

# Unit 3 Transport in the History

## Topic

- Definition of transport
- Evolution and waves of transport development
- Transports from the 19<sup>th</sup> Century onwards

# Objectives

Students should be able to:

- Describe the definition of transport/ transportation.
- Recall briefly the evolution and waves of transport development, especially during the Fordist era (1920-1970).
- State the transportation periods divided based on energy technology innovation.
- Describe the cumulative waves of transport development.



# **DEFINITION OF TRANSPORT/ TRANSPORTATION**



*'Trans'* means across, beyond, crossing, on the other side, changing thoroughly

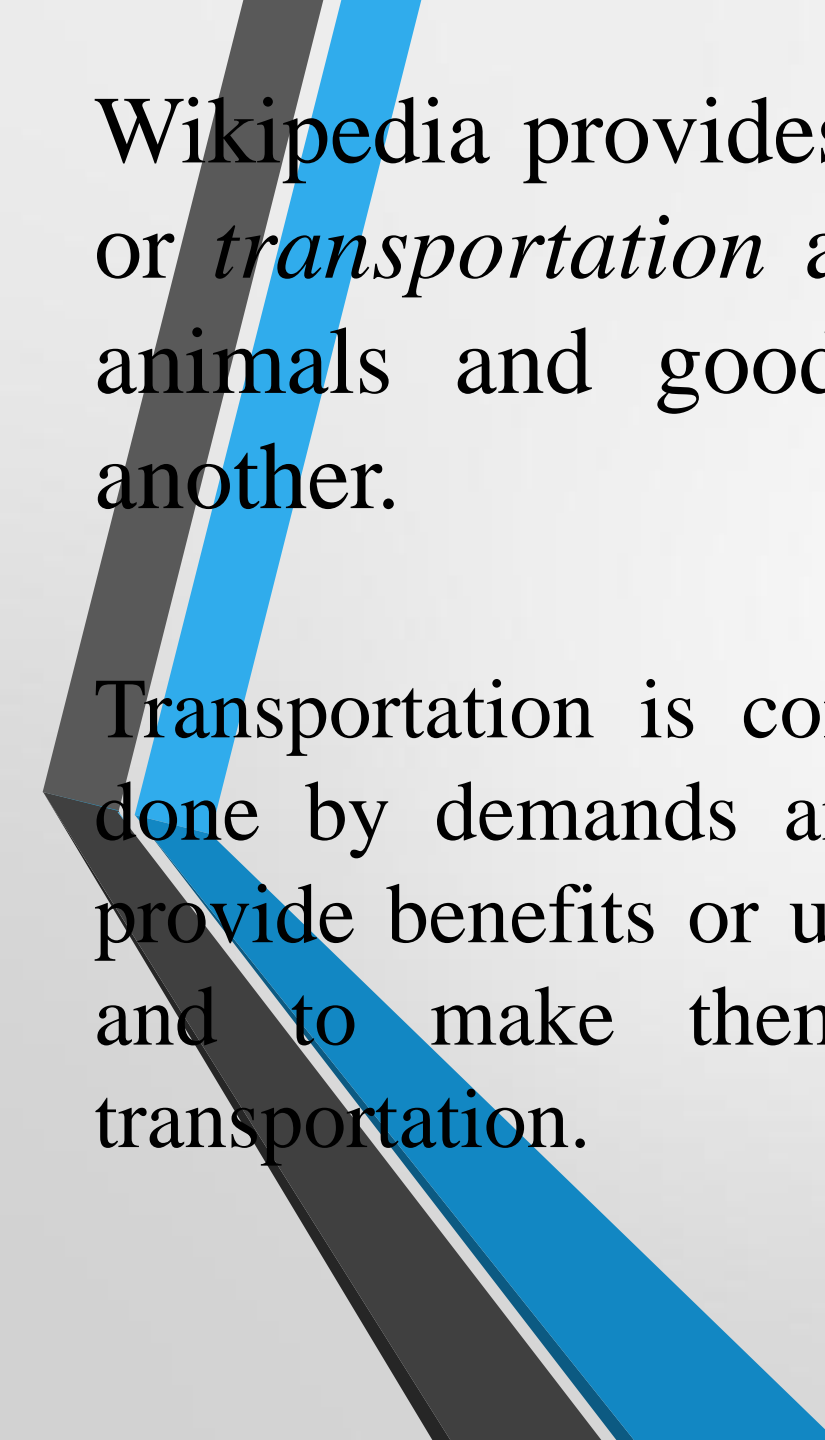
*'Port'* means to hold, to carry, or a place on a waterway with facilities for loading and unloading ships, a city or town on a waterway with such facilities, the waterfront district of a city, a port of entry.

