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**SPECIAL REPORT ON CERTAIN
RAILWAYS OF
NORTH-WEST GERMANY
WITH APPROACHES FROM
ANTWERP AND ROTTERDAM**

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INTER-SERVICE TOPOGRAPHICAL DEPARTMENT

January

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SPECIAL REPORT

ON CERTAIN RAILWAYS OF

NORTH-WEST GERMANY

WITH APPROACHES FROM
ANTWERP AND ROTTERDAM

INTER-SERVICE TOPOGRAPHICAL DEPARTMENT

January 1944

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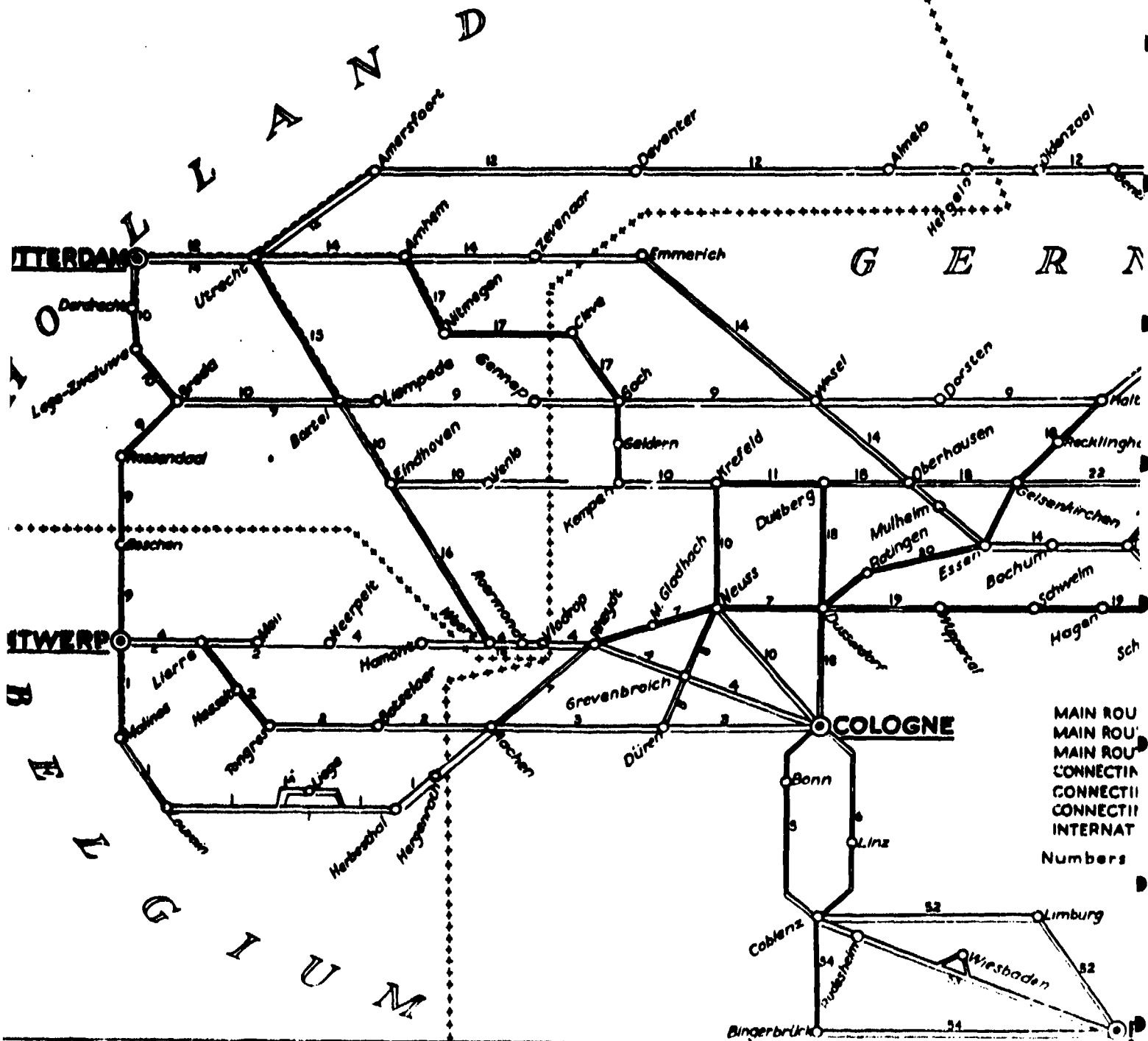
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**CERTAIN LINES IN NORTH WEST GERMANY WITH
APPROACHES FROM ANTWERP AND ROTTERDAM**
(DIAGRAMMATIC ONLY)



JANUARY. 1944



BELGIUM

(s) General description of system

The Belgian railway system consists of a dense network of standard gauge lines, complete in itself, serving all areas of the country, interwoven with an equally dense secondary network of separate light railway lines, mostly narrow gauge and mainly providing for short-distance local traffic.

The two systems are complementary, and although the light railways may, on many routes, serve as relief lines when the main-line transport system is interrupted, they cannot cope with any substantial transport demands, and they are not suitable for long-distance transport on a large scale.

In addition to the railways, a complete road system covers the country, as well as a network of canals linked up with the few navigable rivers in the country and the sea ports. The canals and rivers are of less importance, proportionally, in the general transport system than the inland waterways of Holland, with which they have no important junctions.

The Belgian transport system in general, and the railways in particular, are of great importance for two reasons: the density of the population, and the situation of the Belgian territory astride important trans-European transport routes.

The significance of railways for transport in Belgium may be judged by a comparison with the railways of Holland, a country with a population and area similar in size:

Belgium: 11,800 sq. m.; 8.4 million population
Holland: 13,500 " 8.7 " "

Comparative figures of the main railway systems of both countries in 1939 were as follows:

	Belgium	Holland
Railway mileage in operation (km.)	5,134	3,313
(miles)	3,191	2,072
Miles per 100 square miles	25.9	17.3
Staff	76,700	20,000
Passengers per annum	220 million	80 million
Freight per annum (metric tons)	82 "	22 "
Passenger-train km.	68 "	40 "
Freight-train km.	25 "	12 "
Locomotives (No.)	3,306	1,050
Carriages and wagons (No.)	108,223	33,342
Additional light railways (km.)	3,224	1,200
(miles)	2,004	750

The Dutch railway system is a passenger transport system, with light general goods traffic and little or no coal and ore traffic; the Belgian system carries all classes of traffic.

Road traffic has developed intensively in Belgium as in adjacent countries, and this affected railway traffic considerably during the last decade before the war. The effects have been less serious than in Holland—very few unremunerative branch lines were closed to passenger traffic, practically none to all traffic, and the railway network remained complete. Special measures effecting economies in operation were adopted for lines with diminishing traffic, such as curtailment of services, reduction of staff, closing of signal boxes, and withdrawal of level-crossing gates.

Electrification has not made much progress in Belgium, the only electrified railway being the Brussels-Nord-Antwerp Central double-track section, running parallel with the steam-operated double-track line between these two stations. Electrification of other main lines and of local lines in the hilly Ardennes districts formed the subject of preliminary studies for some time before the war, but no plan had been prepared.

DISPOSITION OF MAIN TRANSPORT ROUTES

The importance of the Belgian railway system in war operations as supply lines, and as a tool in economic warfare, should be considered strategically together with the adjacent Dutch and French railways. As to their disposition, the following points are to be noted:

(a) This area is divided into two distinct parts:

(i) North of a line through the centre of Belgium, roughly through Mons, Brussels, and Maastricht, lies the coastal plain, including practically all Holland and the north-east corner of France. This is flat country, with railways suitable for heavy and fast traffic; lines are close together with many connections, with easy curvature and light gradients, but with a number of vulnerable inland waterway crossings and, in the Dutch territory, several bottle-neck points where single-track bridges cross the larger rivers.

(ii) South of this line, including the southernmost corner of Holland round Maastricht, all Luxembourg, and adjacent French territories; the country is hilly, the railways are further apart, interconnections are fewer, some very heavy gradients occur on the main lines, as well as sharp curvatures, and there are a number of tunnels.

(b) This layout of the land has resulted in a considerable number of railway routes of high capacity in a direction from south-west to north-east, running to Germany through Gennep, Venlo, Roermond, Maastricht, Vise, and Liège, of which the last three are the most important, and only one main route in a north-west to south-east direction, through the Ardennes via Arlon-Luxembourg.

(c) The political frontiers, with their customs barriers and change of administrations, are the cause of the existence of strips of territory through which the number of lines of communication (rail and road) is reduced, and these strips and the number of railways crossing them are the points which most affect the possibilities of long-distance through-operation and transport capacity. The situation in this respect is as follows:

(i) French-Belgian frontier: railway facilities are substantial and of high capacity.

