

The Medieval Machine

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I. Revival of Trade

II. “Industrial Revolution” of the Middle Ages

III. Warfare of the Middle Ages (Metal Production)

IV. Agricultural Revolution of the Middle Ages

I. Revival of Trade

A. Vikings

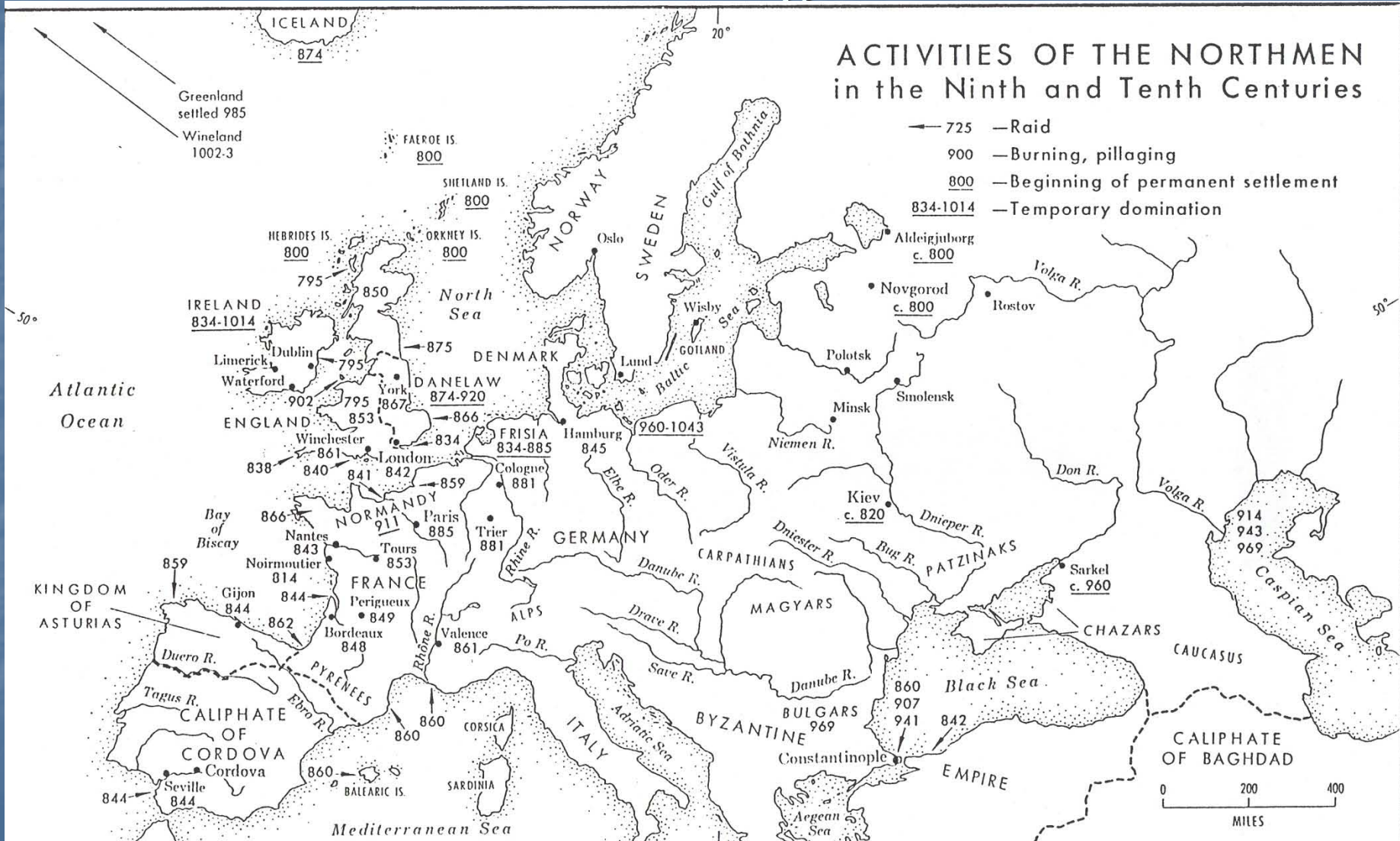
B. The Crusades (1095–1291)

