The evolution of goods transport systems in the mass consumption society

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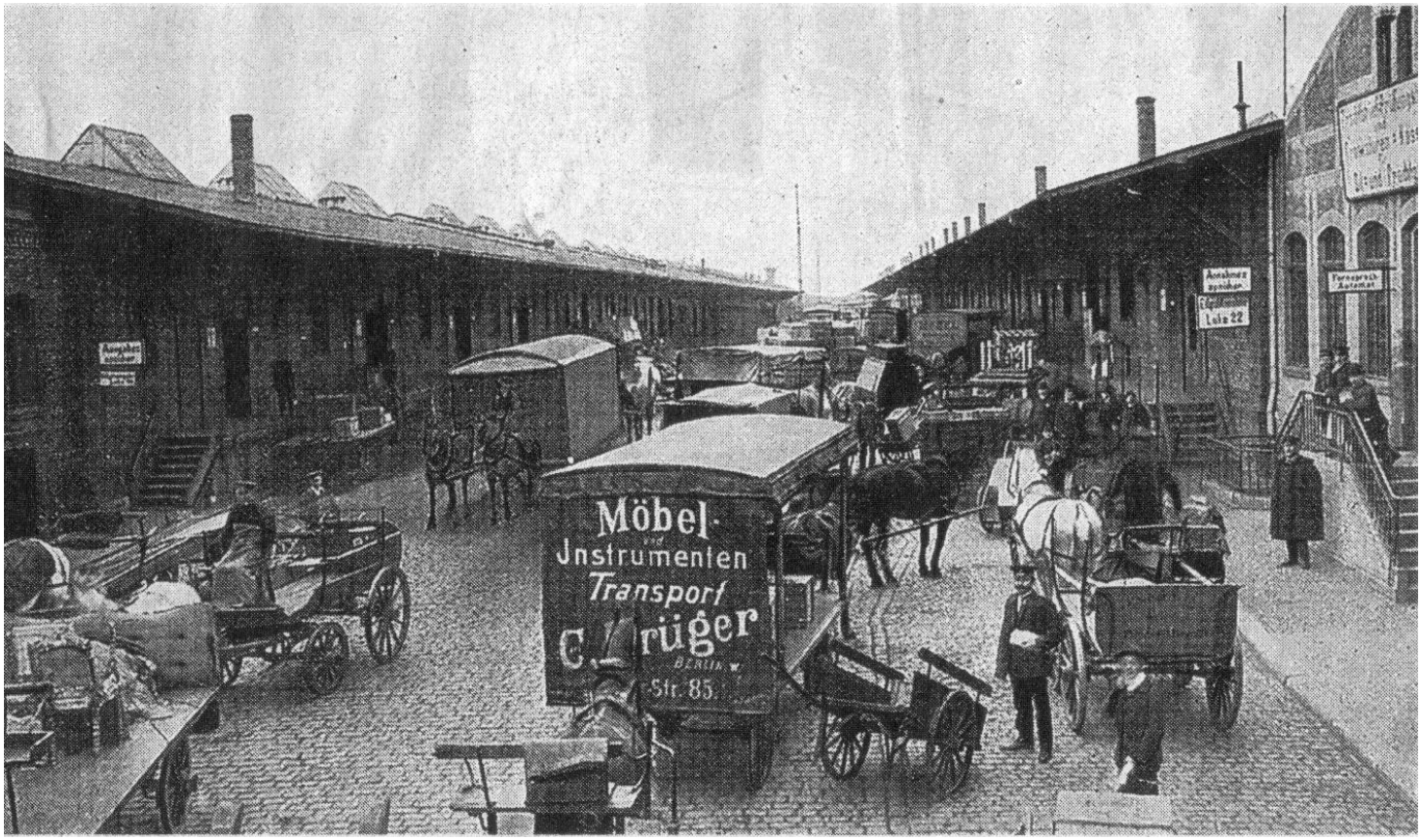


Point to point railway cargo traffic in the basic industries

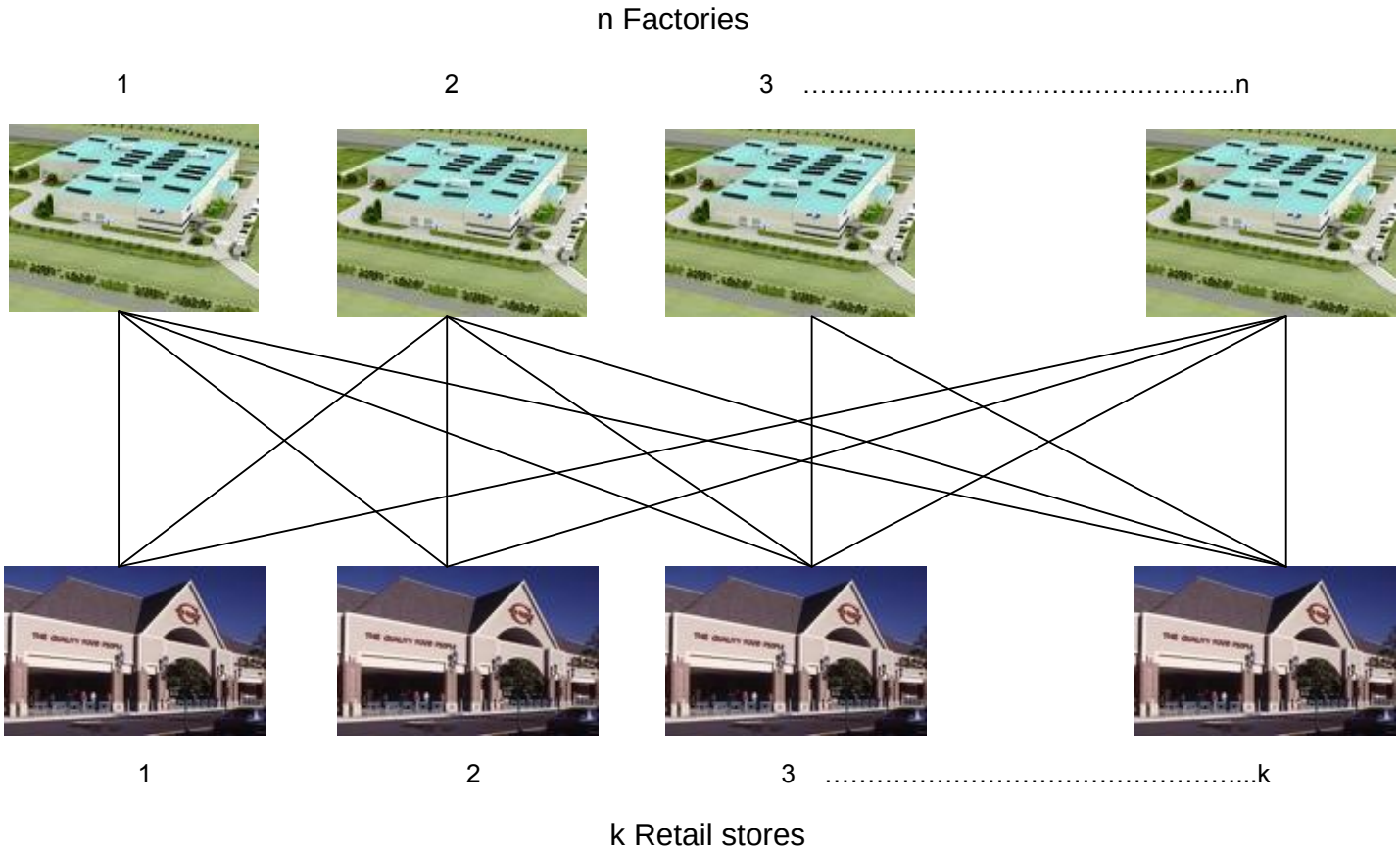
Oberhausen-Sterkrade, Bergwerk Osterfeld, Schachtanlage Sterkrade, 1954 Foto: Kurt Scholz, Oberhausen

FotoHiero/Pixel.de

Railway shuttle
many wagons
long trains
no marshalling operations

Coal mine ⟷ Power plant

Delivery from suppliers to retail stores in the mass consumption society: Structure of Many-to-Many-Networks



High number n*k of delivery relations. The German Metro group has 4000 suppliers and 1000 outlets, i.e. 4 million traffic relations.