(ii) Belgian-Luxembourg-German frontier: one important gateway in the south through Arlon-Luxembourg, and another of very much higher capacity in the north through Liège, Vise, and Maastricht. Very few communications between these two.

(iii) Belgian-Dutch frontier: railway communications few and far between, but of considerable capacity and with many convenient outlets into Germany all along the Dutch-German frontier.

This fact of reduced transport facilities in the frontier regions was appreciated by the Germans in 1914, when, immediately upon the outbreak of hostilities, they undertook the construction of high-capacity new lines parallel to the Aachen-Liège line in the gap south of the Dutch frontier. There are now three double-track main lines crossing the Belgian-Dutch frontier in this region, with many important junctions. They run roughly N.E. to S.W.

RAILWAYS

In this war, great use is being made of the Belgian railways as a section of the routes from Germany into France; those which run through both Holland and Belgium are used extensively.

(a) Mileage and gauges

(a) Mileage

At the outbreak of war the Belgian railways route mileage was:

Railways	5,134 km. (3,191 miles)
Light railways	5,554 km. (3,450 miles)

made up as follows:

Railways:	Km.
Route mileage:	
Single track, steam	2,126
including:	
Malines-Turnhout Co.'s line	79
Chimay Railway	30
Double track, steam	2,030
including:	
Nord-Beige line	170
Double track, electric	44
Multiple track, steam	14
Track mileage	14,277
including Nord-Beige	58
All standard gauge.	

Light railways (mostly metre gauge, some standard gauge):

Route mileage:	Km.
S.N.C.B.P.V. electric	1,493
S.N.C.B.P.V. steam	3,999
Other companies	48

(b) STRUCTURE AND LOADING GAUGE (see Fig. 2)

The structure gauge of the Belgian National Railways is similar to that of the other continental railways, width 4 metres (13 ft. 1½ in.), height 4.80 metres (15 ft. 9 in.); the loading gauge has a width of 3.15 metres (10 ft. 4 in.) and a height of 4.60 metres (15 ft. 1 in.), slightly lower on short branch-line sections in the Mariembourg district south of Charleroi (4.50 metres or 14 ft. 9 in.). The Chimay line, Anor to Hastière, also has a lower gauge, 4.28 metres (14 ft.).

(c) Permanent way

RAILS

Main lines of Belgian National Railways are laid with flat-bottomed rails, Belgian standard; weight, 50 kg. per metre (100.8 lb. per yard); length, 27 metres (88.6 ft.), and 18 metres (59 ft.) in curves of small radius. Over 3,000 miles of main-line track have been laid with this section; other rails used are 57 kg. per metre (114.9 lb. per yard), 52 kg. per metre (104.8 lb. per yard), 40-65 kg. per metre (81.9 lb. per yard), and 38 kg. per metre (76.6 lb. per yard), of which only the 81.9 lb. per yard section is existent in main lines and sidings to any appreciable extent: 700 miles main-line track, 900 miles sidings. Some British, American, Canadian, and German flat-bottomed rails are still in use in a few sidings.

FASTENINGS

Fastenings are steel sole plates and coach screws; rails have an inclination of 1 in 20.

SLEEPERS

Sleepers are oak on main-line tracks and sidings. A small length of branch lines and sidings is laid with pine and other wood. There are also about 600 miles of main line at various places laid with steel sleepers. Sleeper spacing varies between main lines and secondary lines: closest spacing on main lines, average of 1,370 per km. (2,326 per mile); wider spacing in unimportant branch lines and sidings, 1,150 per km. (2,011 per mile).

RAILGAPS

Railgaps are excellent, broken down, 40-60 mm. size being used on main lines, and on secondary lines, broken down, 15-25 mm. size, and a few short lengths of 10 mm.

MAINTENANCE

The standard of maintenance on all lines of the Belgian National Railways was excellent; second to none on the Continent. Maintenance gangs' sections were short on lines of dense traffic, and not unduly long on lines of light traffic. The average length of running track per man was 640 metres (700 yards). The gangs were well equipped with tools; spare track parts were readily available along all lines; the supervision by inspectors (surveillants de voie) and district engineers (ingénieurs, chefs de section) was well organized.

STOCKS

Large stocks of all permanent-way materials were, in ordinary times, kept at the central stores at Haren, near Schaerbeek, smaller stocks at several points on the lines (principal stations and junctions) and spare rails, fastenings, sleepers, switches at gangs' stores on the main lines.

Permanent-way workshops usually had considerable stocks of materials. These were situated at: Beacoup (points crossings, watercranes, &c., fish plates, sole plates), Schaerbeek (rails, sleepers, fastenings), Kouters (concrete and reinforced concrete), Wondelgem (treatment of sleepers and timber), Etterbeek (signalling).

PERMISSIBLE AXLE LOADS

On all Belgian lines, including those operated by the Nord-Beige and Chimay companies, axle loads up to 20 tons are permissible. Belgian main lines Brussels-Antwerp, Brussels-Liège-Herbethal, Brussels-Arion - Luxembourg, Brussels - Aulnoye, Brussels-Charleroi, Brussels - Tournai, Brussels - Ostend allow 24 ton axle loads.

CURVES

Percentage of route-mileage:

Dead straight	65 per cent
R-11 of 500 metres (25 chains) or more	25 " "
Radius of less than 500 metres (25 chains)	10 " "

For the 106 miles of Nord-Beige lines these figures are 48, 43, and 9 per cent. respectively.

In the coastal plains, curves with a radius of less than 500 metres (25 chains) on main lines occur at very few points. The main exceptions are the entrances into Brussels Nord station from Namur and Ghent, and the triangle south of Antwerp at Berchem, with 300 metres (15 chains) radius curves.

In the Ardennes, curves of 250 metres (12½ chains) are the minimum on main lines. Minimum radius in sidings: 180 metres (9 chains).

GRADIENTS

Percentage of route-mileage:

Dead level	21 per cent.
Up to 1 in 200 (5 per mille)	43 " "
1 in 200 (5 per mille) to 1 in 100 (10 per mille)	19 " "
1 in 100 (10 per mille) to 1 in 40 (25 per mille)	17 " "

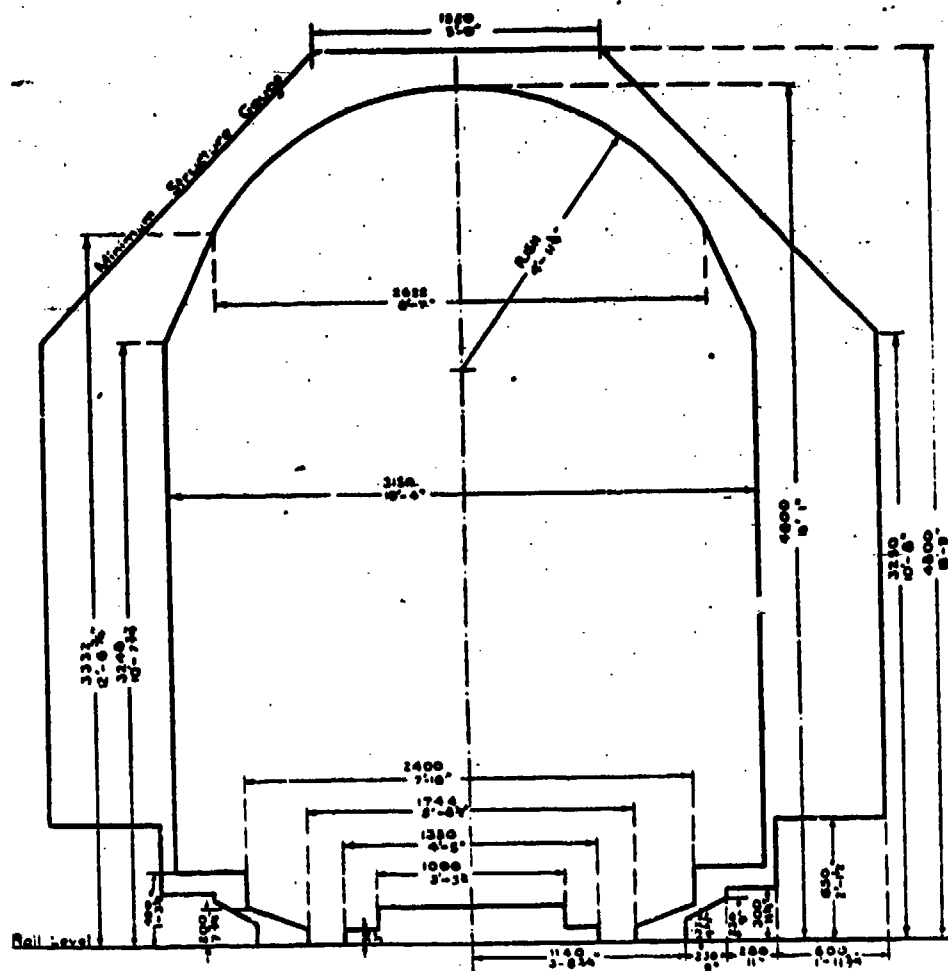
Over 1 in 40 (25 per mille) one section only of 1 in 32 (31 per mille): Ans-Liège-Guillemins, falling towards Liège.