*Transportation* means an act of moving things or animals from one point to another; moving of individuals from one point to another.

Business Dictionary gives a definition of *transportation*:


Any device used to move an item from one location to another. Common forms of transportation include planes, trains, automobiles, and other two-wheel devices such as bikes or motorcycles.

The process of shipping or moving an item from point A to point



Wikipedia provides a definition of *transport* or *transportation* as a movement of people, animals and goods from one location to another.

Transportation is considered to be a movement done by demands and needs of human, and to provide benefits or utilities to those who involve, and to make them meet the objectives of transportation.



# **EVOLUTION AND WAVES OF TRANSPORT DEVELOPMENT**

Transportation can be divided into 6 periods, based on the energy technology innovation created by human to propel or move vehicle

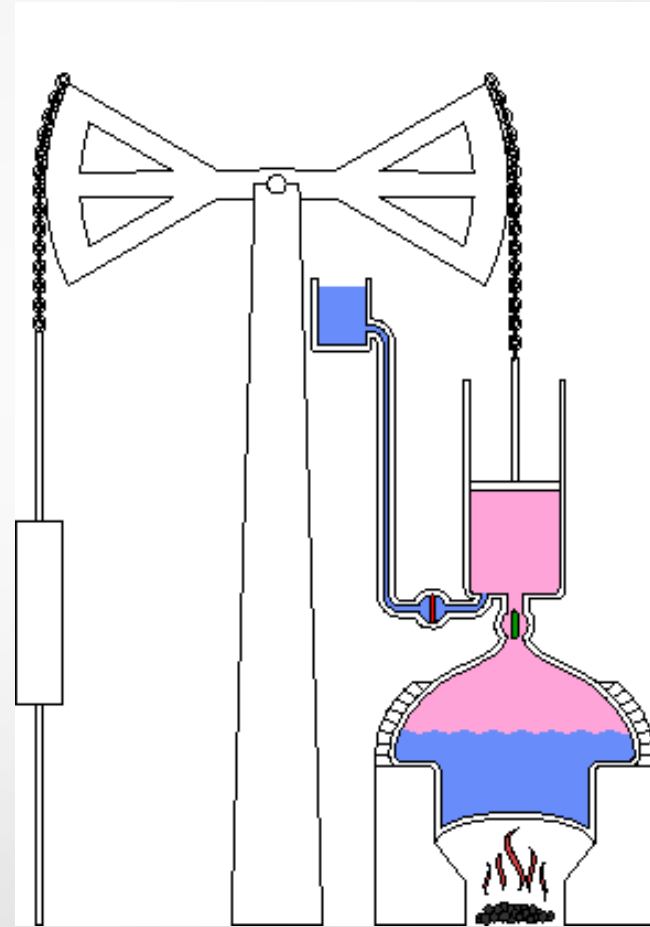
**(1) The period of natural energy: Natural Energy and Human/Animal Labor**