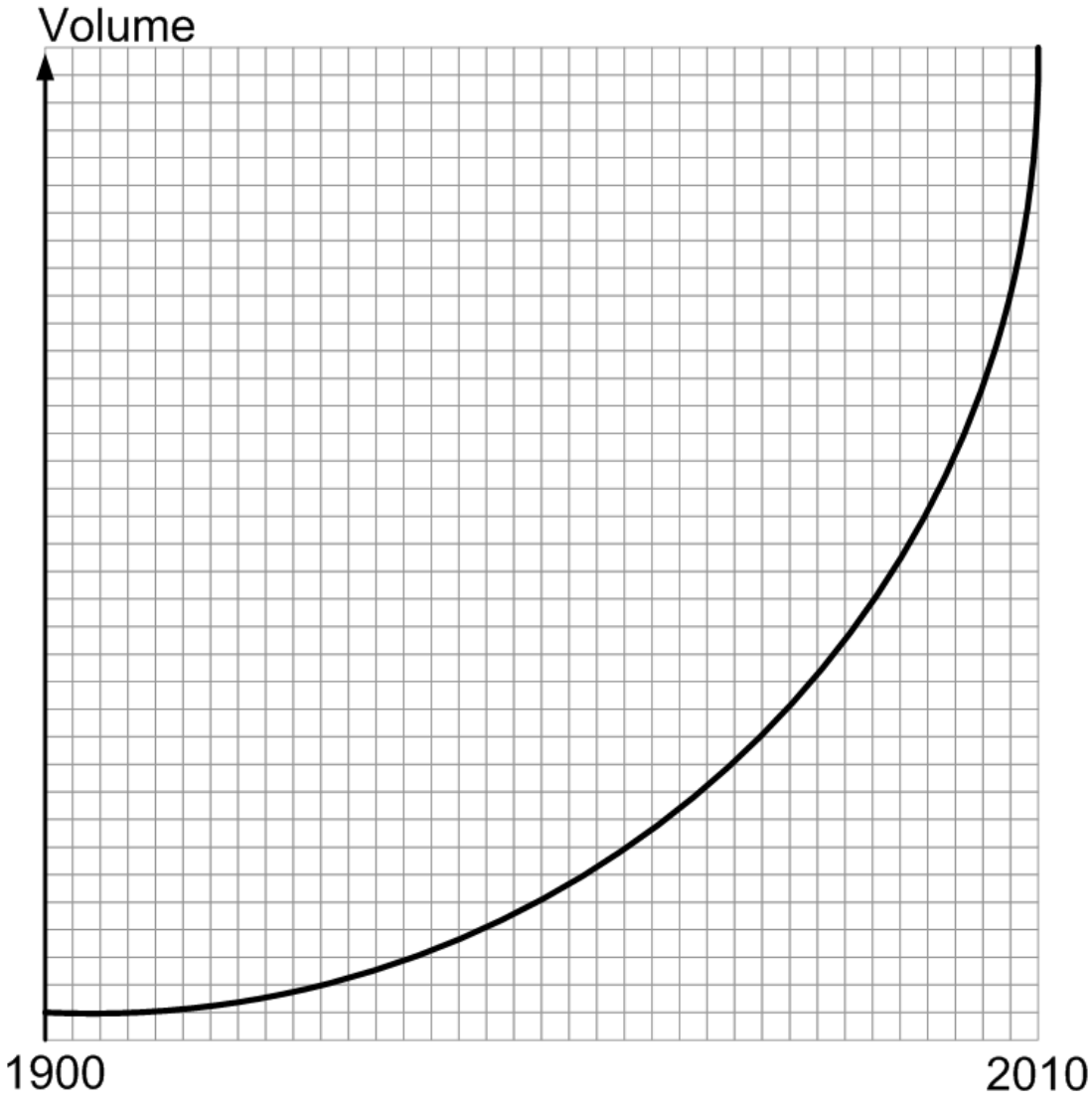
On average the volume of delivery in one relation is low!

Better fitted to truck than to a railway waggon with high capacity.

Different categories of cargo in the railway logistics

In the railway logistics we distinguish freight from basic industries, full wagon load of manufactured goods and less than wagon load of packaged goods. I focus on packaged goods.

Explosive growth of packaged goods in the last 110 years



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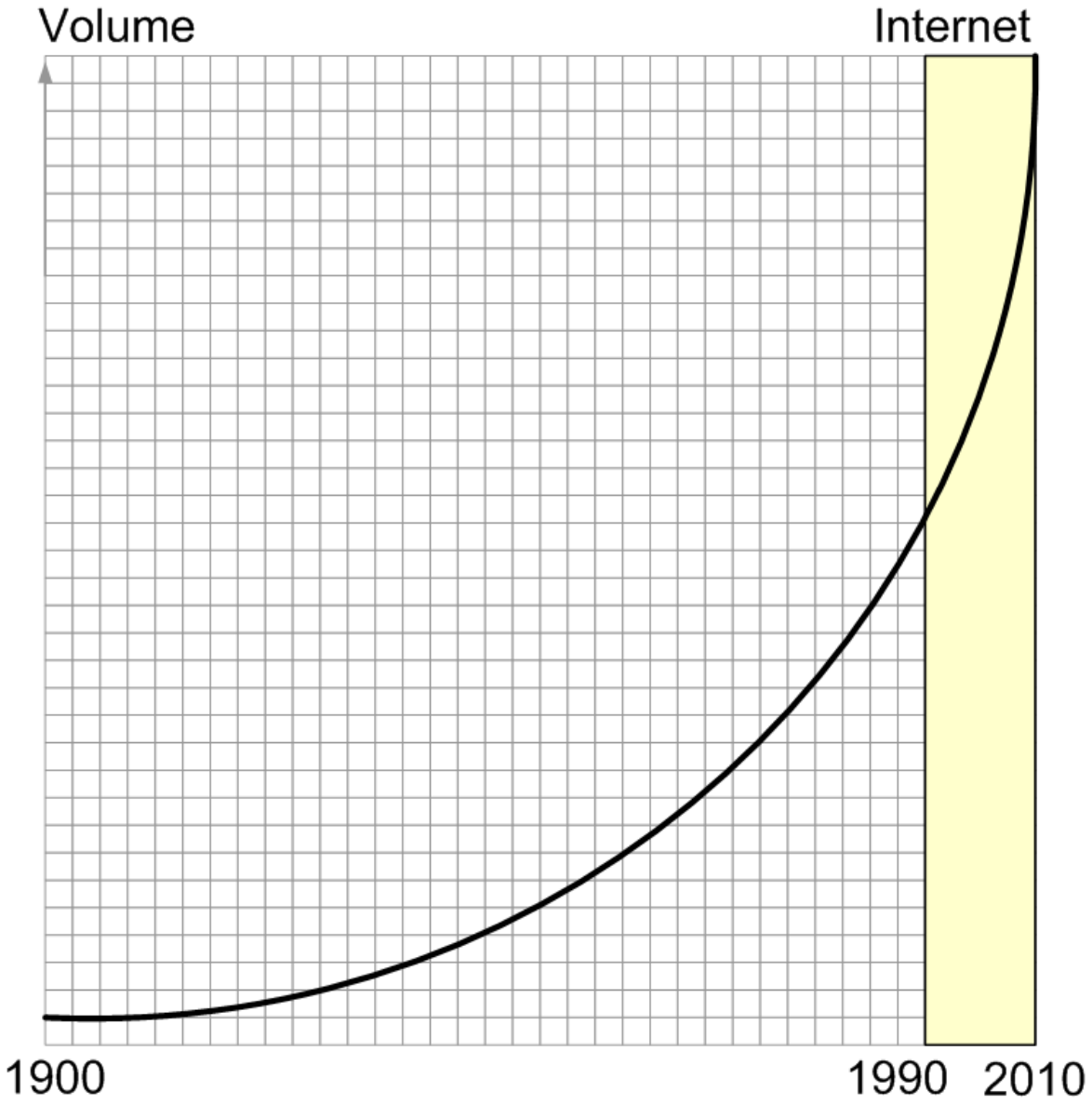
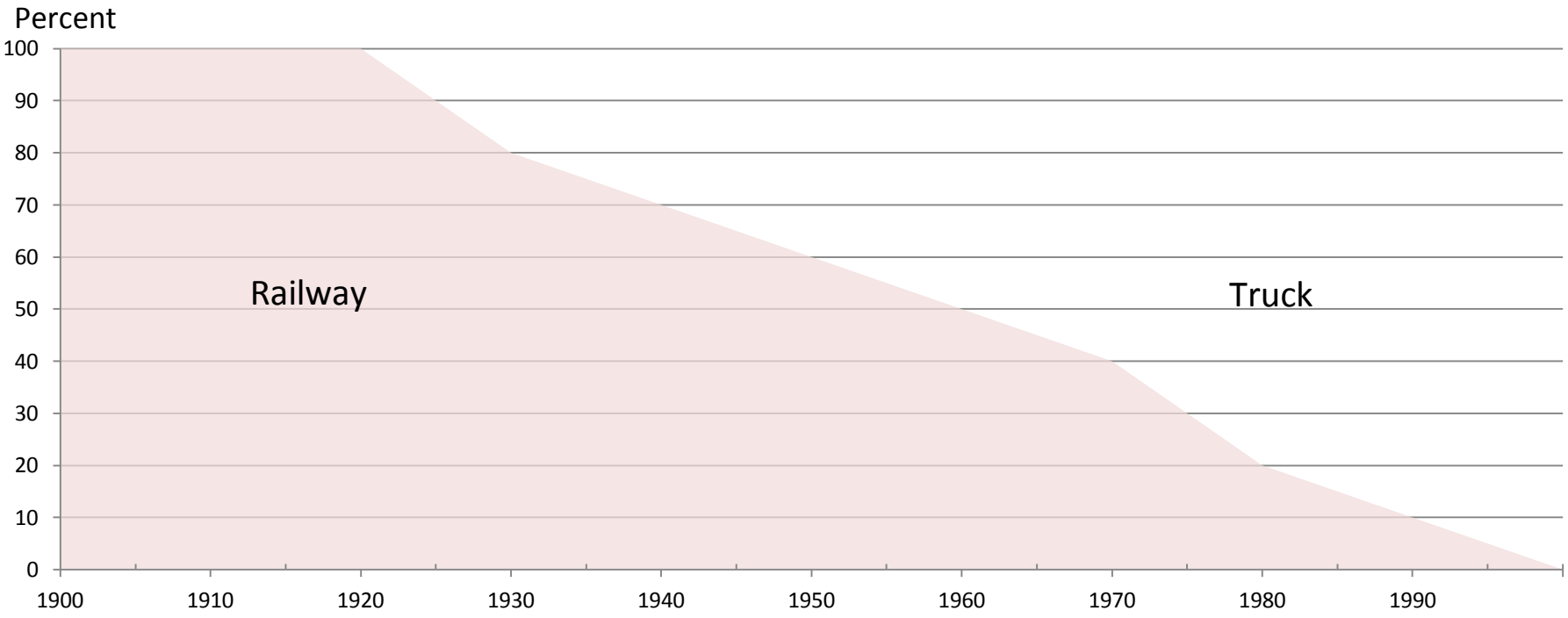