C. Hanseatic League (13th to 16th centuries)

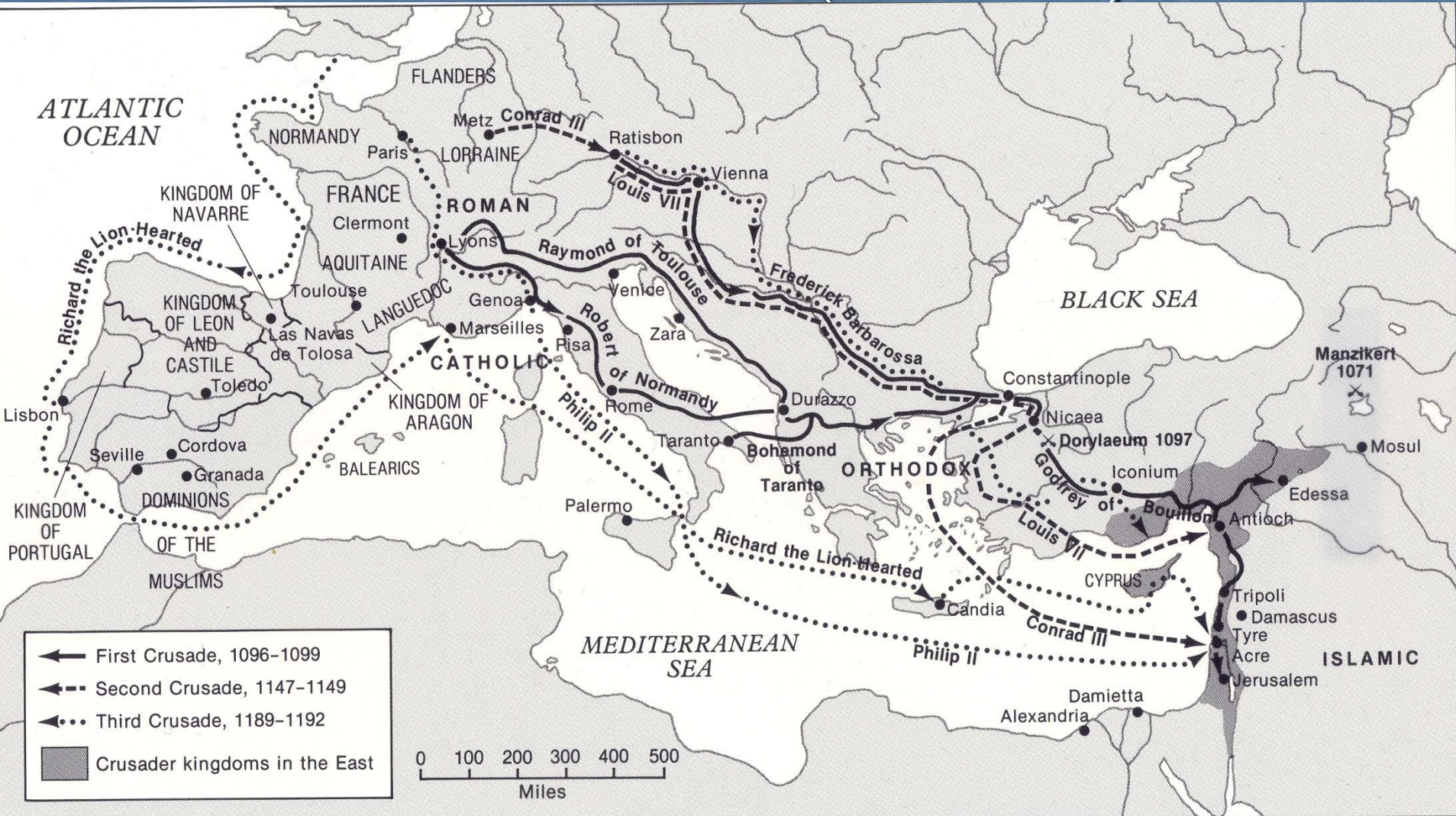
D. Champagne Fair — Troyes

E. Pilgrimages (Tourism)

A. Vikings



B. The Crusades (1095–1291)



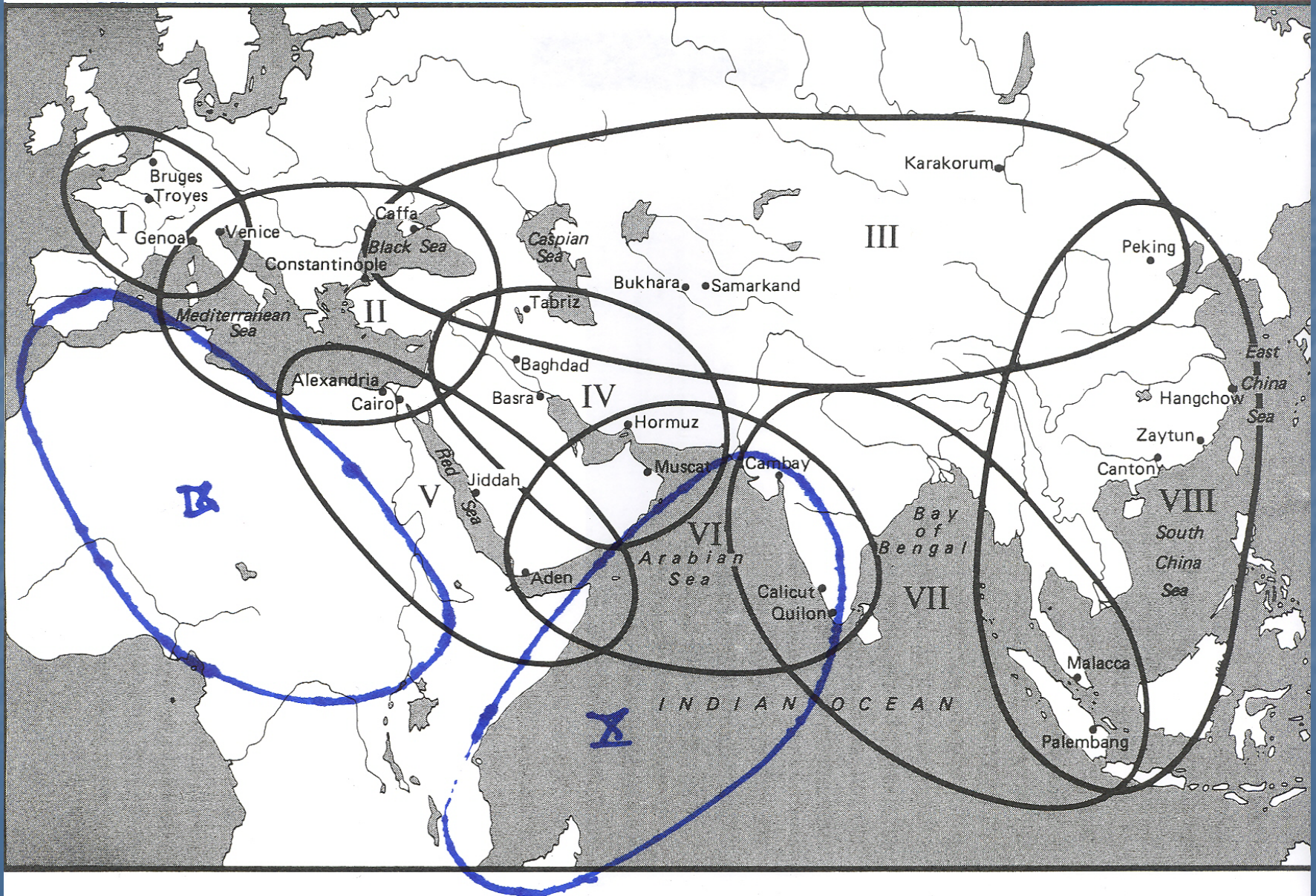
B. The Crusades (1095–1291)

1. Europeans Viewed as Barbarous by Muslims
2. Positive Effects in Western Europe

C. Hanseatic League (13th to 16th centuries)

- Hansa = association
- Leadership of Lubeck
- Once 164 cities belonged to the Hansa
- 1447- assembly met with representatives of 38 cities
- Main objectives: mutual security, trade privileges, monopoly
- Methods: economic boycott, occasional military force
- Reasons for decline