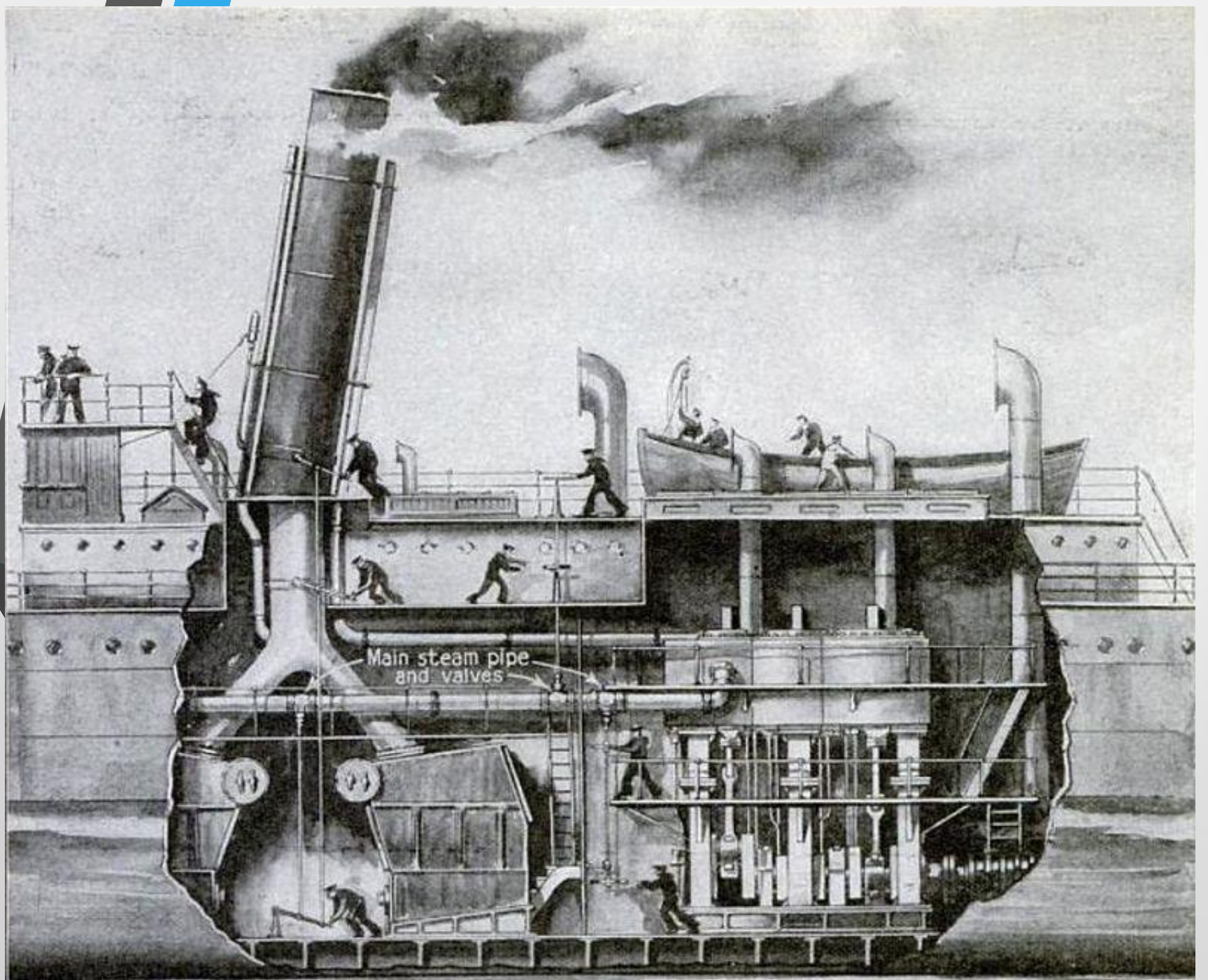




## (2) The period of steam engines

- Thomas Newcomen, a British man, was the first person who invented steam engine.
- Steam engines have been used in water or maritime transport which has ships as the vehicle, and land transport which has rail as the vehicle.