(4) Signalling

GENERAL METHODS

The absolute block system is in force on all lines, double and single track. Lock and block is in operation on all main lines, 722 miles in all; block and telephone system on the remainder of the lines, including all single-track sections. Colour light signals are in operation on the section at Brussels-Antwerp and Charleroi-Namur only. Full instructions are included in the book of rules of signal and in a summary in the event of failure of signal. The following principles are in force:

BELGIAN STANDARD



LOADING AND STRUCTURE GAUGE

Fig. 11

RAILWAYS

trains on the time interval system. The intervals prescribed are:

- 5 minutes after fast train on sections with facing points entering loops;
- 10 minutes after slow trains on similar sections, and for fast trains on sections where backing through trailing points into loops;
- 20 minutes for slow trains on sections where backing into loops through trailing points.

The Nord-Beige and Chimay lines follow French methods. The light railways have no signalling system, except by verbal messages by telephone.

TYPE OF SIGNALS

Semaphore signals of distant, home, starting, and bracket junction types are standard. Signalling methods are similar to British practice. Running is left hand, and signals are, as a rule, on the left of the track, arms pointing to the left as in Great Britain. A special feature is the set of five fixed sloped warning or fog boards at a distance varying from 300 to 600 yards in the rear of the distant signal. Colour-light signals are installed on the electrified Brussels-Antwerp line.

Stop signal-arms are similar in shape and colour (facing and rear) to the British type. Distant signal-arms have broad pointed ends, coloured yellow facing, white rear.

All signal arms work in the upper quadrant, two or three positions (horizontal, 45° up, and upright), but the three positions do not invariably indicate "danger", "caution", "proceed", as will be seen from description hereafter.

Lights by night are red, yellow, green, for stop signals; yellow, yellow and green together, green, for distant signals; purple and green for main-line shunting signals.

The main aspects of the various types of signals are as follows:

Stop signals, single arm

Horizontal, red light by night. Stop.

45° upward, yellow light by night. Proceed with caution, next following stop signal within 800 metres at danger, or speed restriction ahead, branch line turnout.

Upright, green light at night. Proceed.

Junction signals, brackets

Highest arm for straight line, lower arms for branch line. Each arm the same indications as a single-arm stop signal, with the important difference that the lower arm for the branch line shows the upright position and green light for a clear run through the turnout into the branch-line section, unless of course there is a stop signal at danger less than 800 metres ahead. The necessary speed reduction is indicated by the location of the arm.

Distant signals

Horizontal, yellow light at night. Caution, following stop signal at danger.

45° upward, yellow and green lights side by side. Caution, next stop signal at caution for one of the reasons shown above, or, if a junction signal, branch-line signal at proceed.

Upright, green light at night. Proceed, next signal at proceed.

Shunting signal on main line, for backing into passing-loop or siding; section-shaped arm.

Horizontal purple light at night. Remain at standstill.

45° upward, green light at night. Back into siding.

The red disk, rectangular in shape, is used as a warning signal.

SPECIAL ASPECTS

A stop signal placed immediately at the side of the danger point has a short vertical slit across the arm, half-way from the end.

On a number of the less important lines of the Belgian National Railways the pre-1914 signals (two-position stop signals, arm with a ball-shaped end, and two-position distant signal similar to the new type) were still in existence at the outbreak of the 1940 war.

On a very small number of branch lines the German signals, pointing to the right, as 1 disk distant signals, were still in existence.

On the Nord-Beige and Chimay sections the French signalling methods were in operation; they were to be retained when the lines were taken over from the companies in 1941 until they could be replaced by the standard Belgian signals.

INTERLOCKING

Signals and points are operated by double wires; there are, however, a number of signal boxes with rod-operated points. All points and signals covering them, and signals covering conflicting movements, are fully interlocked in the signal frames in the cabins. There are a number of electrically operated signal cabins at larger stations.

COMMUNICATION CIRCUITS

Telegraph and telephone lines connect all stations along the same line. A control system is in operation on all the principal routes by means of telegraphic and telephonic communication between control offices, stations, and sidings. The controllers watch the train running, keep a record of the actual runs and loads, order the shunting of delayed slow trains to be overtaken by fast trains, on the use of light engines for the conveyance of wagons or for piloting duties, &c.

(5) Electrification

SECTIONS

The only electrified railway lines are two tracks of the Brussels Nord-Antwerp Central line, route-mileage 27½ (44 km.).

Electrification of the Antwerp-Dordrecht line is planned for the future in conjunction with the Netherlands Railways. Electrification of the Luxembourg main line and possibly a network of lines in the Charleroi area is under consideration, but no plans have as yet been prepared.

POWER

Power is supplied by the Inter-Brabant power station, located near Schaerbeek Station and the Inter-Escaut power station at Schelle (near Antwerp).

SYSTEM

3,000 volt direct current.

SUB-STATIONS

At Haeren and Mortsel.

CURRENT COLLECTION

By overhead transmission.

Enemy action may interrupt electric services, but in view of the short section involved, this would create very little disturbance of transport possibilities.

ALTERNATIVES

In case of the power station being out of action, electric current can be made available from other power stations in the country. In case of failure of power on the section, the parallel double-track steam-operated lines are fully capable of maintaining steam-operated services; after removal of the electric trains immobilized on the electrified lines, the latter can be worked by steam, for which ample rolling stock is normally immediately available. The traffic on the electrified lines is confined to Brussels-Mechelen-Antwerp multiple-track section.

RAILWAYS

LIGHT RAILWAYS AND TRAMWAYS

Of the 2,555 miles of light railways operated by the *Société des Chemins de Fer Vicinaux*, 979 miles were electric, and of the 303 miles of light railways and tramways operated by other companies, 45 miles were electric at the outbreak of war in 1940. Power was supplied by local electricity undertakings.

(6) Locomotives

On 1 January 1939 the locomotive stock of the Belgian National Railways was stated to be as follows:

Number of locomotives of all types . . . 3,396

Classified as under:

	Tender	Tank
0-4-0, 2-4-0, 1-1-0, 1-2-2	108	148
0-6-0, 2-6-0, 1-3-0, 1-3-2	1,071	500
0-8-0, 2-8-0, 1-5-0	1,050	470
0-10-0, 2-10-0, 2-10-2	125	48
	2,354	1,166

In addition, the Nord-Beige used 156 French engines on the Belgian lines, classified as follows:

Four-coupled	12 tank
Six-coupled	35 tender, 17 "
Eight-coupled	38 " 70 "
Ten-coupled	20 "

The Chimay-Railway owned 13, and the Mechlin-Terneuzen Railway 25 locomotives; the light railways had 454 locomotives, 277 railcars, 1,800 electric trams, mostly metre gauge.

SERVICE

This number is adequate for all normal requirements, with something to spare.

REPAIR

All locomotives in service were in good repair on the day of the German 1940 invasion; those in the shops for periodical overhaul or minor repairs were efficiently dealt with.

NEW ORDERS

No new locomotives were built or on order.

RUNNING SHEDS AND WORKSHOPS

(a) Running sheds are provided at the principal junctions, at short distances along all main routes. Passenger rolling stock is to be found at the stations where running sheds are established, and goods stock is spread over all stations with large concentrations in the *gares de marchandises* in the large centres, in marshalling yards and in dock areas.

The following is a list of running sheds. The principal sheds stabling engines for regular passenger and goods services were indicated by code letters, which were also marked on the sides of the engine cab. Large sheds equipped with mechanical coaling plants are at Schaerbeek, Bremsous, Haine-St-Pierre, Meirelbeke. The numbers shown against the sheds indicate the normal peace-time number of engines in running order belonging to the shed.