D. Champagne Fair — Troyes



E. Pilgrimages (Tourism)



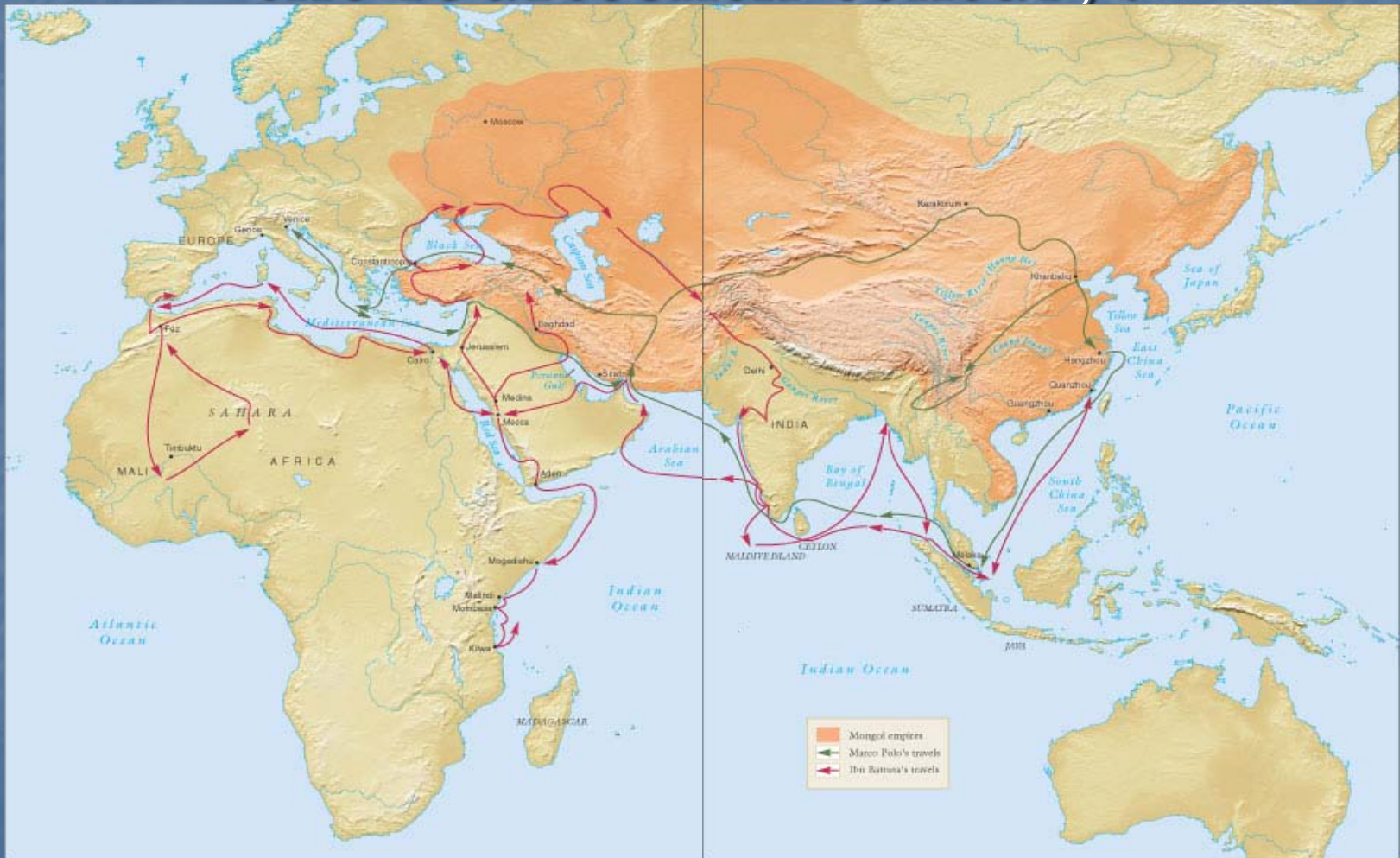
Patterns of Long-Distance Trade

- Silk roads
- Sea lanes of Indian Ocean basin
- Trans-Saharan caravan routes
- Development of trading cities, emporia
- Nomadic invasions cause local devastation but expand trade network
 - e.g. Mongols in China, 13th c.

