieval Warm Period
  - Around 950, Europe entered the Medieval Warm Period.
    - Climatologists speculate that earth's temperature might have increased by as much as one degree centigrade; that's about two degrees Fahrenheit for us Americans.
    - For about 300 years, Europe became a much warmer and dryer place.
    - This was bad news for the Mediterranean, where the temperatures were already high and the soil was dry and shallow.
    - But, it was great news for Northern Europe, where the temperatures were much lower and the soil was wet and deep.
    - Americans often forget that Europe is at a similar latitude to Canada.
      - Though surrounding oceans and seas keep Europe warm and wet, it still can get very cold in the north.
*The Medieval Warm Period and New Agricultural Technologies*

• **The Medieval Warm Period**
  - The Medieval Warm Period allowed the farms of Northern Europe to outproduce their Mediterranean counterparts.
  - This, in turn, resulted in a shift of power and importance away from the Mediterranean basin, which no longer enjoyed its old surpluses, and to the untapped fertile lands of Northern Europe.

• **A Shift in Political Climate**
  - Thus, it was not just the natural climate of Europe that was changing. The political climate was changing as well.
    - Since the time of Charlemagne, Europe had been pummeled by centuries of Viking invasions.
    - As the weather warmed, Viking invasions started to step down.
      - Perhaps the Vikings were finally able to produce their own agricultural surpluses, and no longer felt the need to raid their neighbors in the south so often.
A Shift in Political Climate

At the same time, centralized governments in Europe were becoming stronger, and a real sense of stability was returning to Europe for the first time since the collapse of the Roman Empire.

In this period of relative peace, Europeans no longer needed to cluster around the local fortifications of their lords.

They were finally able to disperse and settle new lands.

Aristocrats gave up their hunting grounds in the interest of generating profit from agricultural surpluses.

Forests retreated as isolated pockets of agriculture spread until they at last met.

The untamed woods of Northern Europe gave way to field after field, as far as the eye could see.

Yet none of this expansion would have been possible without the spread of some very important agricultural technologies and techniques:
The Medieval Warm Period and New Agricultural Technologies

• A Shift in Political Climate
  • The heavy plow, the harrow and the hoe
  • The horse collar, the tandem harness and horse shoes, and
  • The three-field crop rotation system.

• The Heavy Plow, the Harrow and the Hoe

  • The farmers of Northern Europe had to face challenges that their Mediterranean counterparts never had to deal with.
    • The very features that made northern Europe prosper in the Medieval Warm Period - deep, rich, wet alluvial soil - also made the land incredibly difficult to plow.
    • Now, the Romans had plows, but they were light things that only scratched the surface.
      • These plows were no good for the deep, damp soils of Northern Europe.
The Medieval Warm Period and New Agricultural Technologies

- The Heavy Plow, the Harrow and the Hoe
  - Farmers needed a way to tear up deep soil and drain their waterlogged fields.
  - The solution was the **heavy plow**.
    - The heavy plow is essentially an iron wedge that you drag behind an animal, to cut deep furrows into a field.
    - By creating such deep furrows, the heavy plow mixed up the ground, bringing oxygen back into the soil.
    - It also helped create a drainage system, preventing crops from drowning, for Northern Europe normally suffers from too much water, rather than the lack of it.
    - Finally, the heavy plow opened a deep trench into which one could drop a seed with a fair degree of confidence that it would stay underground.
* The Medieval Warm Period and New Agricultural Technologies

- **The Heavy Plow, the Harrow and the Hoe**
  
  - And if you really wanted to be sure that those seeds got buried, you could also follow your sowing by running a harrow over the field.

  - **Harrow**s take many forms, but they're basically a tool designed to level out the deep furrows of plowing to provide a comfy bed for seeds and ensure that they get buried.

  - And, once your crops began to grow, you could use a hoe to keep down the weeds.

- The impact of these technologies cannot be overstated. Without the heavy plow to break up the alluvial soils, intensive agriculture in Northern Europe would have been all but impossible.

- Without the harrow, burying seeds would take days, instead of hours.
The Medieval Warm Period and New Agricultural Technologies

- The Heavy Plow, the Harrow and the Hoe
  - Without the hoe, each weed would have to be picked by hand.
  - Together, these technologies made the surpluses of the Agricultural Revolution possible.