Main steam pipe  
and valves

### (3) The period of electric motor

- In this period, human was successful in inventing electric motor.
- Electric motors convert energy into mechanical motion that is used in driving vehicles.
- Electric motor can be used with small- sized vehicle, tram, and some types of trains. Some are called by the energy used such as electric train which is a train powered by electricity (for example: electric locomotive). Electric energy is considered an environmentally- friendly energy.



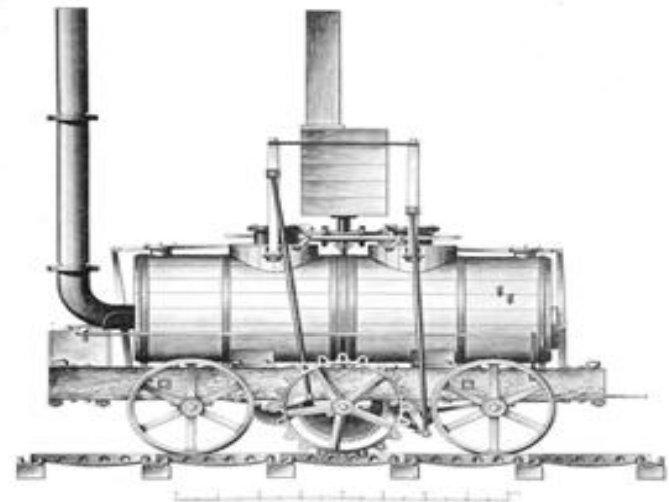


An Amtrak, electric locomotive pushing train, New Jersey



Locomotive train, India

Blenkinsop's rack locomotive, 1812  
(British Railway Locomotives 1803-1853)



## (4) The period of internal combustion engine

- Internal combustion engine was invented in this period.
- Fuel or gas was combusted to produce energy.
- Small- sized vehicles use Benzil, such as private car.
- For vehicles that nee higher amount of energy like truck or 10-wheel trailer truck, pick- up, or train, use Diesel.
- Combustion of the vehicles of this type leaves chemical substance; therefore, internal combustion engines cause air pollution, while some types of internal combustion engines cause noise pollution.

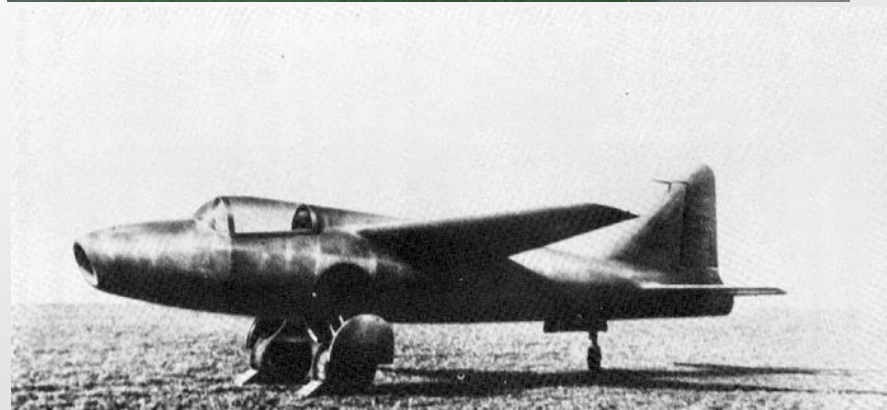
## (5) The period of jet engine

- Jet engine is a product of higher technological advancement developed further from internal combustion engine.
- Jet engine has a very high propulsion (jet propulsion), making a vehicle that uses this type engine move very fast. At present, the only vehicle type that's jet engine is air transport mode, such as airplane.





Popular-Pics.com



## (6) The period of nuclear power

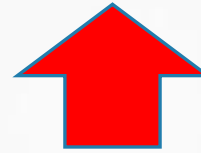
- Nuclear power was developed from the knowledge of chemistry and physics sciences.
- It is categorized as a very high technology that costs very high investment and can have severe danger if there is no strong control of production and use.
- Nuclear power is normally restricted in laboratory uses for research benefit. There still is no use of nuclear power in transport services.