Warehouse of Amazon in England

Warehouse Amazon in Hempstead, press release Amazon

Tragedy of packaged goods traffic

Market share of the German railway 1900 till 2000



Abandoned packaged good shed in Berlin Lichtenberg 2010

Why lost the train the fight with the motorized truck?

We consider arguments at the macro level and micro level.

Strong growth of good traffic since 1890 at Berlin‘s good terminals

Overload of the good terminal

Permanent investments for expansion of capacity

Terminal	1891 Packaged goods	1911 Packaged goods	Increase %	Increase of wagon laod %
Anhalter Bahnhof	126.800	297.000	134	64
Hamburg-Lehrter Bahnhof	172.100	391.300	127	109
Stettiner Bahnhof	103.100	352.600	242	-70
Schlesischer Bahnhof	71.000	220.400	210	19

Denkschrift: Ist es mit den Interessen von Groß-Berlin vereinbar,
die Güterbahnhöfe aus der Innenstadt in die Außenbezirke zu verlegen?;
Denkschrift, aufgestellt vom Architekten-Ausschuß Groß-Berlin,
Berlin-Grunewald: Burgverlag, 1913

Growth of packaged goods in the 1920s

Packaged goods increased from 14 million tons in 1925 to 20 million tons in 1929.

The congestion of the good sheds gave an incentive for shippers to shift from railway to trucks as carriers.

Overload of good terminals

Example good terminal Heilbronn.

In 1893 opened for 750 wagon per day.

In 1913 heavy overload of 1600 wagon per day in the autumn peak.

Investment problem: A good terminal is an entire entity of infrastructure that can not be enlarged in an incremental manner, as for example an air port or a motorway.

So one has a difficult investment strategy to build new remote good terminals for the load removal of the existing good terminals. The German states planned independendly their good terminals without coordination.

Luftbild vom Anhalter- und Potsdamer Güterbahnhof 1943
(Quelle: Senatsverwaltung für Stadtentwicklung)

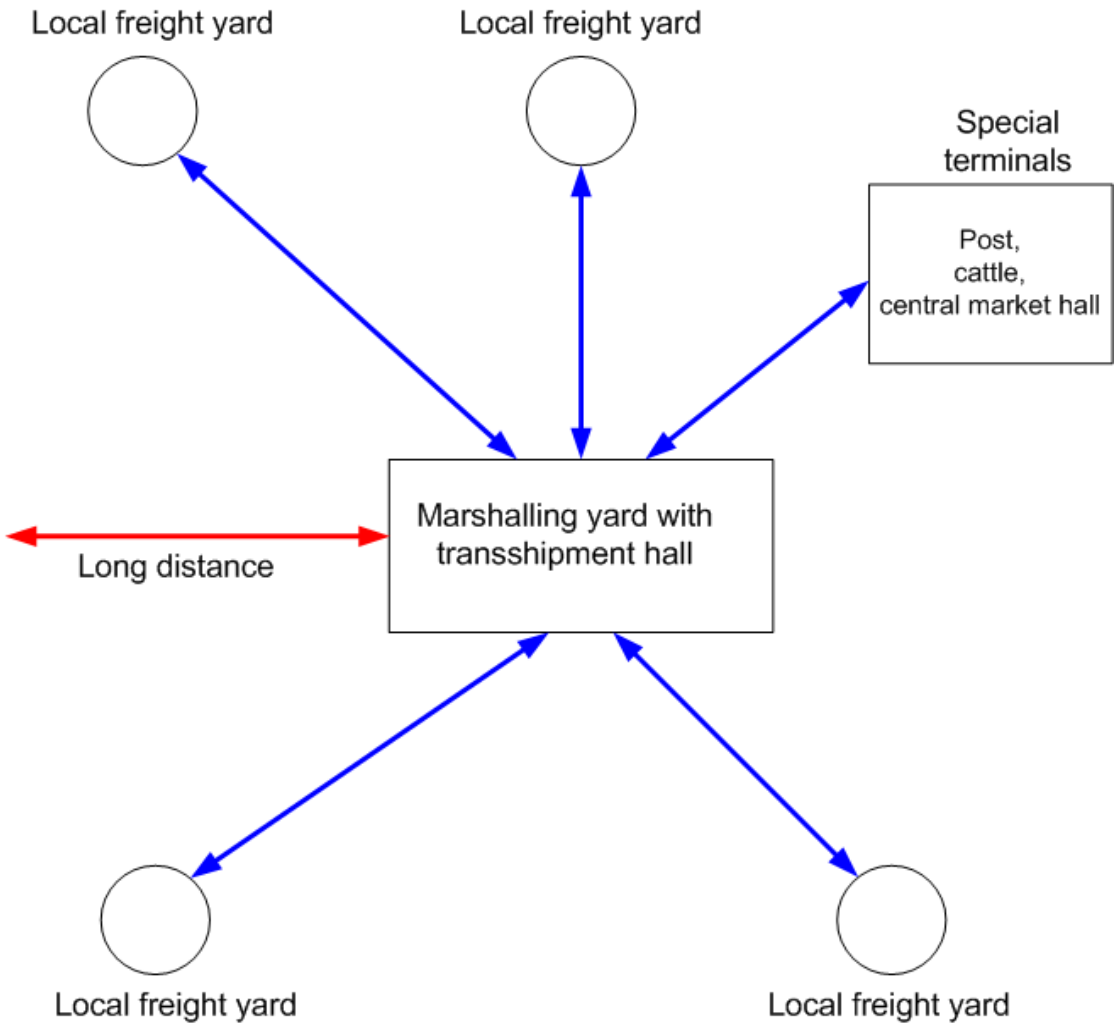
Micro level: Transshipment of goods is labor intensiv

Passanger transportation: the poeple change the trains by themselves.
But packaged goods have to be transshipped by laborers.

