ROAD TRANSPORT

• Road Transport
  - Carriage Wheel Composition
  - Vehicle Construction
  - Public Transport
  - Steam Powered Vehicles
  - 19th Century Experiments
  - Pecqueur & Dietz
  - Prejudices & Controls
  - Steam Powered Automobiles

• Carriage Wheel Composition
  - Around 1820
  - Ball Bearings
  - Banding of Felly With Nailed Banks Of Iron
    - Thermal Expansion
  - New Banding
    - Continuous Strip Welded & Then Shrunk

• Mail Carriage
  - Carriage Developments Were Influenced By Iron Industry (1800 - 1825)
  - Single Spring Suspension
    - Long Continuous Strips Of Rolled Iron
  - Long Solid Wrought Iron Shaft

• Light Calash
  - Around 1830s
  - Double Suspension
  - Jones Brothers
    - Carriage Makers (Brussels)
  - Long Continuous Strips Of Iron For Wheels

• London Livery Carriage
  - Brougham (1851)
• **Parcel-Carrying Stagecoach**
  - Passengers & Mail
  - Between 1825 - 1850
  - Replaced Old, Heavy, Slow Coaches
  - Primarily Rural

• **Omnibus**
  - Paris (1828)
  - 22 Seats
    - 12 Inside
    - 10 On Top
  - Primarily Urban

• **Joseph Cugnot**
  - First Successful Steam Powered Wagon
  - In Service (1770)
  - Two Opposing Atmospheric Engines
  - Reverse Arrangement
  - No Condensation
  - Double Ratchet System
    - Controlled Valves
    - Controlled Propulsion

• **Joseph Cugnot**
  - Engine, Firebox, & Boiler At Front
  - Steering At Center
  - Unstable
    - 3 Wheel
    - Single King Bolt
  - Historically Important
    - Carried Military Loads
      - Contract (1771)
  - Musee du Conservatoire national des Arts et Metiers

• **Murdock’s Steam Carriage**
  - Conceived 1784
  - Didn’t Pursue Construction Due To Advances Of Watt
  - Unique Design
    - Cylinder In Boiler

• **Trevithick’s Steam Carriage**
  - Richard Trevithick
    - Tested High-Pressure Engine (1787-98)
    - Vertical Cylinder In Boiler
  - Trevithick & Vivian (1802)
    - Horizontal Cylinder In Boiler
    - Separate Driver
    - Heavy Vehicle - No Suspension
    - Adapted To Railroad
• Onesiphore Pecqueur
  • Patent - France (1828)
  • Differential Gear
    • Solved Turning Problem
  • Not Applied Till Gasoline Powered Automobiles
  • Similar Patents In England
    • Hanson (1830)
    • Richard Roberts (1832)
    • Buhl, Neuchatel (1833)

• Charles Dietz
  • Great Pioneer
  • Patent - France (1835/36)
    • Two Oscillating Cylinders
    • Elastic Material On Wheels
    • Jointed Rim
  • Trial Runs
    • Paris, Versailles, Saint Germain
  • Regular Service (1834)

• Prejudices & Controls
  • House of Commons Committee (1831)
    • Limited Use On Roads
    • Steam Vehicles (10-20 MPH), Horse (2 MPH)
  • Locomotive Act (1861)
    • Limited Speeds (10 MPH Highways, 5 MPH Cities)
    • 2 Operators, No Smoke
  • Red Flag Act (1865)
    • Limited Speeds (4 MPH Highways, 2 MPH Cities)
    • 3 Operators
  • Fears
    • Boilers Exploding, Noise, Soot, Accidents

• Highway Locomobile
  • Call (1857)
  • Tubular Boiler & Condenser
  • Agricultural Machines & Heavy Loads
  • Strictly Regulated

• Steam Powered Automobile
  • Developments
    • Boilers
    • High Pressure
    • Died Due To Petroleum
  • La Mancelle (1881)
  • Frequently Built
  • Arrangement
    • Boiler - Rear
    • Engine - Front
  • Differential