Antwerp division		
Schaerbeek	FSR	250
Haren Nord	FHE	—
Muyse (Mabius)	FVN	50
Antwerp (Berchem)	FNBL	75
Antwerp (Dam)	FNBN	140
Antwerp Sud	FNBD	70
Louvain	FLV	100
Tirlemout	FLT	50
Aerschot	FRST	50

Ghent division		
Ostend Maritime	FSD	65
Zeebruges	LZR	10
Bruges	FR	80
Ghent St. Pierre	FGSP	—
Ghent Maritime	FGNF	35
Meirelbeke	FKR	120
Abbe Nord	FIS	20
De Meirieuw	FDD	20
St. Nicolas	FS	35
Enghien	FCO	30
Torhout	FT	—
A. Broule	FON	—

Mons division		
Brussels Midi	LBM	25
Brussels P.L.	FBPI	—
Hal	—	—
Braine-la-Croix	FBC	40
Manège	FMN	—
Haine-St. Pierre	LHP	40
Mons	FMS	40
La Louvière	MGR	—
St. Ghislain	FGH	25
Quidvrain	—	—
Ath	ATH	60
Tournai	FTY	40

Hasselt division		
Hasselt	FHS	70
Moll	—	—
Liège division		
Liège	FL	120
Kinkempois (Liège)	—	—
Angleur (Renory) (Liège)	—	—
Peppinier	FTS	—
Raeren	—	—
Gouvy	FVY	20
Rivage	—	—
Trois Pons	FNS	25
St. Vith	RSV	—
Montzen	OMN	—
Viel	FVS	35
Ars	ANS	75
Landen	FLD	45
Statis	LHY	—
Flemish Haute	Nord Beige	—
Huy Nord	Nord Beige	—

Namur division		
Namur	FNR and Nord Beige	—
Ottignies	LT	70
Gemboux	—	—
Ciney	LC	30
Jemelle	LJ	—
Marbehan	—	—
Stockem	MKM	—
Arlon	AL	140
Bastin	MBX	—
Latour	MUT	80
Ronet	FRO	140

Charleroi division		
Charleroi Sud	FCR	75
Couillet-Montignies	GMT	—
Tamiois	FTM	55
Chateaufort-Chatelet	FCL	—
Luttre	FLU	40
Baulers	FSU	—
Walcourt	LWC	40
Mariembourg	LNG	70
Hauter	—	—
Chimay	Chimay line	—
Lodelinsart	LDS	—

Steam-operated breakdown crane wagons are stationed at Schaerbeek shed (68 tons); Antwerp Nord (35 tons); Ronet (35 tons); Jemelle (35 tons); Luttre (25 tons); Meirelbeke (20 tons); Montzen (12 tons).

(b) Workshops. All rolling-stock repairs are carried out in the railways' own shops, which are well equipped with modern machine tools and well stocked with spare parts. They are equipped for rolling-stock construction on a small scale. Since the last war the concentration of repairs in a few chief shops has been developed. There are now two large workshops for all rolling stock, at Mechlin and Salzinnes. In addition there are smaller shops equipped only for minor repair work to all rolling stock, at Antwerp Dam or Austruweel, Louvain, and Liège; wagon works at Gentbrugge and Guesmes; carriage works at Mechlin.

In 1942 the Antwerp shops were in course of being transferred from the site at Dam station to Austruweel.

Private companies' workshops were at Ars (Nord-Beige) and at Ghent (Mechlin-Terneuzen), both of which output.

* Figures do not include engines owned by the State.

New carriage-repair shops were being built at Ostend and at Antwerp (outside the docks) in 1940.

All these shops employ an aggregate of 5,700 workmen and a proportionate supervisory and administrative staff. All running sheds are equipped for small repairs.

FUEL

All locomotives are coal-burning. Coal is supplied from the Belgian coal-mines in the Sambre-Meuse valleys in the Charleroi district:

Fuel consumption, railways—1936

Briquettes	291,000 tons
Screened coal	84,000 "
Unscreened and small coal	1,446,000 "
Including Nord-Belge consumption of 9,200 tons briquettes and 50,000 tons of coal	

WATER SUPPLY

Watering facilities are available at all running sheds, at short distances along all lines, and at many wayside stations, generally not farther than 15 miles apart. As a rule, water is supplied by the local water board, but on secondary lines some stations have their own pump and tank installations.

(7) Rolling stock

Rolling stock in service (1939) consisted of:

(a) Passenger vehicles

Passenger coaches	6,928
Classified as under:	
4-wheeled	30
6-wheeled, including 2,073 old German	4,780
Bogie, wooden	635
Bogie, steel	1,441
Guards and mail vans	1,040
4-wheeled	6
6-wheeled	879
Bogie	155
Service coaches and vans	125
Electric 4 car units	12
Steam railcars	5
Diesel railcars	26
Diesel-electric railcars	2
" 4 car units	1
" 3 car units	9

(b) Goods vehicles

Goods wagons	108,750
Classified as under:	
Covered 4-wheeled, 10-20 tons	30,714
" 6-wheeled, 30 tons	98
" bogie, 40 tons	3
Open, 4-wheeled, 10-20 tons	65,982
" bogie, 30-40 tons	4,008
(Of the open wagons, 10,728 are low-sided or flat.)	
Privately owned wagons	4,226
Special wagons	57
Brake vans, also used to load goods, and service wagons	5,662
Containers, various sizes	1,669

All Belgian National Railways rolling stock.

(c) French rolling stock, operated by the Nord-Belge on Belgian sections:

244 passenger coaches, 4-wheeled, 6-wheeled, and bogie
123 guards and mail vans, 4-wheeled
1,184 covered goods wagons
1,201 low-sided or flat open wagons
3,330 other open wagons
408 privately owned wagons
15 special wagons

(d) Chimay Railway stock:

14 passenger coaches
100 goods wagons

(e) Mechlin-Terneuzen stock:

68 passenger coaches
1,120 goods wagons

(f) Light railway rolling stock, mostly narrow gauge, operated on the sections spread over the country consisted of:

1,015 passenger coaches
1,015 guards and mail vans
1,015 goods wagons
1,015 other vehicles

BRAKE AND COUPLINGS

Passenger stock is fitted with the Westinghouse brake, goods stock is fitted with the Westinghouse brake or pipe. Screw couplings and ordinary side buffers are fitted to all rolling stock, passenger and goods.

REPAIRS

Passenger stock is kept at the principal stations and junctions, where there are running sheds. (See "Running Sheds and Workshops" above.) Goods stock is not concentrated on any stations or yards, but a large number of vehicles is always available at the marshalling yards, junctions, and docks. All rolling stock is kept in good repair. Workshops for locomotives and carriage and wagon repairs are at sites enumerated above (p. 5).

NEW ROLLING STOCK

At the outbreak of the war there were on order:

6 diesel-electric railcars
12 diesel-electric 2-car units
6 diesel-electric 3-car units
12 petrol railcars
30 light petrol railcars

(8) Traffic

NATURE AND DENSITY

Traffic is dense, and includes the transport of all commodities for the life of the community. The importance of the railways in this respect is set out in the general description (p. 1).

WEIGHTS AND SPEED

Train lengths and weights vary considerably on the different lines, according to the physical conditions of the lines; gradients of 1 in 40 are not uncommon, and crossing- and passing-loops are often short on the lines in hilly districts. Locomotive power is high, however, and as a general figure, passenger trains seating 1,500 and goods trains of 1,500 tons gross behind the engine (60 four-wheeled wagons) may be considered as workable. In ordinary operating conditions 600 tons behind tender is considered a maximum for passenger trains. Double-heading increases the maximum permissible weight behind the tender by 75 per cent., except on the sections: Pepinster-Herbethal, Gouvy-Bouvigny, Stockem-Arlon, Sterpenich-Arlon. In the direction given (up-gradient) 600 tons for passenger trains, 60 four-wheeled vehicles for goods trains are the absolute maximum on these sections.

The speed limit is 120 km./h. for all-steel coaching stock passenger-trains, except for the Bruges-Ghent line on which the speed limit is 140 km./h. Maximum speeds on straight track are:

Non-steel passenger trains	100 km. h.
Rapport goods trains	85 "
Mixed trains	60 "
Ordinary goods trains	50 "

Prescribed maximum loads and speeds of military trains in peace-time, worked under normal traffic conditions at high frequencies, may give an indication of weight and speed possibilities.

Military trains, up to 25 coaches, bogie, 6-wheeled and 4-wheeled, but not more than 60 axles, 100 km. h.

Military trains, over 25 coaches, or 60 axles, up to 30 carriages, but not more than 72 axles, 85 km. h.

Military trains, heavier than the above, must be worked as goods trains, 50 km. h.