Berlin Ostkreuz 2008

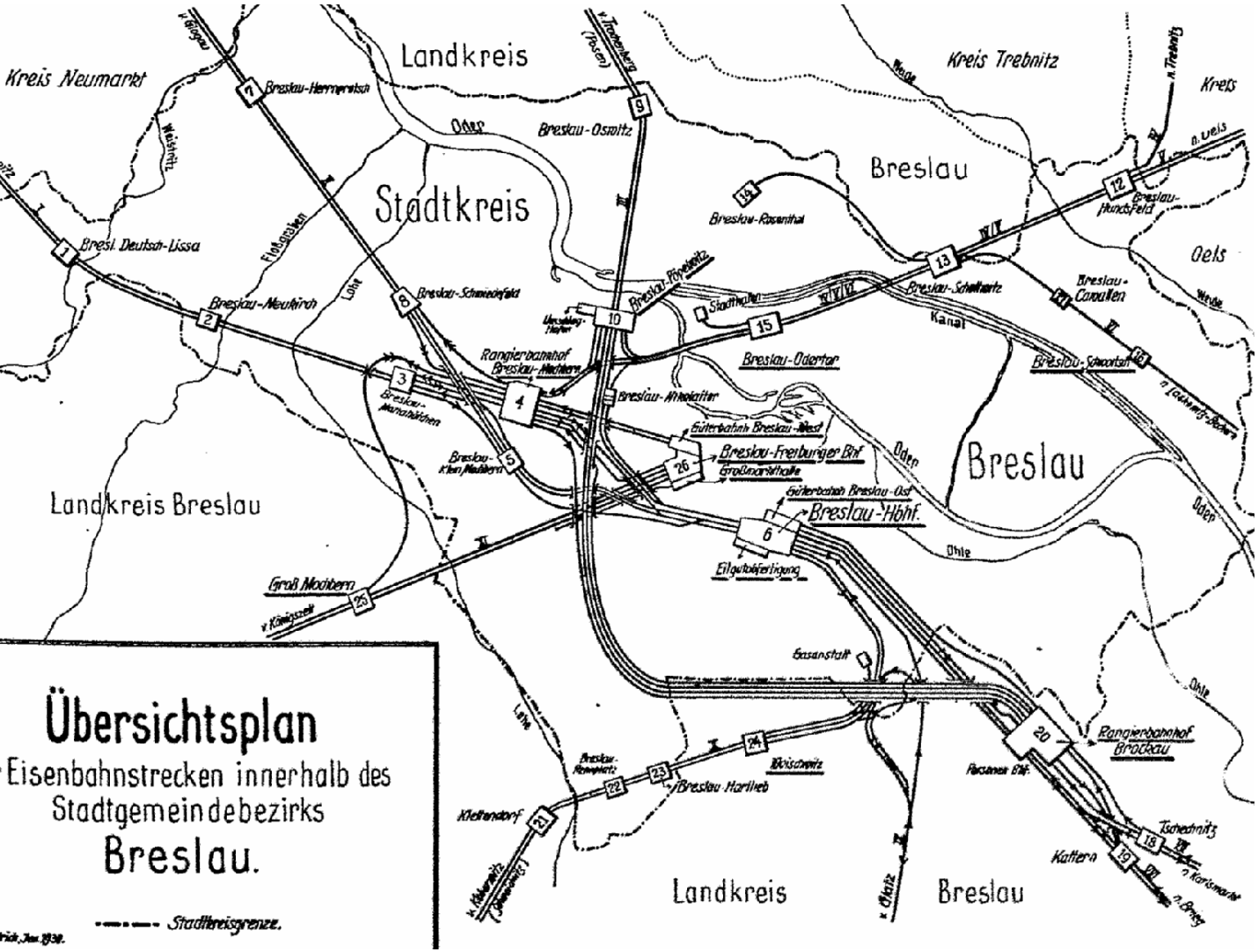
Transshipment hall Bietigheim 1972

Big cities with local networks of freight yards with sheds



The movement of short good trains in the local network used inefficiently the costly locomotives.

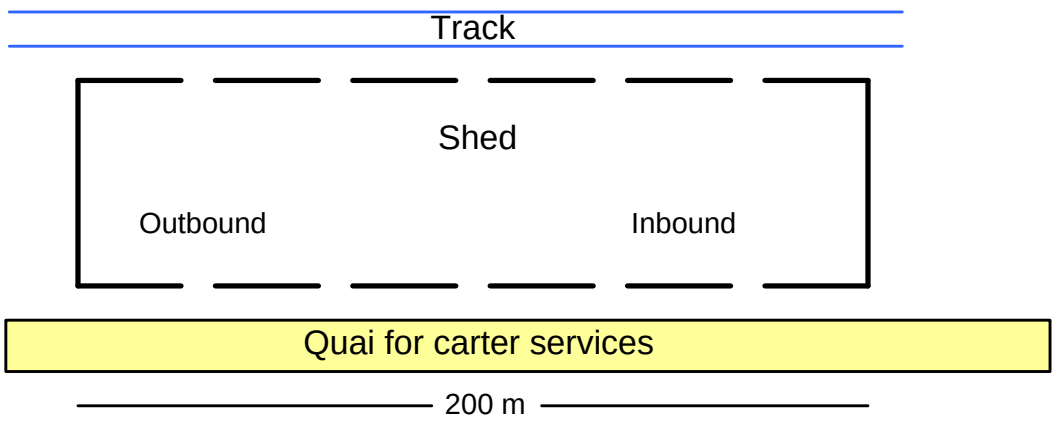
The local network of freight yards in Breslau 1930