Marco Polo (1253-1324)

- Example of long-distance travel
- Travelled to China with merchant father, uncle
- Enters service of Mongol Khubilai Khan
- Returns to Venice after 17-year absence
- Experiences recorded by fellow prisoner in Venice-Genoa conflict
- Great influence on European engagement with far east

Travel and trade from the twelfth to the fourteenth century.



Diplomatic Travellers

- John of Plano Carpini
 - Franciscan monk, sent by Innocent IV
 - 1245–1247 – Traveled to court of Mongol Khan Guyuk
- William of Rubruck
 - Franciscan monk, sent by Innocent IV
 - 1253–1255 – traveled to Qaraqorum, court of Khan Mongke

Diplomatic Travellers

■ Rabban Sauma

- Nestorian Christian Priest sent to Pope by Mongols in Persia, 1287, regarding proposed attack on Jerusalem
- Did not win European support
- 1295 Khan Ghazan of Il-khanate accepted Islam

■ Ibn Battuta (1304-1369)

- Islamic scholar, worked in governments on extensive travel
- Strict punishment meted out according to *sharia*
 - Lashes for drinking alcohol
 - hand amputations for theft

II. “Industrial Revolution” of the Middle Ages

A. Energy Resources and Their Development

B. Weaving

C. Clocks

D. Mining and the Mineral Wealth of Europe

E. Environment and Pollution

A. Energy Resources and Their Development

1. water mills (overshot and undershot)
 - a. Barbegal (3rd cent.)
 - b. Malt-smashing mill at St. Gall (9th cent.)
 - c. Domesday Book (5624 mills)
 - d. Venarfro
 - e. Robec Banks
 - f. Department of l'Aube
 - g. Liège, 1348, first water-powered bellows