TRAFFIC CONTROL

Daily control was exercised by the traffic departments of the divisional headquarters. Sudden increases in traffic could be promptly dealt with. Stand-by engines were available at all marshalling yards enumerated above, and passenger stock was kept in reserve at the same stations. Goods stock was well distributed over the whole system. Special trains were timed and numbered to avoid head-on collisions at Antwerp, Brussels, and Namur.

Strict control on the use of goods wagons was enforced. In normal times there were 60,000 goods wagons loading, running, or unloading continuously. 15,000 wagons were required daily, average turn-around time per trip 4 days. 4,000 wagons under repair, 35,000 wagons waiting.

Some special features, as set out below, have increased the utility of the Belgian main lines, which are very well equipped to handle fast, heavy, and unbalanced traffic. Reconstruction after the 1914-18 war gave opportunities to increase the utility.

(i) **Dunkirk-Adinkerke and Lichtervelde-Thielt on the Dunkirk-Brussels route.**

- (ii) The cross connections between the parallel routes Liège-Luxembourg and the Elfal line (Köln-Trier) to Jankowatz and Gerolstein.
- (iii) Short section Gouvy-Trois Vierges, 5 miles in length, on the Liège-Luxembourg line.
- (iv) Section Moll-Hamont, 20 miles in length, on the Antwerp-Rearmond-Germany line (Route No. 4).

(b) All the main routes have several alternative routes of equal capacity, and the alternatives themselves have second alternatives for most of the sections. As an example may be mentioned the route Brussels-Luxembourg: main route via Namur, alternative via Charleroi-Dinant-Strasbourg, with a variety of cross sections between the two. It is known that the German forces made great use of these alternatives in the 1940 campaign.

(4) Equally important is the great number of flying junctions on lines where the ordinary peacetime traffic would not appear to demand these layovers.

(f) The ample provision of parallel cross-overs between different lines entering and leaving termini and junctions and yards, so as to give the maximum possible simultaneous train movements in and out.

Summary

Plumbing and drainage systems are provided in one of two ways: by installing a public distribution system, or by installing a local distribution system. The latter is the preferred method. A local distribution system is a self-contained system that can be used to supply water to a building or a group of buildings.

The deck in goods sheds is level with the wagon floor, and heavy equipment may conveniently be loaded through the shed across the deck into the wagons. The railway track and the road are usually outside the shed proper, not under cover.

MARSHALLING YARDS

(c) The larger yards at Schaerbeek (Brussels) and Antwerp*:

*Antwerp: five yards, at Antwerp Nord, Austruwal, Zurenberg, Kiel, Sud, of great capacity (over 3,000 wagons each), serving the port and city of Antwerp.

Bruys Maritime
 Mafreilhe (Ghent)
 Termooide
 • Louvain
 • Waterschei Zwartberg
 (Haselt)
 • Liège (at Am, Kinkampoi,
 and Angleur)
 • Verviers Ouest
 Petite Ile (Brussels)
 Courtail
 Charleroi (at Monceau, Lodellinart, Couillet-Montignies,
 Tamin, Châtellainum-Chatelet)
 St. Ghislain
 Ronet (Namur)
 Suckem (Arlon)
 Ghent Maritime
 Denderleeuw
 • Muryan (Mechlin or Malines)
 • Menten
 Vaulx (Tournai)
 Jemappes (Nones)
 Haine St. Pierre
 Laitux

Eaches	Ypres	Aerschot
Ottignies	Baalte-Namur	Broom
*Lierre	*Herenthals	Diest
Leopoldsbury	*Neerpelt	*Moll
St. Truiden	Theclien	Ramilles
Drieslinter	Liers	Tongres
Brenoux	Rivage	*Pepinster
Battice	Trois-Ponts	Weywerdt
Gouvy	St. Vith	*Herbesthal
*Viel-Haut	Kaeren	Ciney
Mariohe	Jemelle	Marbehan
Athus	Libramont	Pavigne Sud
Bertris	La Sambre	Jumet-Bruloitte
Luttre	Baulers	Walcourt
Thuillies	Seneville	Mariembourg
Ransart	Nazareth	Fleurbaey
Aves	Mettet	Armeton-Biert
Florennes	Warnant	Huyvet
Gembours	Hal	Clabecq
Braines-Faloud	Enghien	La Louvière
Pirion	Manège	Fossines-Carrières
Fauveault	Saignies	Braines-le-Comte
Jurbise	Warquennes	Quêvrain
Platon	Aix	Herveaux
Lesce	Renaix	Alst
Genettebergem	Trélon	Goyech
Fontaineel-Wast	Treuxen	St. Nicolas
Montebellin	Saint-Jean	Donze
Amblève	Vervins	Soignes
Fort-de-Sax	Verdun	St. Gilles
Anvers-la-Peche	Vermandois	St. Amand
Antenne	Vermeire	Verhaeghem

TRANSHIPMENT POINTS

Railroad transhipment sidings and handling platforms at all stations and at many halts. Rail-water transhipment points are few, outside the extensive dock sidings at Antwerp port. Transhipment points from rail to inland waterways are at Hasselt (Halteren Canal), and Visé. There are a few transhipment stations, enumerated below, where standard-gauge light railways connect with the main line. Main-line trains cannot use the light railway, but low-capacity goods wagons may in some cases be run through:

Moll (on the Antwerp-Roermond line) (Route No. 4).

Troos, Dolhain (in the Liège district) (Route No. 1).

(g) Capacity

The capacity of a system, line, or section is the maximum number and load of trains, passenger, goods, and service which that particular system, line, or section can accommodate under normal operating conditions, with all equipment in perfect order and the complete staff in their allotted duties. This capacity is dependent on a number of factors, chief among which are:

- The time interval obtainable between following trains.
- The variation in speed between the various classes of trains.
- The accommodation at termini to accept, turn round, and dispatch the series of following trains, and the accommodation at junctions to direct the trains on their various courses, without interruption or delay.
- The rolling-stock and motive power available.

The speed in itself has not a preponderant influence; the capacity is reached when all trains run at the same speed. It makes little difference if this speed is, say, 10 or 20 miles higher or lower, on lines with the normally short block sections.

The speed is affected by the number and duration of intermediate stops, and the allocation of stops therefore has its effect on capacity.

The capacity is further affected to a high degree by the traffic on other lines or sections which join, leave, or cross the line or section under consideration.

Full capacity can be maintained for periods which are limited by the necessities for repairs or examination of equipment, also by fluctuations in traffic demands, further by the need for redressing unavoidable breakdowns or delays.

Full capacity can only be reached after thorough and careful preparation of working time-tables.

Taking into account the foregoing definitions and provisos, the capacity of all Belgian main-line railways is at the highest level reached on the European continent, the special features enumerated above being of particular importance.

Under emergency and war conditions the full capacity may not be expected to be attainable. The following figures may be considered as practical maxima for military traffic under such conditions:

DOUBLE-TRACK MAIN LINES

Category (a) For prolonged periods, individual lines, in both directions, trains at 20 minute intervals, i.e. 72 trains per day.

" (b) For limited periods, part of a day, or even for full 24 hours, trains may be scheduled at 15 minute intervals, i.e. 96 trains per day.

" (c) Tracks available, but staff and equipment, such as signalling, not in full working order, intervals of 1 hour will still be practicable, i.e. 48 trains per day.

SINGLE-TRACK MAIN LINES (including branch and terminal lines).

Category (a) 24 trains per day in each direction.

" (b) 32 " " " " " "

" (c) 18 " " " " " "

SINGLE-TRACKED SECTIONS OF OTHERWISE DOUBLE-TRACKED LINES, APPROXIMATELY 10-20 MILES IN LENGTH (or single-tracked sections of similar length connected up at each end with double-tracked lines).

Category (a) 24 trains per day in each direction.

" (b) 32 " " " " " "

" (c) 18 " " " " " "

SINGLE-TRACKED SECTIONS OF OTHERWISE DOUBLE-TRACKED LINES, UP TO APPROXIMATELY 10 MILES IN LENGTH (or single-tracked sections of similar length connected up at each end with double-tracked lines).

Category (a) 36 trains per day in each direction.

" (b) 48 (These figures might in some cases be increased according to the nature and equipment of individual sections.)

" (c) 24

The light railway lines, several of which are laid on or alongside roads, can carry a certain amount of local short-distance traffic; train load and frequency vary between wide limits, and no figures of practical value can be given.

(10) Vulnerable points

Points at which operation of railway lines might be interrupted and blocked for any length of time are principally tunnels and bridges, and for shorter periods also the junctions. There are few large railway bridges, but a fairly large number of tunnels.

(a) BRIDGES

For a list of the larger and more vital railway bridges in the area of Belgium covered by this report, see Schedule of Bridges, p. 130, giving a summary of the information available and their classification as to vulnerability.