# Transportation in the Fordist era (1920- 1970)

Period of  
engine and  
part  
development

Road vehicles operations became  
faster and more comfortable

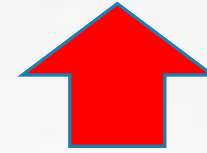


Pneumatic tire was invented by **Dunlop** in 1885.

In 1889, Diesel was modified into the **internal combustion engine**

**Assembly line** as the dominant form of industrial production

The automobile became more comfortable and popular among consumers



Ford began the production of the Model T car using an assembly line, and From 1913 to 1927, about 15 million Ford Model T cars were built.

Mass production of automobile, buses or trucks had changed the industrial production system, especially in 1913.

Internal combustion engine was the factor of faster, inexpensive and door-to-door transport services, such as automobiles, buses and trucks.

Petrol became a convenient fuel.

Period of  
automobile  
development

## International trading was growing at longer distance



The distances were very long, larger tankers were produced to do oil trade in this long distance. So, productions were also expanded to other regions. -----  
Maritime longer distance trades.

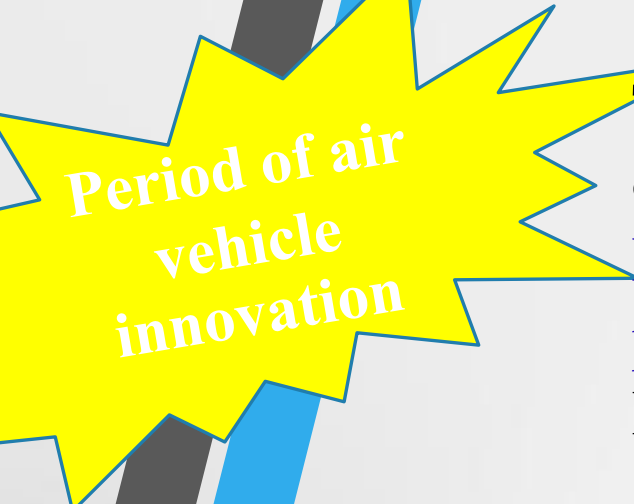
Maritime routes were thus expanded to include tanker routes,

Gradual growth of international trade and the Second World War motivated a building of ship (shipbuilding).

Rapid diffusion of the automobile marked an increased demand for oil products and other raw materials such as steel and rubber.



Containerization



Period of air  
vehicle  
innovation

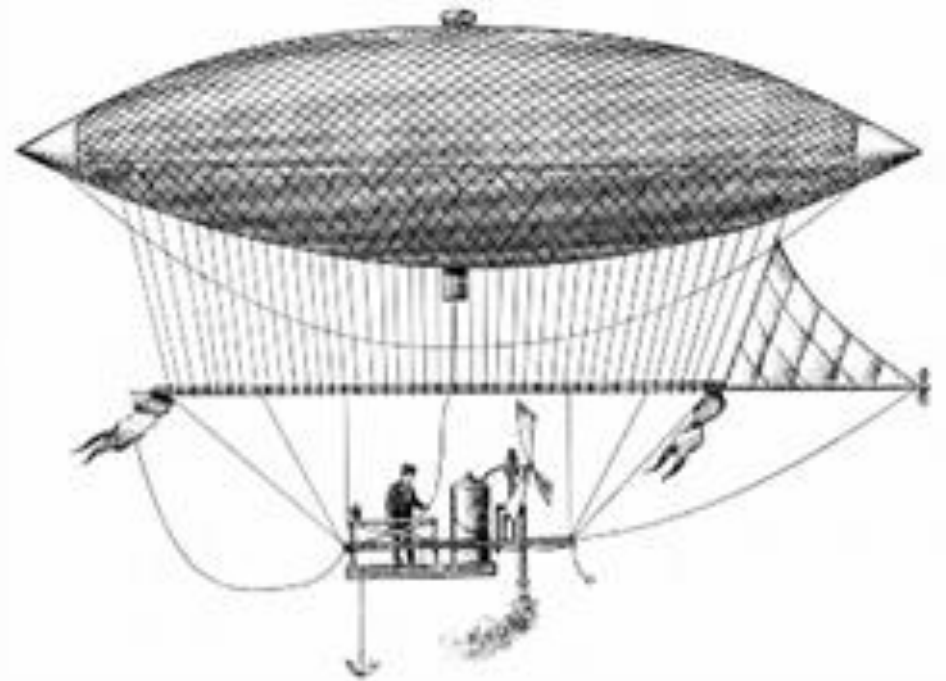
The 1920s and 1930s, there was the expansion of regional and national air transport services in Europe and the United States with mass produced propeller aircrafts such as Douglas DC-3