2. Dams and cams

B. Weaving

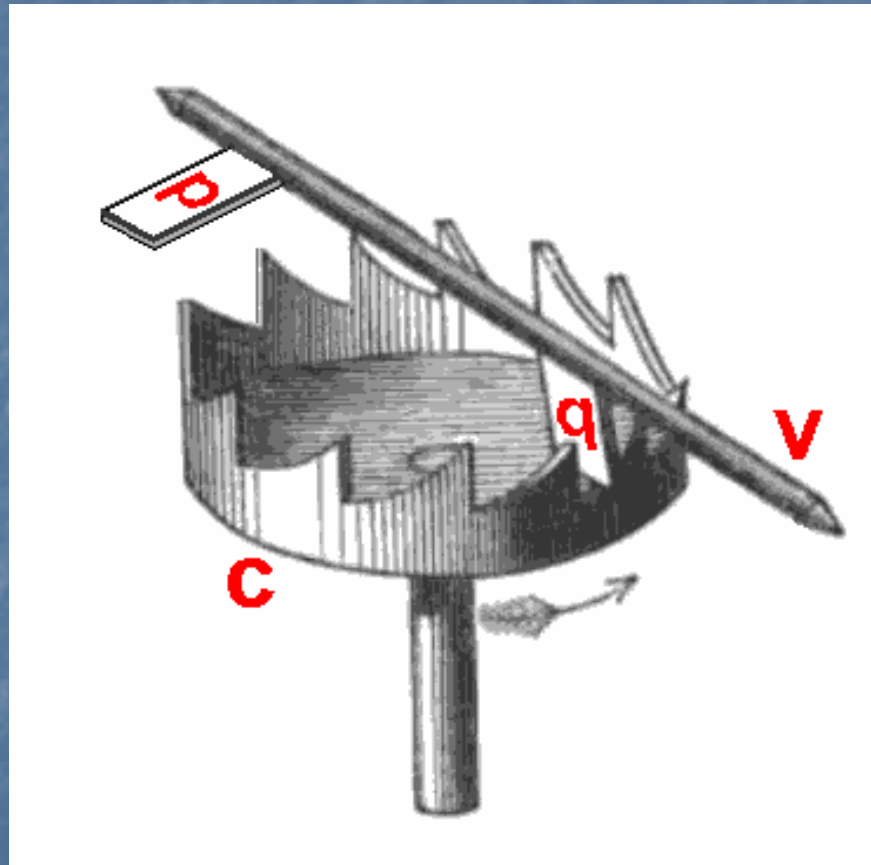
1. loom

2. spinning wheel

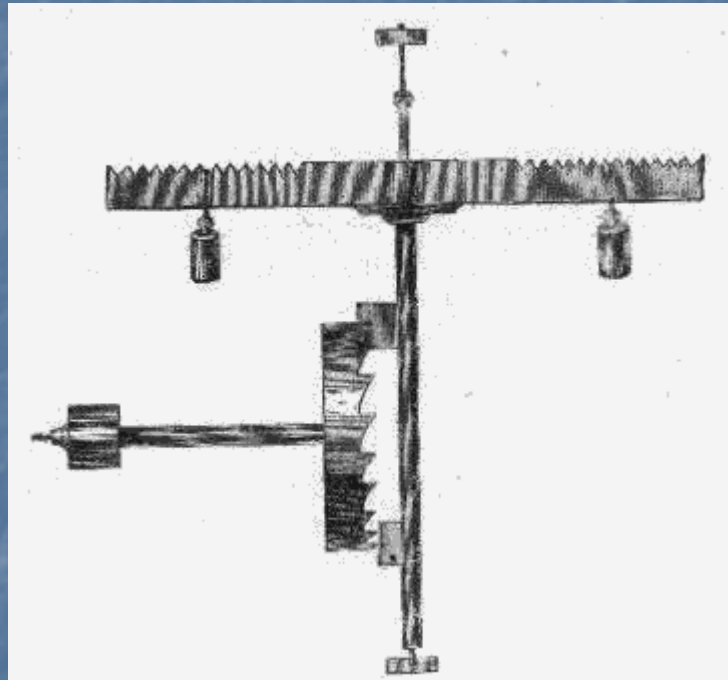
C. Clocks

1. Water clock, mentioned by Jocelyn de Brakelond at Bury St. Edmunds in Suffolk, June 23, 1198
2. Alarm clock (11th-cent. ms, Benedictine Monastery of Santa Maria de Ripoll)
3. Verge and foliot

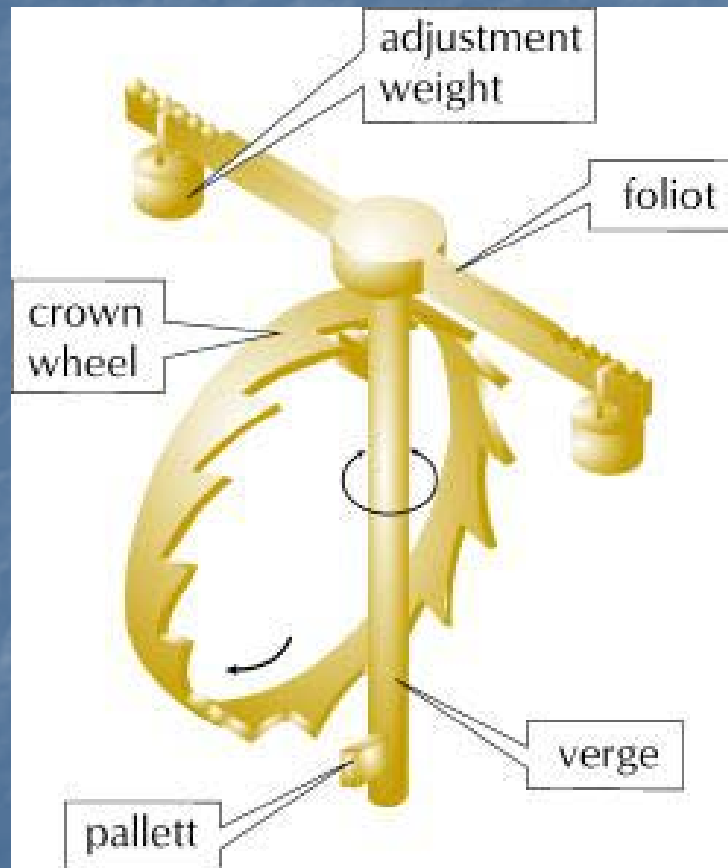
Verge escapement showing (c) crown wheel,
(v) verge, (p,q) pallets