(b) TUNNELS

Route No.	Distance		Between	Length approx.	Track
	Miles	Kms.			
1	66½	107.2	Voroux-Goreux and Kin-lempois	180 yds.	I. T.
	67	107.7	Voroux-Goreux and Kin-lempois	787 yds.	"
	69	110.0	Voroux-Goreux and Kin-lempois	411 yds.	"
	70½	113.2	Voroux-Goreux and Kin-lempois	114 yds.	"
	71½	114.6	Voroux-Goreux and Kin-lempois	333 yds.	"
	77	123.9	Henne and Chaudfontaine	220 yds.	"
	78½	126.4	Chaudfontaine and La Brouk	110 yds.	"
	79½	128.3	La Brouk and Troos	50 yds.	"
	81	130.3	Troos and Olne	135 yds.	"
	81½	131.6	Olne and Fraipont	520 yds.	"
			Nemours-Fraipont and Goffontaine	210 yds.	"
			Nemours-Fraipont and Goffontaine	700 yds.	"
			Goffontaine and Pepinster	200 yds.	"
			Goffontaine and Pepinster	120 yds.	"
			Goffontaine and Pepinster	230 yds.	"
89	143.4		Enval and Verviers Central	420 yds.	"
90	144.8		Verviers Central and Verviers Palais	110 yds.	"
90½	145.3		Verviers Palais and Verviers Est	130 yds.	"
90½	145.6		Verviers Palais and Verviers Est	170 yds.	"
			Verviers Est and Dethain Gileppe	130 yds.	"
92	147.9		Verviers Est and Dethain Gileppe	150 yds.	"
92½	148.4		Verviers Est and Dethain Gileppe	110 yds.	"
93½	151.1		Verviers Est and Dethain Gileppe	150 yds.	"
			Dethain Gileppe and Verviers	150 yds.	"
			Dethain Gileppe and Verviers	150 yds.	"
94½	152.1		Verviers Est and Verviers	150 yds.	"
95½	153.1		Verviers Est and Verviers	150 yds.	"
96½	154.1		Verviers Est and Verviers	150 yds.	"
97½	155.1		Verviers Est and Verviers	150 yds.	"
98½	156.1		Verviers Est and Verviers	150 yds.	"
99½	157.1		Verviers Est and Verviers	150 yds.	"
100½	158.1		Verviers Est and Verviers	150 yds.	"
101½	159.1		Verviers Est and Verviers	150 yds.	"
102½	160.1		Verviers Est and Verviers	150 yds.	"
103½	161.1		Verviers Est and Verviers	150 yds.	"
104½	162.1		Verviers Est and Verviers	150 yds.	"
105½	163.1		Verviers Est and Verviers	150 yds.	"
106½	164.1		Verviers Est and Verviers	150 yds.	"
107½	165.1		Verviers Est and Verviers	150 yds.	"
108½	166.1		Verviers Est and Verviers	150 yds.	"
109½	167.1		Verviers Est and Verviers	150 yds.	"
110½	168.1		Verviers Est and Verviers	150 yds.	"
111½	169.1		Verviers Est and Verviers	150 yds.	"
112½	170.1		Verviers Est and Verviers	150 yds.	"
113½	171.1		Verviers Est and Verviers	150 yds.	"
114½	172.1		Verviers Est and Verviers	150 yds.	"
115½	173.1		Verviers Est and Verviers	150 yds.	"
116½	174.1		Verviers Est and Verviers	150 yds.	"
117½	175.1		Verviers Est and Verviers	150 yds.	"
118½	176.1		Verviers Est and Verviers	150 yds.	"
119½	177.1		Verviers Est and Verviers	150 yds.	"
120½	178.1		Verviers Est and Verviers	150 yds.	"
121½	179.1		Verviers Est and Verviers	150 yds.	"
122½	180.1		Verviers Est and Verviers	150 yds.	"
123½	181.1		Verviers Est and Verviers	150 yds.	"
124½	182.1		Verviers Est and Verviers	150 yds.	"
125½	183.1		Verviers Est and Verviers	150 yds.	"
126½	184.1		Verviers Est and Verviers	150 yds.	"
127½	185.1		Verviers Est and Verviers	150 yds.	"
128½	186.1		Verviers Est and Verviers	150 yds.	"
129½	187.1		Verviers Est and Verviers	150 yds.	"
130½	188.1		Verviers Est and Verviers	150 yds.	"
131½	189.1		Verviers Est and Verviers	150 yds.	"
132½	190.1		Verviers Est and Verviers	150 yds.	"
133½	191.1		Verviers Est and Verviers	150 yds.	"
134½	192.1		Verviers Est and Verviers	150 yds.	"
135½	193.1		Verviers Est and Verviers	150 yds.	"
136½	194.1		Verviers Est and Verviers	150 yds.	"
137½	195.1		Verviers Est and Verviers	150 yds.	"
138½	196.1		Verviers Est and Verviers	150 yds.	"
139½	197.1		Verviers Est and Verviers	150 yds.	"
140½	198.1		Verviers Est and Verviers	150 yds.	"
141½	199.1		Verviers Est and Verviers	150 yds.	"
142½	200.1		Verviers Est and Verviers	150 yds.	"
143½	201.1		Verviers Est and Verviers	150 yds.	"
144½	202.1		Verviers Est and Verviers	150 yds.	"
145½	203.1		Verviers Est and Verviers	150 yds.	"
146½	204.1		Verviers Est and Verviers	150 yds.	"
147½	205.1		Verviers Est and Verviers	150 yds.	"
148½	206.1		Verviers Est and Verviers	150 yds.	"
149½	207.1		Verviers Est and Verviers	150 yds.	"
150½	208.1		Verviers Est and Verviers	150 yds.	"
151½	209.1		Verviers Est and Verviers	150 yds.	"
152½	210.1		Verviers Est and Verviers	150 yds.	"
153½	211.1		Verviers Est and Verviers	150 yds.	"
154½	212.1		Verviers Est and Verviers	150 yds.	"
155½	213.1		Verviers Est and Verviers	150 yds.	"
156½	214.1		Verviers Est and Verviers	150 yds.	"
157½	215.1		Verviers Est and Verviers	150 yds.	"
158½	216.1		Verviers Est and Verviers	150 yds.	"
159½	217.1		Verviers Est and Verviers	150 yds.	"
160½	218.1		Verviers Est and Verviers	150 yds.	"
161½	219.1		Verviers Est and Verviers	150 yds.	"
162½	220.1		Verviers Est and Verviers	150 yds.	"
163½	221.1		Verviers Est and Verviers	150 yds.	"
164½	222.1		Verviers Est and Verviers	150 yds.	"
165½	223.1		Verviers Est and Verviers	150 yds.	"
166½	224.1		Verviers Est and Verviers	150 yds.	"
167½	225.1		Verviers Est and Verviers	150 yds.	"
168½	226.1		Verviers Est and Verviers	150 yds.	"
169½	227.1		Verviers Est and Verviers	150 yds.	"
170½	228.1		Verviers Est and Verviers	150 yds.	"
171½	229.1		Verviers Est and Verviers	150 yds.	"
172½	230.1		Verviers Est and Verviers	150 yds.	"
173½	231.1		Verviers Est and Verviers	150 yds.	"
174½	232.1		Verviers Est and Verviers	150 yds.	"
175½	233.1		Verviers Est and Verviers	150 yds.	"
176½	234.1		Verviers Est and Verviers	150 yds.	"
177½	235.1		Verviers Est and Verviers	150 yds.	"
178½	236.1		Verviers Est and Verviers	150 yds.	"
179½	237.1		Verviers Est and Verviers	150 yds.	"
180½	238.1		Verviers Est and Verviers	150 yds.	"
181½	239.1		Verviers Est and Verviers	150 yds.	"
182½	240.1		Verviers Est and Verviers	150 yds.	"
183½	241.1		Verviers Est and Verviers	150 yds.	"
184½	242.1		Verviers Est and Verviers	150 yds.	"
185½	243.1		Verviers Est and Verviers	150 yds.	"
186½	244.1		Verviers Est and Verviers	150 yds.	"
187½	245.1		Verviers Est and Verviers	150 yds.	"
188½	246.1		Verviers Est and Verviers	150 yds.	"
189½	247.1		Verviers Est and Verviers	150 yds.	"
190½	248.1		Verviers Est and Verviers	150 yds.	"
191½	249.1		Verviers Est and Verviers	150 yds.	"
192½	250.1		Verviers Est and Verviers	150 yds.	"
193½	251.1		Verviers Est and Verviers	150 yds.	"
194½	252.1		Verviers Est and Verviers	150 yds.	"
195½	253.1		Verviers Est and Verviers	150 yds.	"
196½	254.1		Verviers Est and Verviers	150 yds.	"
197½	255.1		Verviers Est and Verviers	150 yds.	"
198½	256.1		Verviers Est and Verviers	150 yds.	"
199½	257.1		Verviers Est and Verviers	150 yds.	"
200½	258.1		Verviers Est and Verviers	150 yds.	"
201½	259.1		Verviers Est and Verviers	150 yds.	"
202½	260.1		Verviers Est and Verviers	150 yds.	"
203½	261.1		Verviers Est and Verviers	150 yds.	"
204½	262.1		Verviers Est and Verviers	150 yds.	"
205½	263.1		Verviers Est and Verviers	150 yds.	"
206½	264.1		Verviers Est and Verviers	150 yds.	"
207½	265.1		Verviers Est and Verviers	150 yds.	"
208½	266.1		Verviers Est and Verviers	150 yds.	"
209½	267.1		Verviers Est and Verviers	150 yds.	"
210½	268.1		Verviers Est and Verviers	150 yds.	"
211½	269.1		Verviers Est and Verviers	150 yds.	"
212½	270.1		Verviers Est and Verviers	150 yds.	"
213½	271.1		Verviers Est and Verviers	150 yds.	"
214½	272.1		Verviers Est and Verviers	150 yds.	"
215½	273.1		Verviers Est and Verviers	150 yds.	"
216½	274.1		Verviers Est and Verviers	150 yds.	"
217½	275.1		Verviers Est and Verviers	150 yds.	"
218½	276.1		Verviers Est and Verviers	150 yds.	"
219½	277.1		Verviers Est and Verviers	150 yds.	"
220½	278.1		Verviers Est and Verviers	150 yds.	"
221½	279.1		Verviers Est and Verviers	150 yds.	"
222½	280.1		Verviers Est and Verviers	150 yds.	"
223½	281.1		Verviers Est and Verviers	150 yds.	"
224½	282.1		Verviers Est and Verviers	150 yds.	"
225½	283.1		Verviers Est and Verviers	150 yds.	"
226½	284.1		Verviers Est and Verviers	150 yds.	"
227½	285.1		Verviers Est and Verviers	150 yds.	"
228½	286.1		Verviers Est and Verviers	150 yds.	"
229½	287.1		Verviers Est and Verviers	150 yds.	"
230½	288.1		Verviers Est and Verviers	150 yds.	"
231½	289.1		Verviers Est and Verviers	150 yds.	"
232½	290.1		Verviers Est and Verviers	150 yds.	"
233½	291.1		Verviers Est and Verviers	150 yds.	"
234½	292.1		Verviers Est and Verviers	150 yds.	"
235½	293.1		Verviers Est and Verviers	150 yds.	"
236½	294.1		Verviers Est and Verviers	150 yds.	"
237½	295.1		Verviers Est and Verviers	150 yds.	"
238½	296.1		Verviers Est and Verviers	150 yds.	"
239½	297.1		Verviers Est and Verviers	150 yds.	"
240½	298.1		Verviers Est and Verviers	150 yds.	"
241½	299.1		Verviers Est and Verviers	150 yds.	"
242½	300.1		Verviers Est and Verviers	150 yds.	"
243½	301.1		Verviers Est and Verviers	150 yds.	"
244½	302.1		Verviers Est and Verviers	150 yds.	"
245½	303.1		Verviers Est and Verviers	150 yds.	"