Development of airship (dirigible) services, with the Atlantic crossed by a Zeppelin airship (dirigible) in 1924.

The first commercial air transport service between England and France began in 1919

The first propelled flight was made in 1903 by the Wright brothers

In 1783, the first air balloon flight took place.



Hot air balloon (left) and air balloon to carry a basket containing people into the air (right).





Dirigible (airship)

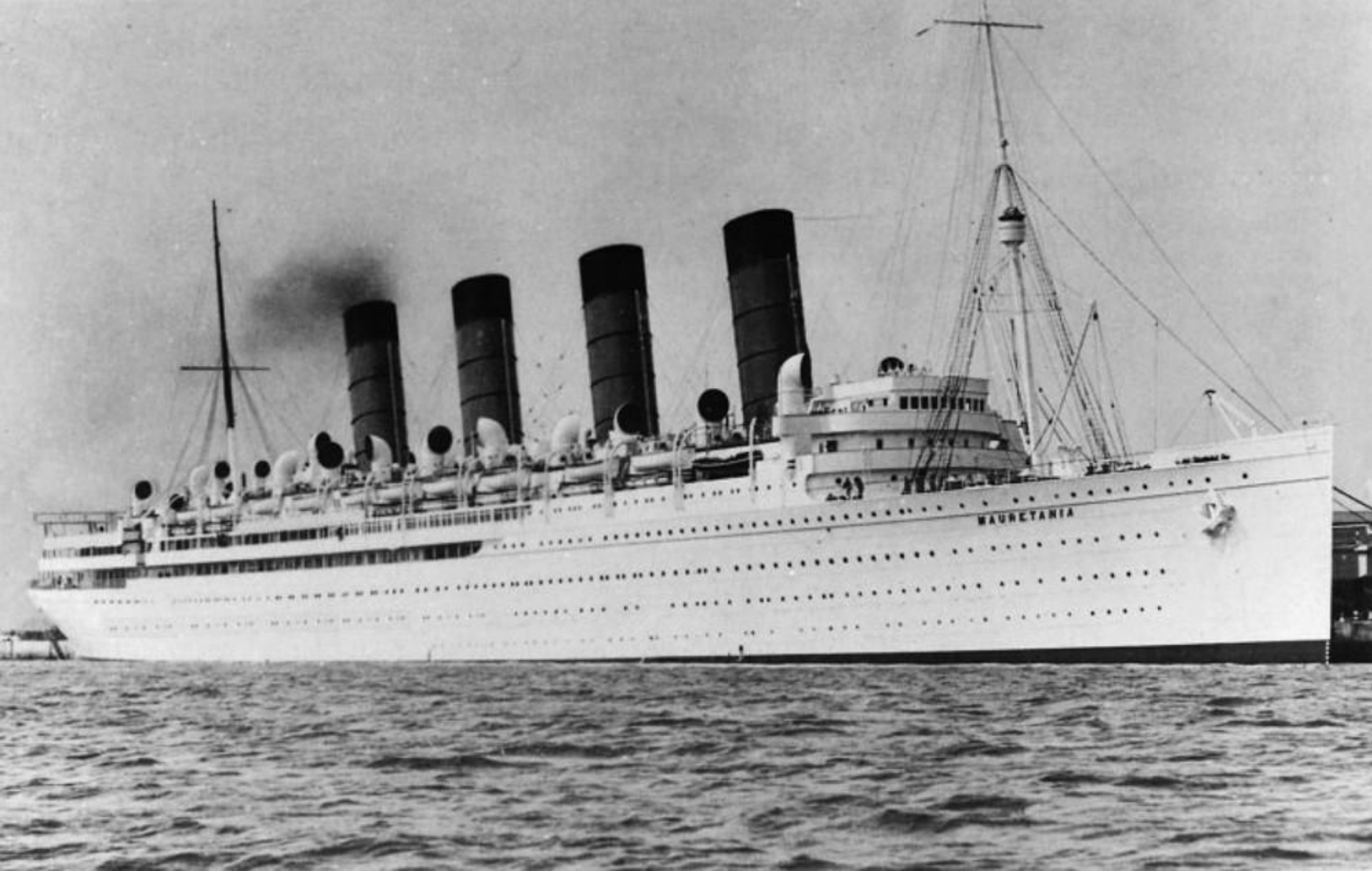
The introduction of pressurized propeller planes in 1945 allowed the first regular transatlantic services with two technical stops and a flight time of about 11 hours.