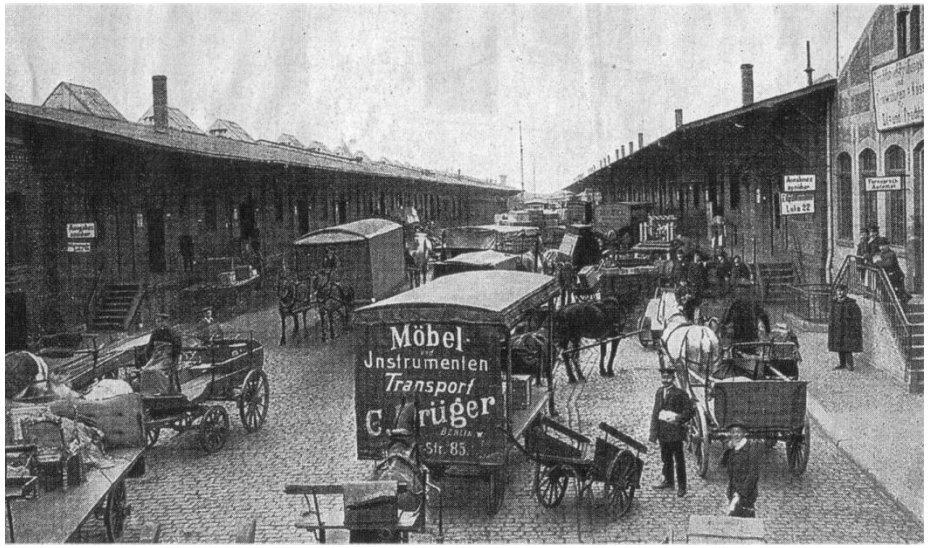
24 local freight yards

Marshalling yard
Brockenau Nr. 20

Transshipment in Sheds



Shed Berlin Anhalter Bahnhof 2009

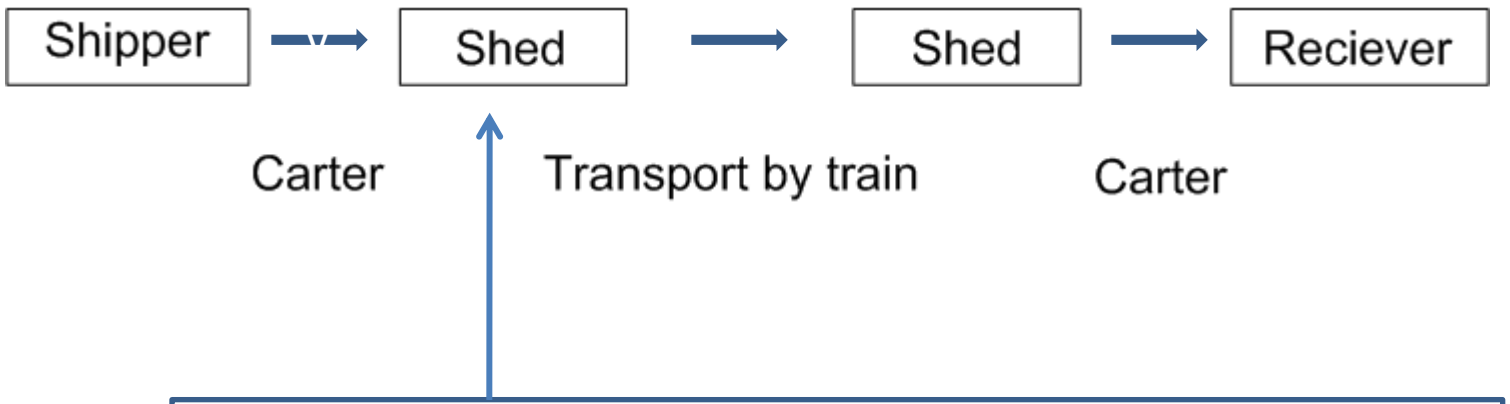


Congestion at shed Berlin Anhalter Bahnhof 1908

Shed Nuremberg 1934

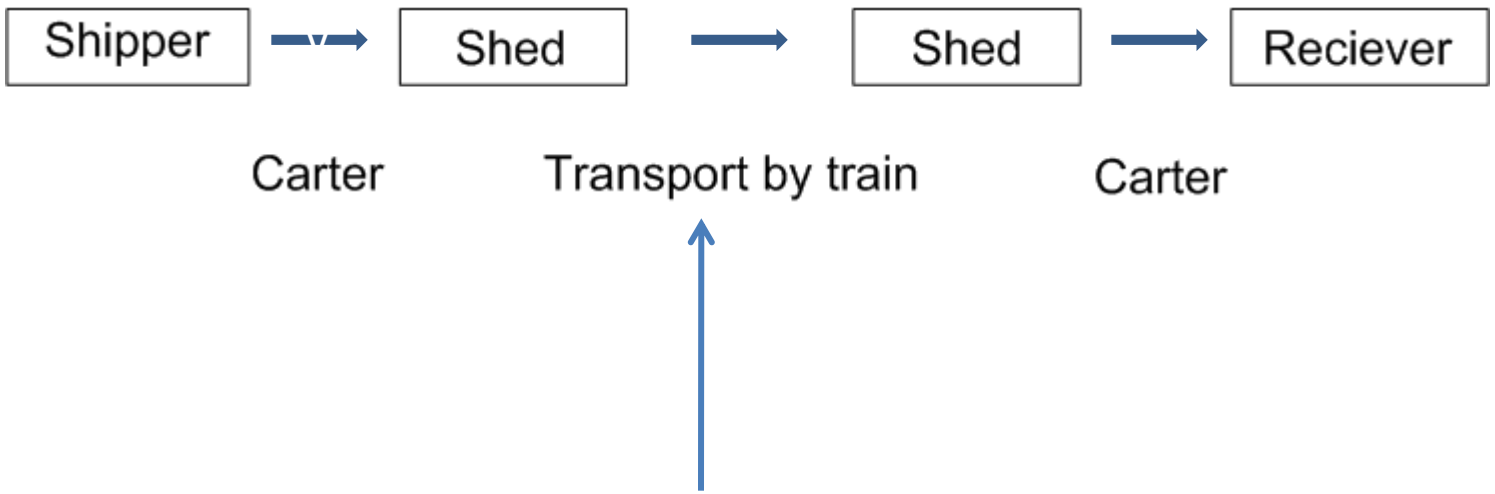
Complex processes in the transport chain of packaged goods

Complex processes in the transport chain of packaged goods



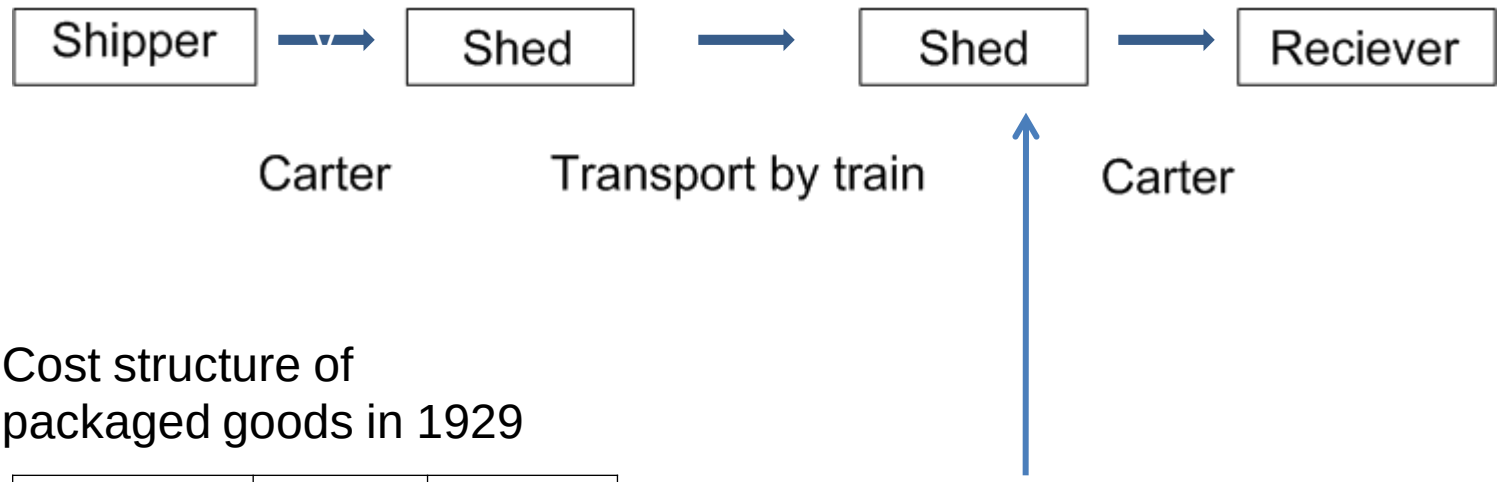
Determine the good category and the related price.
There were some 100 different categories of goods with different prices. The complex price system impeded the determination of the right price. Long queues in front of the counters.
Fill out the form for the bill of lading.
Load the good into the shed.
Load the good from the shed into the wagon.

Complex processes in the transport chain of packaged goods



Navigation in the local network of terminals.
Transshipment in the central **transshipment hall**
Building (marshalling) the trains for the long distance transport. Many relations without direct trains.
Transship the cargo from one long distance train to another .