RAILWAYS

(c) *Flower junctions*

The principal flower junctions at key points are:

(i) Antwerp-Brussels electric line crossing the other main lines at many points:

3 1/2 miles south of Antwerp, under Antwerp-Antwerp South lines (Route No. 1).

1 1/2 miles south of Antwerp, under main line (Route No. 1).

12 miles south of Antwerp, under Antwerp South-Brussels line (Route No. 1).

(ii) Louvain-Aachen: at Liège (Route No. 1).

(iii) Tongres-Aachen: outside Tongres, at Vise, at Montzen (Route No. 2).

THE NETHERLANDS

(2) General description of system

The Dutch railway system is considerably smaller in size and transport capacity than the neighbouring Belgian system. Comparative figures are:

	Km. per 100 sq. km.	Miles per 100 sq. mile
Holland	10.4	17.3
Belgium: National system	16.2	26.3
Secondary lines	15.8	25.5
Total network	32.0	51.8
Great Britain		29.1

It is essentially a passenger-traffic system, the inland water-ways being all-important in regard to goods traffic. Before the development of motor road transport 80 per cent. of all freight inside Dutch territory was carried by water, 20 per cent. by rail. Since the introduction of motor road transport 55 per cent. is carried by water, 38 per cent. by road, and 10 per cent. by rail.

Practically no freight in bulk is carried by rail; coal is mostly transported by water and agricultural produce by road and water. There is no ore and little oil transport.

The construction of an extensive system of new trunk roads and the improvement of existing roads as feeders have diverted passenger traffic from rail to road. This has mostly affected the intermediate stations. Many of these stations are far from the localities they serve, as the railways were constructed in straight lines between the large towns and a large number of the intermediate stations serve two localities—a large proportion of double-named stations may be noted.

In the decade ending 1939, many unremunerative branch lines were closed to all traffic: others were retained for goods traffic only. On the lines remaining in operation the majority of intermediate stations and halts have either been closed to all traffic or remain open to goods traffic only. Some sections of the wholly closed lines have been dismantled; on others only the track has been taken up. On some tracks they have been provisionally retained and only movable structures removed. Track and structures have not generally been removed from closed stations on lines still in operation, but they have been allowed to fall into disrepair.

Electrification of main lines, at high costs, has been adopted as a means to stem the tide of declining passenger traffic. Some stations and halts previously closed have since been reopened on electrified lines.

There are still branch lines and stations scheduled for possible closing. In 1939 the management also ordered a survey to be made in order to prepare a plan for the dismantling or removal of structures and tracks from closed lines and stations, as well as from stations whose traffic has seriously declined.

(a) Mileage and gauges

At the outbreak of war the Netherlands railways system had 3,667 km. (2,278 miles) of lines in operation: 1,686 km. (1,042 miles) double track, all-traffic lines, 14 km. (9 miles) double track, goods only; 1,639 km. (1,012 miles) single track, all-traffic, and 138 km. (85 miles) single track, goods only; in addition, 527 km. (328 miles) were electrified. All route kilometres, and all of standard gauge, 1,415 mm. (4 ft. 8 in.).

In addition to the Netherlands railways system, there are light railways and tramways in operation, mostly of narrow gauge. Many of these lines have been closed and many more are scheduled for closing. Some light railways of standard gauge are laid with

light standard track, and are suitable for some classes of main-line rolling stock; the others are laid with tramway tracks and are unsuitable for any main-line rolling stock.

The structure gauge (Fig. 3, p. 18) is the same as the standard gauge of the central European railway systems: width 4.00 metres (13 ft. 1½ in.), height 4.90 metres (15 ft. 9 in.); the loading gauge, however, admits a slightly greater width than the central European standard; the maximum permissible width is 3.30 metres (10 ft. 10 in.) and height 4.65 metres (15 ft. 3 in.).

(3) Permanent way

Main lines are laid with 46 kg. per metre (about 98 lb. per yard) rails, flat bottomed, on cast-iron sole plates with clips and screw fastenings, on wooden sleepers. Branch lines with 36 kg. per metre (about 76 lb. per yard) rails with or without sole plates, and dogspikes or screws.

Maintenance of track in normal times is excellent.

Ballast is of poor quality; the country has only gravel, dredged from the large rivers, and sand from sand-pits in the high grounds in the centre of the country.

On most lines, more particularly in the provinces of Zeeland, South and North Holland, Friesland and Groningen, the railways have, at very short intervals, large numbers of small bridges and culverts crossing canals, small streams, drains, and flood outlets.

(4) Signalling

There are as yet only two short sections with colour-light signals, outside The Hague station and between Gouda and Oudewater. Semaphore signalling is standard. Distant, home, and starting signals and bracket junction signals are used similarly to British practice. As there is right-hand running, however, the signal arms point to the right from the signal post. Distant signals are not separately worked but linked with the home signals they cover. Upper quadrant is used for clear, lower quadrant only for distant signals at caution.

There are various shapes of signal-arms:

- home and starting signal-arms end in the shape of a disk;
- distant signals have a straight end as the British home signal;
- bracket junction signals end in a widened fish-tail.

All signals are worked by double wires, and so are all points. There are very few rod-operated points left.