In the mid- 1930s, flying boat (propeller and sea plane) transatlantic services began. The sea plane initially had an advantage with its capacity to land on water

By the time transatlantic liner (sail ship) services started to be abandoned (less popular) in the 1950s

Steamship was the first powered mode to set regular passenger services from the late 1830s













Growing development of air transport service with higher capacity

The application of the gas turbine principle led to the development of jet engines, and in 1952 marks the beginning of commercial jet services with the Comet.

A growing number of people were able to afford the speed and convenience of air transportation.

The postwar period (relaxing after 1945) was the turning point for air transportation as the range, capacity and speed of aircrafts increased as well as the average income of passengers.

The jet plane enabled the setting of time dependent trade relations between producers across the world (such as electronics), and created a long distance market for perishable goods and supported the development of mass tourism.

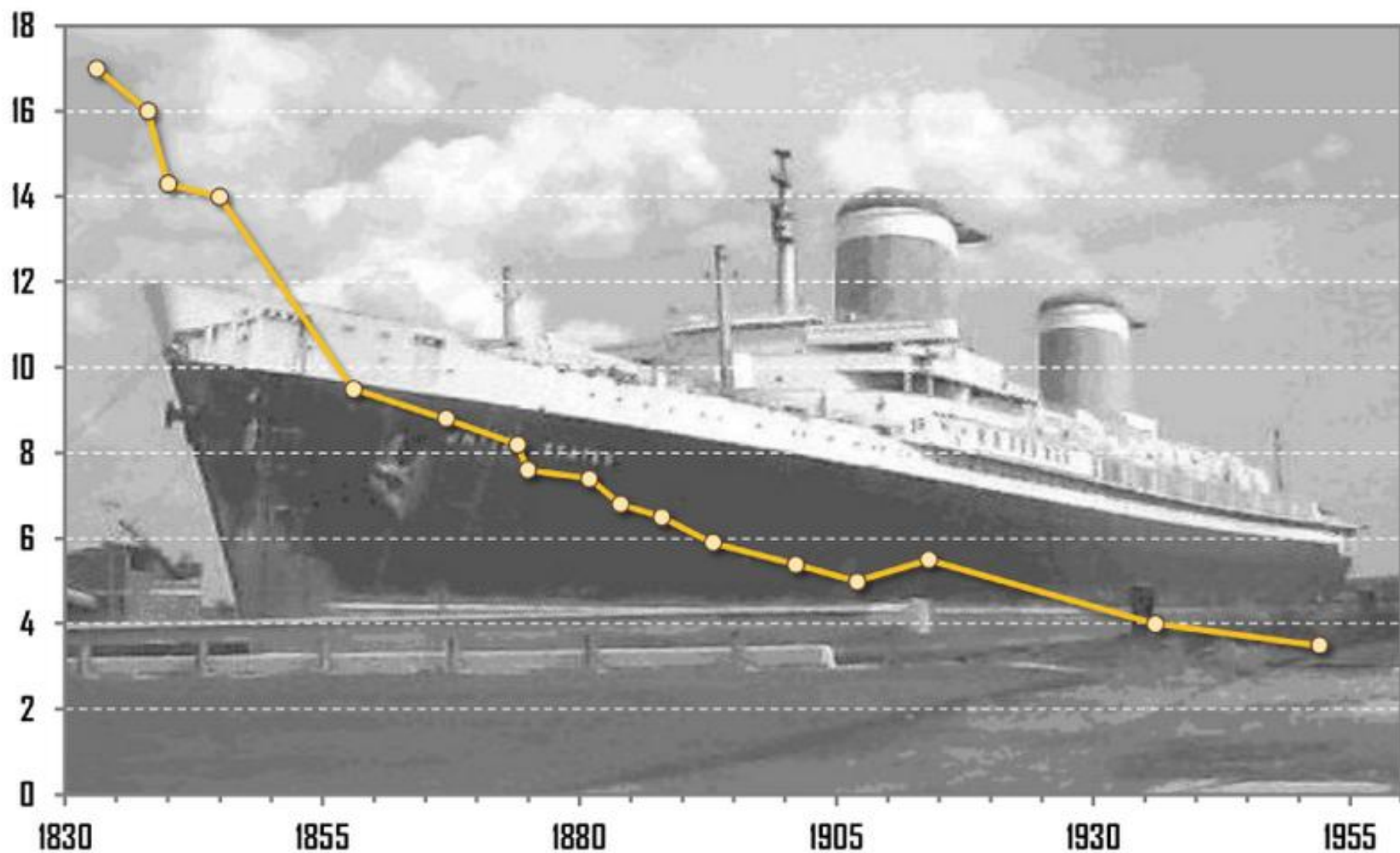


Propeller planes for long distance services replaced.

Beginning of the end of long journey of passenger transoceanic ships (liners)

In 1958, the first successful commercial jet plane, the Boeing 707, entered in service and revolutionized international movements of passengers