Complex processes in the transport chain of packaged goods

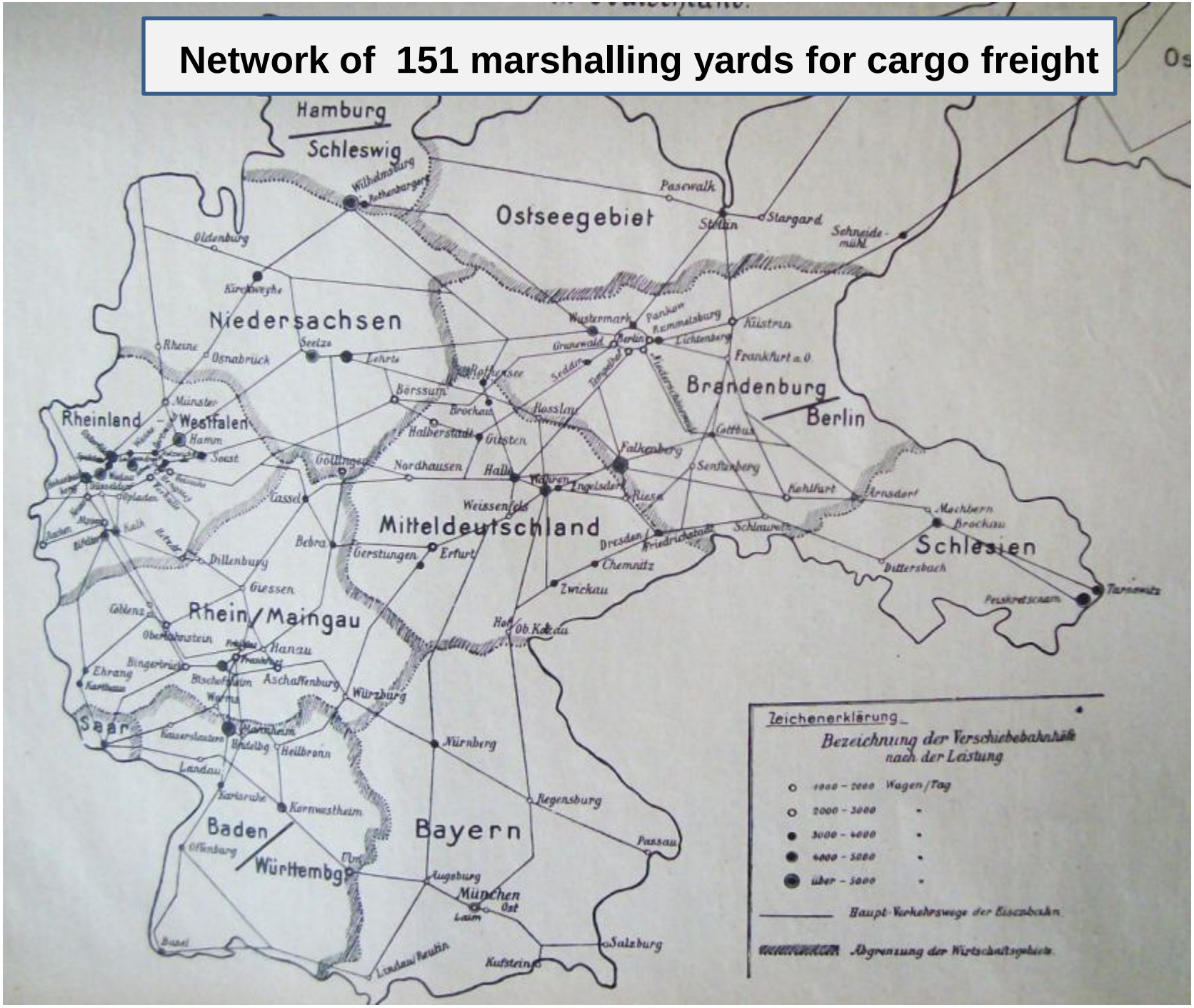


Cost structure of packaged goods in 1929

Process	Cost in million RM	Share in percent
Shed	238	40,3
Transshipment hall	106	18,0
Marshalling	103	17,5
Train transport	143	24,2
Total	**590**	**100**

Unload the cargo into the shed.
Place the cargo in storage.
Separate according to the mode of carter service.
Notification of the reciever.
Control of authorization of the carter service.

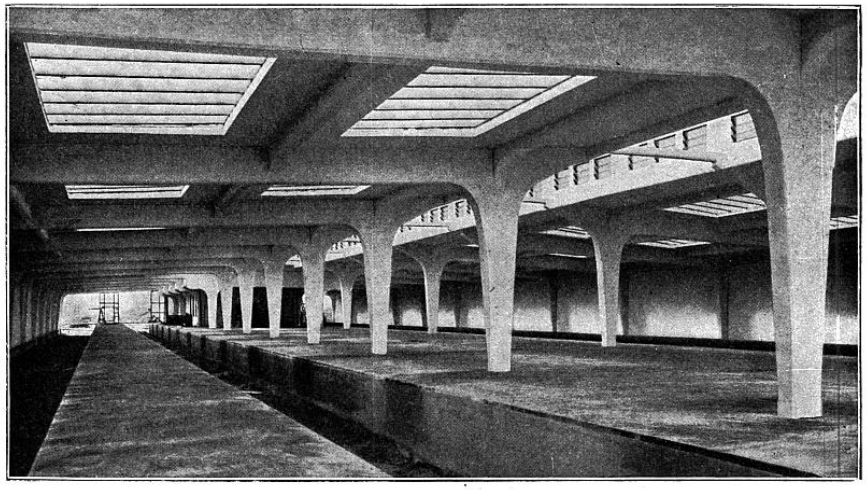
Network of 151 marshalling yards for cargo freight