- The Horse Collar, the Tandem Harness and the Horse Shoe
  - Of course, the heavy plow is just a chunk of metal until you find a way to pull it.
  - And, as the name implies, the heavy plow was heavy.
  - Now, an ox could pull a heavy plow easily.
    - Oxen have big shoulders, making them easy to yoke and they're strong enough to pull almost anything.
    - However, oxen are heavy, they're slow, they tire easily, and they're notoriously difficult to turn around.
* The Medieval Warm Period and New Agricultural Technologies

- The Horse Collar, the Tandem Harness and the Horse Shoe

  - All of these features made oxen ill suited to plowing fields.

  - Oh, if only we could get a horse to pull our heavy plow.

  - Horses are light, they're quick, they have great endurance, and you can steer them with a bit.

  - Unfortunately, horses don't have the shoulders oxen have.

  - They tend to strangle themselves if they try to pull anything too heavy.

  - For literally thousands of years, this delicacy had protected horses from ever doing an honest day's work.

  - Horses were reserved for warfare, for hunting, for travel.

  - They were the mark of nobility.

  - Yet in the 9th century, some clever fellow found a way to put the horse to work.
* The Medieval Warm Period and New Agricultural Technologies

- The Horse Collar, the Tandem Harness and the Horse Shoe

  - The invention was the **horse collar**, a relatively simple idea.

  - It's just a padded collar that directs the burden onto the horse's shoulders without choking it.

  - Yet, the implications for the horse were grave, as the pampered pet of aristocracy was turned into a true beast of burden.

  - Soon enough, humans were nailing iron shoes to horse's feet and hitching them up to tandem harnesses to pull even heavier plows.
The Medieval Warm Period and New Agricultural Technologies

- Three-Field Crop Rotation

  - Yet, there was another reason horses had been reserved for the nobility, beyond their delicate tendency to choke themselves.

    - Horses are dreadfully expensive to feed.

      - Unlike cattle, which can subsist on grazing alone, horses need a steady diet of oats to remain healthy.

      - To support a horse, a farmer would need to grow oats.

      - This is, perhaps, how the three-field crop rotation system began.

    - A farmer would use one field to grow wheat for himself, and he'd use another field to grow oats for his horse.

      - At first, the farmer would probably have divided his fields as people always had.

      - He would grow crops on half of his land, while he let the other half lie fallow.
The Medieval Warm Period and New Agricultural Technologies

- Three-Field Crop Rotation
  - **Lying fallow** means that you don't try to grow anything on the land, but instead, let it recover naturally.
    - This sort of rotation is essential because crops pull nutrients from the soil, and the soil needs time to recover them.
    - Otherwise, the soil gets degraded rather quickly and will not support crops.
    - Somewhere along the line, our farmer must have accidentally planted oats after a crop of wheat.
    - And, lo and behold, the oats flourished, and after letting the field lie fallow for a year, the wheat came back bigger than ever.
      - You see, the oats had replaced the nitrogen the wheat had drawn from the soil.
The Medieval Warm Period and New Agricultural Technologies

• Three-Field Crop Rotation

• Though the farmers of Europe had no idea what nitrogen was, they knew that planting oats after the wheat somehow kept the soil healthy.

• Soon, they found other plants that had a similar effect: like barley and beans, and a new three-field form of crop rotation was established.

  • The first field grows cereals, which deplete the nitrogen.

  • The second field grows oats, barley or beans, which restore the nitrogen, and the third field lies fallow to recover.

  • This meant that European's were now using two thirds of their land to grow food, instead of half.

  • The importance of this shift cannot be overstated.
* The Medieval Warm Period and New Agricultural Technologies

• Three-Field Crop Rotation

  • The difference between two thirds and one half may not seem like much. It's what? Sixteen percent? Negligible you might say.

  • Wrong!

  • Imagine you have three acres.

  • Each acre can produce 50 bushels of wheat or 50 bushels of beans.

  • In the old system, you're only using half your acres, which means that you're getting 75 bushels of wheat.

  • In the new system, you're using two thirds of your acres.

  • So, while you may be only getting 50 bushels of wheat, you're also getting 50 bushels of beans.
* The Medieval Warm Period and New Agricultural Technologies

• Three-Field Crop Rotation

• Not only are you getting more food out of the land, you're also getting a wider variety of food.

• The three-field crop rotation system changed the world of farming forever, creating unprecedented surpluses and a greater variety of food for Europe.

• This great surplus and wider variety of foodstuffs contributed greatly to the health of your average European, whose life expectancy leaped from an all-time low of about 30, to as high as 50.

• Populations exploded, and the number of Europeans tripled in less than three centuries.