Note: Liverpool / New York.

Source: data from P.J. Hugill (1993) *World Trade since 1431*, Baltimore: Johns Hopkins University Press, p.128. Stopford, M. (2009) *Maritime Economics*, Third Edition, London: Routledge.

## Liner Transatlantic Crossing Times, 1833 - 1952 (in days)



## Steamship

- 1830s to 1950s (About 6 days; 4 days by the 1930s)



## Dirigible

- 1931-1937 (About 80 hours)



## Sea Plane

- 1934-1946 (About 15 hours)



## Propeller Plane

- 1934-1960 (11 hours)



## Jet Plane

- 1958- (7-8 hours); Supersonic jet (1976-2003: 3.5 hours)

**Vehicle innovation  
development**

# Cumulative waves of transport development



## Sailships

(17–18th century)  
Empires and global trade networks

## Canals

(19th century)  
Punctual inland access

## Railways

(19–20th century)  
Inland and national accessibility

## Highways

(20th century)  
National mobility systems  
Sub-urbanization

## Airports

(20–21st century)  
Global mobility systems

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**Transportation development**  
(vehicles + mode facilities = transport commercial service)



# Cumulative waves of transport development

1. **First wave: Sail ships**
2. **Second wave: Canals**
3. **Third wave: Railways**
4. **Fourth wave: Highways**
5. **Fifth wave: Airports**

# Intermodal Transport Modes

## Intermodalism



## Transmodalism