65 gigantic transshipment halls for packaged goods throughout Germany

Köln-Kalk

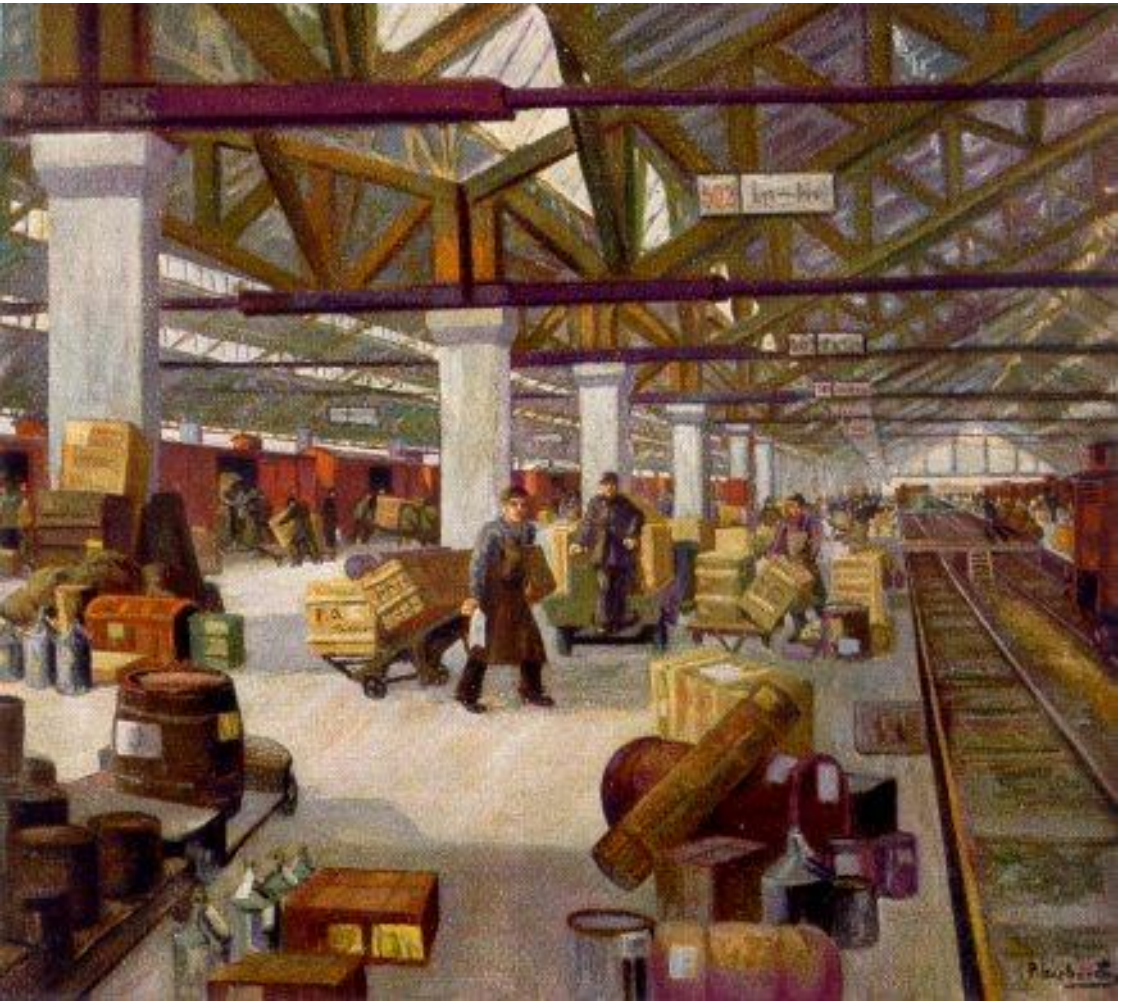
Magdeburg



Wustermark

Stettin

Labor intensiv transshipment, long distances between 2 platforms



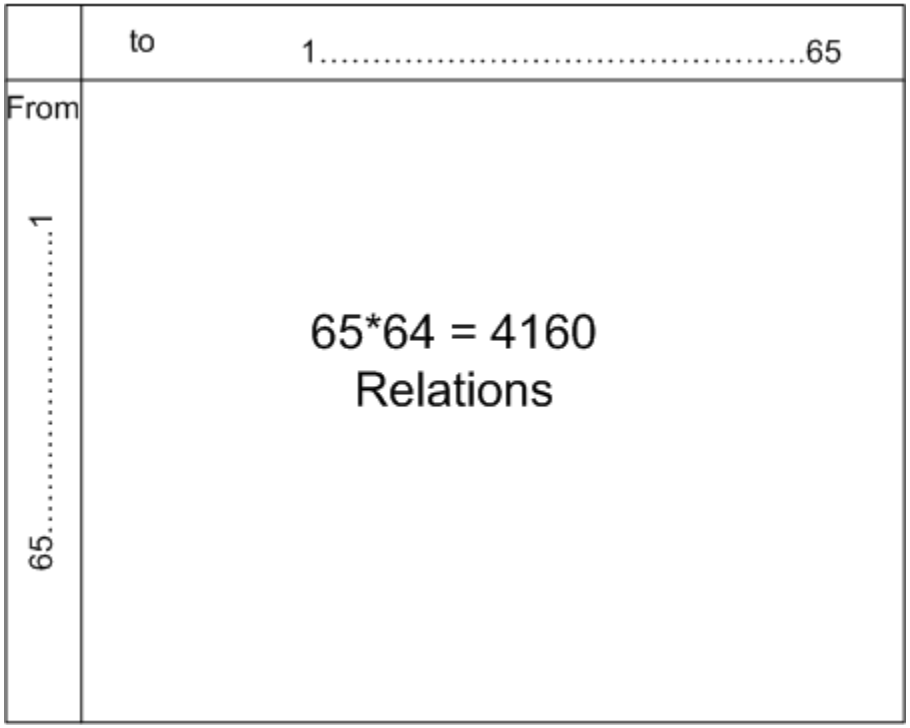
Painting Gerhard 1936

The transshipment hall Nuremberg, built 1936

Long distance between two platforms makes transshipment difficult.

Direct transport relations among the 65 transshipment halls

In Germany in 1933 there were 65 transshipment halls. Among these halls were theoretically 65*64 = 4160 direct transport relations possible.



Only 38% of the 4160 direct transport relations were served daily.

The other relations were not served by direct transportation, but with additional 1 or 2 transshipments in the halls.

For relations from Munich to north east Germany Nuremberg was the location of transshipment.

Express freight

Express freight were small shipments up to 30 kilogram und were transported by passenger trains in special wagons. This segment of freight competed with the postal parcel services.

One can regard the extend of express freight as indicator of the process of social differentiation and development of the society.

Express freight

Express freight doubled at Berlin‘s railway stations between 1913 and 1926. Overload of the counters. Delay of the passenger trains.

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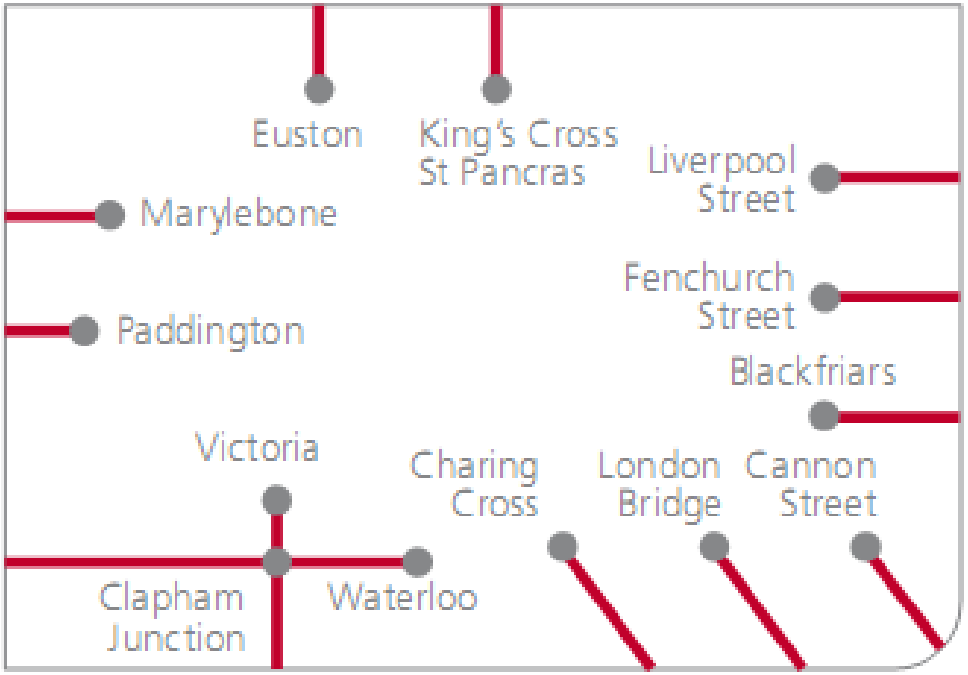
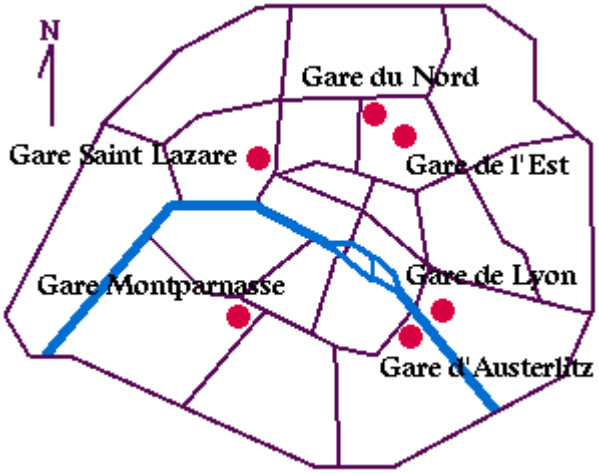
Exchange of express freight among the terminal stations in metropolitan cities: London, Paris, Berlin.