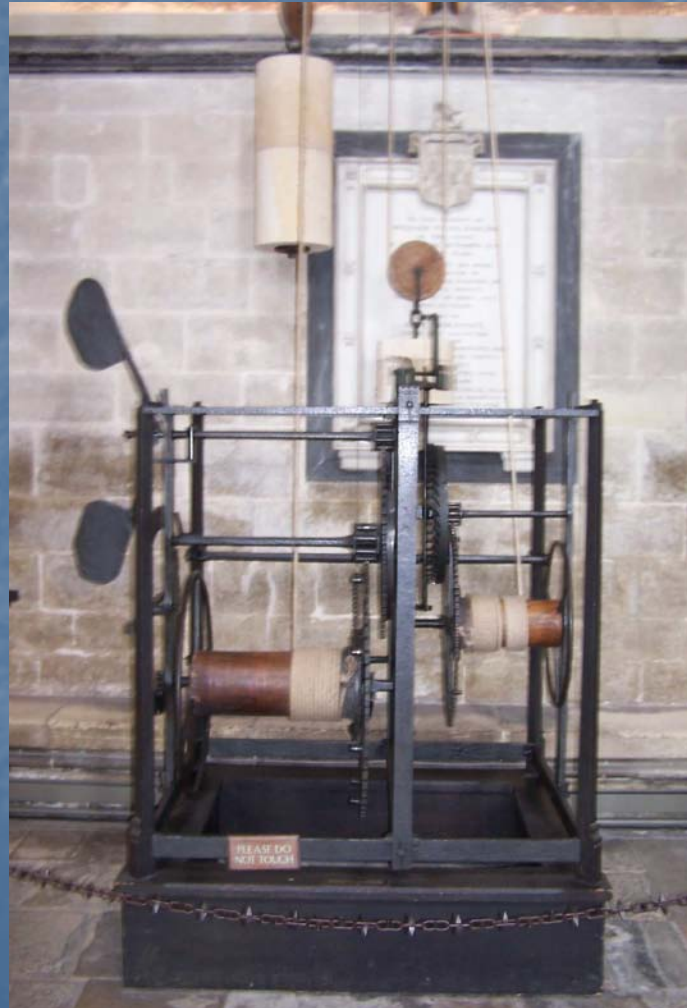
Verge and foliot escapement from De Vick clock, built Paris, 1379, by Henri de Vick



Verge and foliot design



Salisbury Cathedral clock (1386) – oldest known working clock in the world



III Warfare of the Middle Ages (Metal Production)

A. Heavy Cavalry

B. Unorganized

C. Infantry

D. Siege Weapons

A. Heavy Cavalry

1. armored knight on horseback
2. long stirrup
3. lance, shield, sword, chain mail

D. Mining and the Mineral Wealth of Europe

E. Environment and Pollution

900 BC – 300 BC	cold period
200 BC – AD 400	warm period
400 – 750	cold period
750 – 1215	warm and dry / “little climatic optimum”
1215 – 1350	limited cold spell
1350 – 1550	warm period
1550 – 1850	cold spell / “Little Ice Age”
1850 – 1930s	warm period
1940 – 1990	colder

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B. Unorganized Warfare

- Battle of Liegnitz (April 9, 1241)
- Battle of Mohí (April 13, 1241)

C. Infantry

1. Pike

2. crossbow

3. long bow — Battle of Crécy (1346)

D. Siege Weapons

1. Ballista

2. Cannon

- a. Gunpowder—combination of saltpeter, charcoal, and sulfur
- b. Chinese Invention (11th century)
- c. Roger Bacon (ca. 1214–ca. 1292)
- d. Siege of Constantinople (1453)

IV . Agricultural Revolution of the Middle Ages

A. Technological Innovations and Borrowings

1. heavy plow
2. open fields
3. modern harness
4. three-field system
5. nailed horse shoe

B. Development of Husbandry