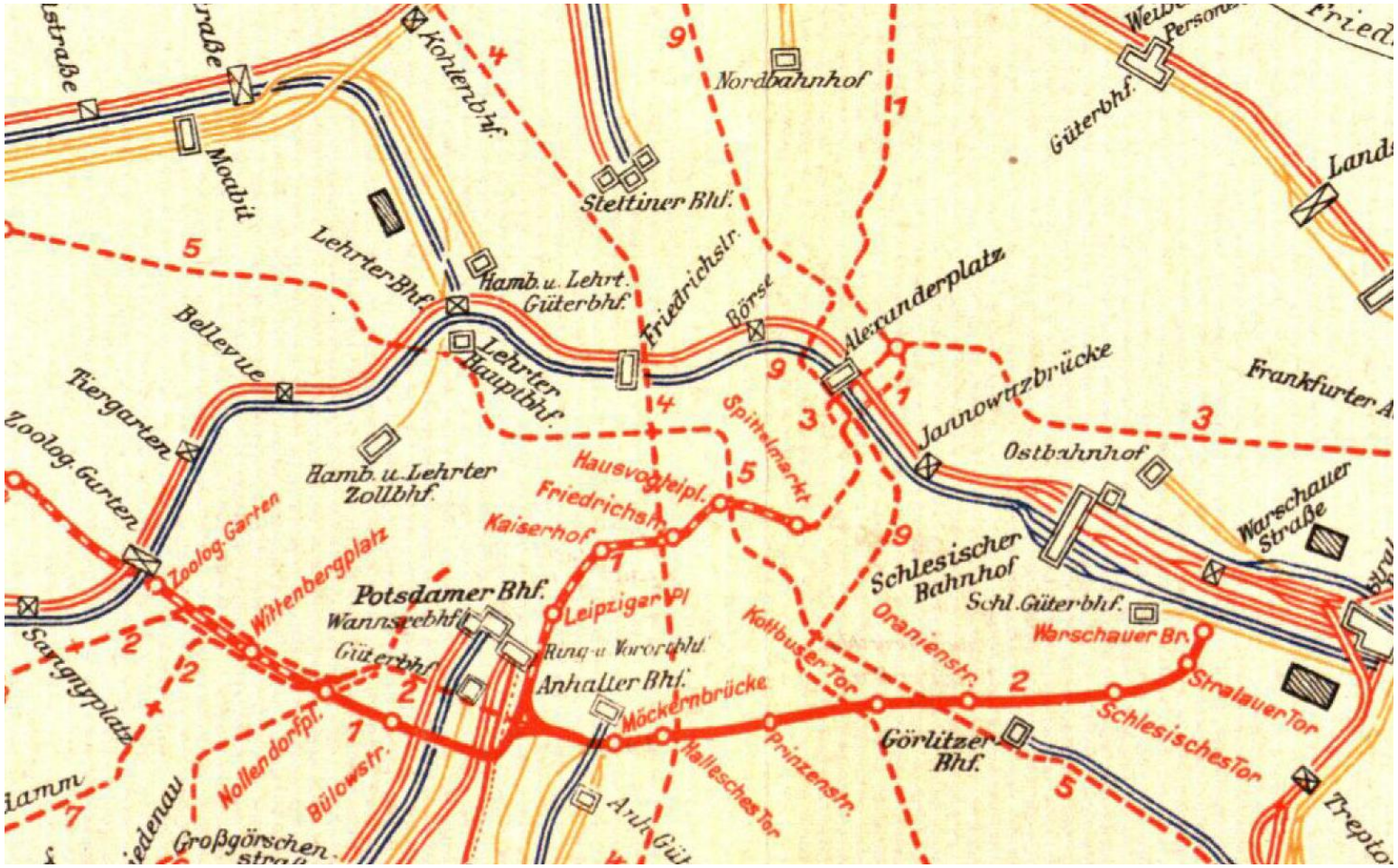
Central London Stations



Paris



Exchange of express freight among the terminal stations in Berlin by trucks



Truck transportation of express freight in Berlin

Since 1922 exchange of express freight among the terminal stations in Berlin by motorized trucks. Per day 200 tons of freight on 222 routes.

In long distance train transportation via Berlin, the train transportation chain was intermitted by local truck transportation

The German Reichsbahn did not develop a strategy for packaged goods

Cost of transportation of packaged goods were not covered by the low prices.
In 1929, 49% of the shipments did only cost up to 1,50 RM.

It became evident in the 1920s, that transportation by trucks in short und medium distances were more cost effectiv.

In 1923, the Reichsbahn established a committee to study the shift from rail to truck.

In 1923, a pilot study for packaged goods: on average 40 tons per day by truck in the short distance transportation from Berlin‘s terminal „Görlitzer Bahnhof“ to the southern suburbs.

But despite of these approaches, the Reichsbahn failed to develop a convincing **strategy**. Instead to broaden its vision to the transportation of goods – regardless of the carrierer – it narrowed its strategy to run trains.

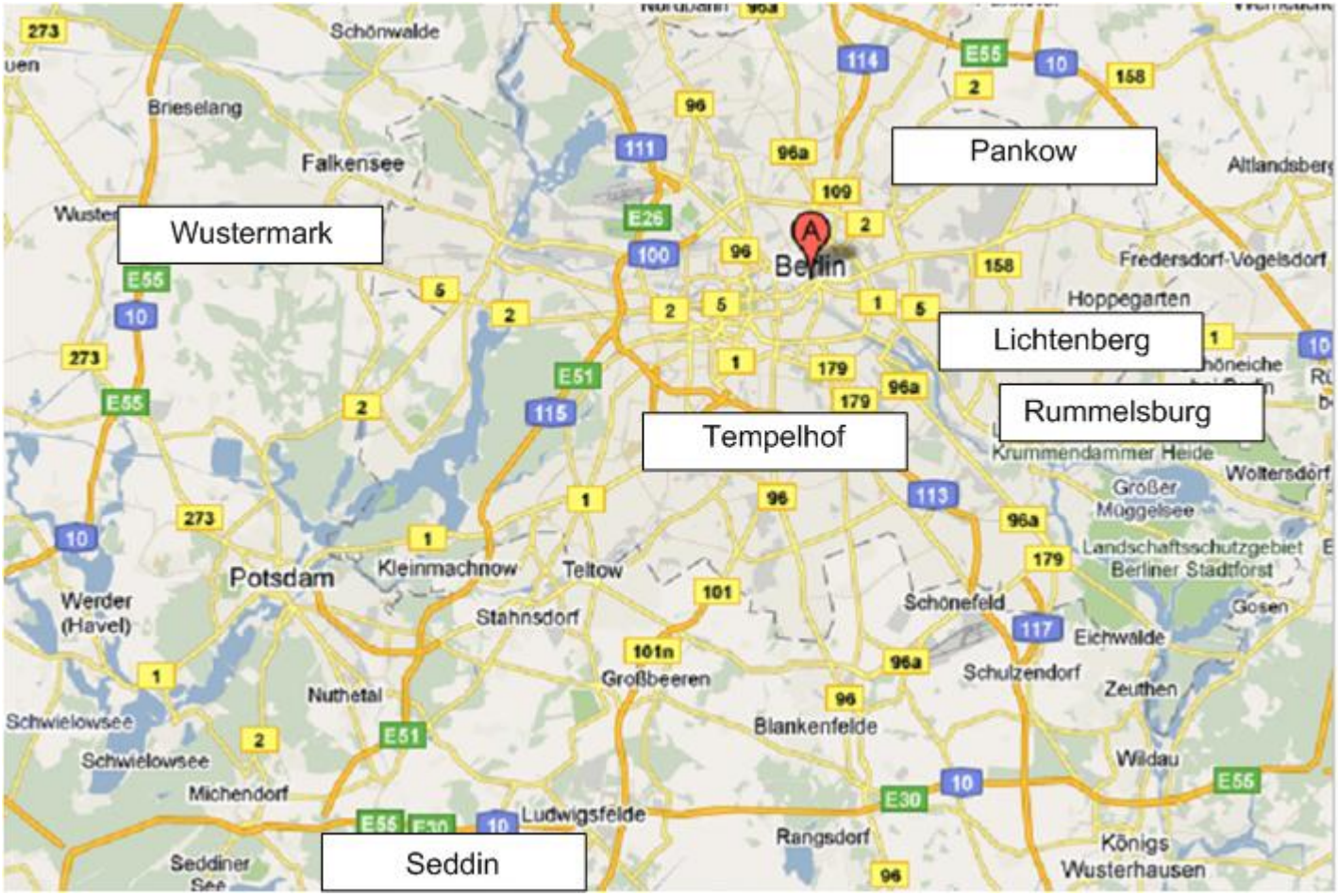
Supply of fresh fruits and vegetables from the farm yards to the cities: Urgent delivery according to the status of ripening.

Advantage for truck transportation

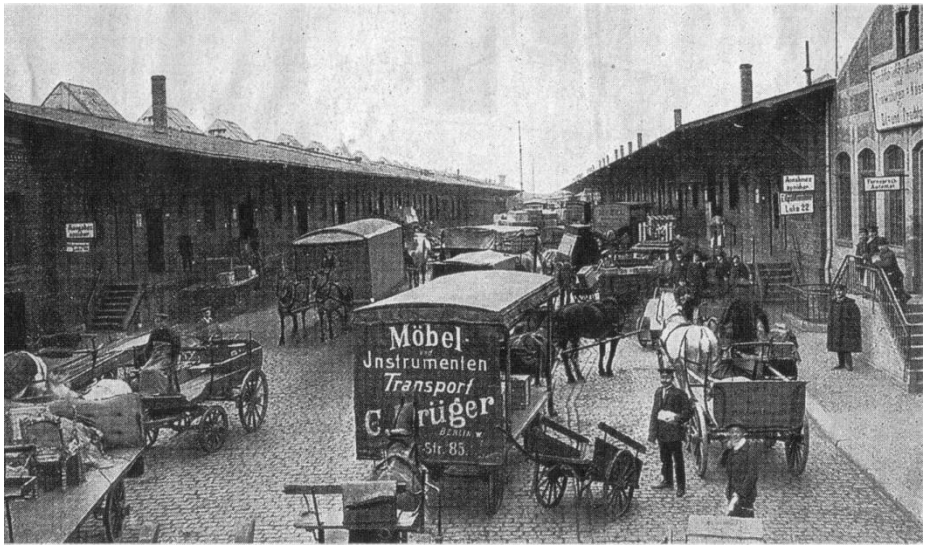
RBD Hamburg 1932

The vulnerability of the marshalling yards by air attacks

If allied bombing in WW2 would have been focused on marshalling yards, there would have been a collaps of German arm production in short time.



Mierzejewski, Alfred: The collapse of the German war economy, 1944–1945: allied air power and the German national railway, Chapel Hill 1988.



I thank for your kind attention!

The lecture will be published in Journal of Transport History