(5) Electrification

Map 1 shows the electrified lines.

Electrification is in progress on the lines:

- (a) Amsterdam-Amersfoort.
- (b) Hilversum-Utrecht.
- (c) Utrecht-Amersfoort.

Operation was scheduled to begin in May 1942.

Scheduled for electrification in 1942 are the lines:

- Dordrecht-Belgian frontier.
- Rosendaal-Hertogenbosch.
- Large Zwolles-Breda.
- Elburg-Bosch.

After completion of these lines, electrification is planned for the lines Amersfoort-Campan, Amsterdam-Breda, and Rotterdam-Amersfoort.

The electrification is entirely planned for passenger traffic by electric rail-cars. In provision of electric locomotives has so far been planned, though the possibility of the use of electric locomotives for international traffic and goods trains on lines crossing the frontier has been under consideration for the time when electrification will be carried out across the Belgian frontier.

Power is supplied by provincial and city power stations, indicated on the map, transformed in substations, also indicated on the map, into direct current, 1,500 V., supplied from overhead conductor wires.

(5) Locomotives and rolling stock

The rolling stock consisted of:

- 891 locomotives, steam
- 159 shunting tractors, petrol and diesel
- 1,732 passenger carriages, seating 98,000
- 153 mail vans
- 25 composite guard's, luggage, and mail vans
- 818 guard's and brake vans
- 153 electric motor vehicles
- 181 electric tractors
- 61 electric 2-car units
- 37 electric 3-car units
- 40 diesel 2-car units
- 27 rail cars, petrol and diesel
- 11,700 closed goods wagons, mostly of 15 tons capacity
- 15,404 open goods wagons, average capacity 12 tons
- 1,114 ballast and other service wagons
- 1,444 private owners' wagons

All rolling-stock repairs are carried out in the railway's own shops, but no building of new stock is carried out there. The shops are well equipped with modern machine tools and well stocked with spare parts. Most locomotive sheds are equipped for minor repairs.

Reorganization was still in progress in 1939; it aimed at concentration of repairs in four shops. The position at the end of 1939 was as follows:

HAARLEM: repairs of electric rolling stock, rail-cars, diesel stock, and steam coaching stock. The locomotive repair department had been removed to Tilburg.

TILBURG: repairs of locomotives only. All other departments had been removed or were being removed to other shops.

UTRECHT: repairs of steam coaching stock mainly. This shop was scheduled for closure, but it was still in full operation.

ZWOLLE: repairs of locomotives and steam coaching stock. This, the smallest of the shops, was actually closed in 1939, but no plant or equipment had been removed by the end of the year, and it may have been temporarily reopened during 1940.

AMERSFOORT: repairs to goods rolling stock only. A modern and very active shop.

BLERIK: repairs of goods rolling stock, mainly coal wagons. Smaller shop than Amersfoort, but well equipped.

The staff, of all classes, working in these shops numbered 3,400.

There are also permanent-way workshops employing about 100 men at Utrecht, and there are large permanent-way materials stores at Craailo, between Naarden-Bussum and Hilversum, and at Dordrecht: at the latter station only sleepers.

New railway rolling stock is built in Holland at four private works:

WAGeningen: at Zuden, alongside Utrecht-Amsterdam main line, for all goods stock;

Wageningen: at Amsterdam, in the city, close to D.V. (Dutch Vehicle) goods station, for passenger stock;

BOVEN-DE-HOEF: at Boven-De-Hoef, for passenger stock;

AMSTERDAM: at Amsterdam, for passenger stock.

The first-named might have its capacity up to 1,000 wagons a week; the others have a small output.

(7) Traffic (See also (1) "General description")

PASSING-LOOPS: the rule is one passing-loop in a station used by up and down trains. This loop is rarely between the two main lines, almost always on one side. It should be noted that trains using the loop on the opposite side must cross the opposite main line on entering and leaving the loop. This reduces the utility of the loop on lines with dense traffic. On the other hand, as facing points are not avoided on main lines, there is never backing of trains into passing-loops. Passing- and crossing-loops are long enough to accommodate standard goods trains of engine, 50 wagons, and brake van. If shorter, the fact is mentioned in the description of the particular station.

LOCAL GOODS SIDINGS are, in most cases, on the opposite side from the passing-loop; this is, generally, on the same side as the station office.

LOADING FACILITIES: sidings are short; average of 15 to 20 wagons. Cranes are only available in the larger yards and then only one per yard in most cases.

There is usually one loading platform in each station, constructed as a bank, slope on side away from track, wall of old sleepers, brick or concrete on side of tracks, accommodating one wagon for end-on loading and one for side-loading. Height is 1.12 metres (3 ft. 8 in.) above rail-level, which is level with wagon floor (this is 3 ft. 9 in. when empty, 3 ft. 7 in. when loaded). The loading bank is reached from street-level by a ramp 1 in 10 or 1 in 15. Buffer stops have flat tops, level with wagon floor, and they may, in cases of urgency, with little equipment, be used for end loading.

The deck of all goods sheds is on the same level of 3 ft. 8 in., and heavy equipment may conveniently be loaded through the shed into wagons across the shed decks.

In addition, passenger platforms are, in most cases, very suitable for loading and unloading of heavy military equipment. All platforms have ramps 1 in 10 to 1 in 15 from rail-level, and level crossings across the tracks, connecting with outside roads. Platforms are of three different heights:

- (i) Low, varying from 4 to 8 in. above rail-level;
- (ii) 2 ft. 4 in. above rail-level is now standard;
- (iii) 3 ft. 6 in. above rail-level was standard for new construction until 1920, and now exists in many stations.

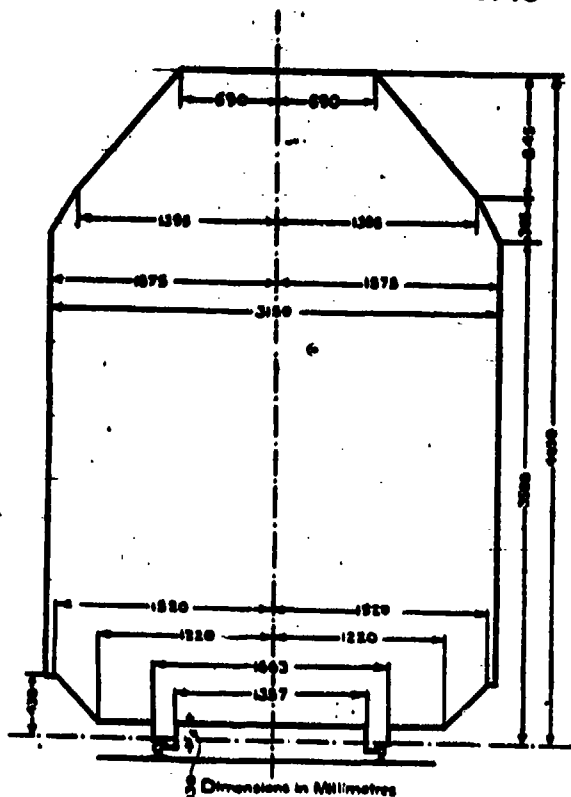
MARSHALLING YARDS

None of the marshalling yards is of imposing size; the principal yards are those serving the ports of Amsterdam and Rotterdam, and distribution yards at Amersfoort, Groningen, and Susteren. These, with the exception of Amersfoort, are hump marshalling yards. The importance of most marshalling yards is more in stabling of goods trains and storage of goods rolling stock than in actual marshalling, in view of the fact that the distribution areas are so small.

List of marshalling yards and their storage capacity

Station	Approx. No. of tracks	Storage capacity No. of wagons
Amsterdam		
Wageningen	50	1,000
Rotterdam	80	1,500
Amersfoort	10	2,000
Groningen	10	2,000
Susteren	10	2,000
Utrecht	10	2,000
Blaricum	10	2,000
Amstelveen	10	2,000
Bussum	10	2,000
Hilversum	10	2,000
Naarden-Bussum	10	2,000
Craailo	10	2,000
Dordrecht	10	2,000
Breda	10	2,000
Den Bosch	10	2,000
Utrecht	10	2,000
Amsterdam	10	2,000
Rotterdam	10	2,000
Amersfoort	10	2,000
Groningen	10	2,000
Susteren	10	2,000
Utrecht	10	2,000
Blaricum	10	2,000
Amstelveen	10	2,000
Bussum	10	2,000
Hilversum	10	2,000
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Hilversum	10	2,000
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Craailo	10	2,000
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Utrecht	10	

UNION OF CENTRAL EUROPEAN
RAILWAY ADMINISTRATIONS



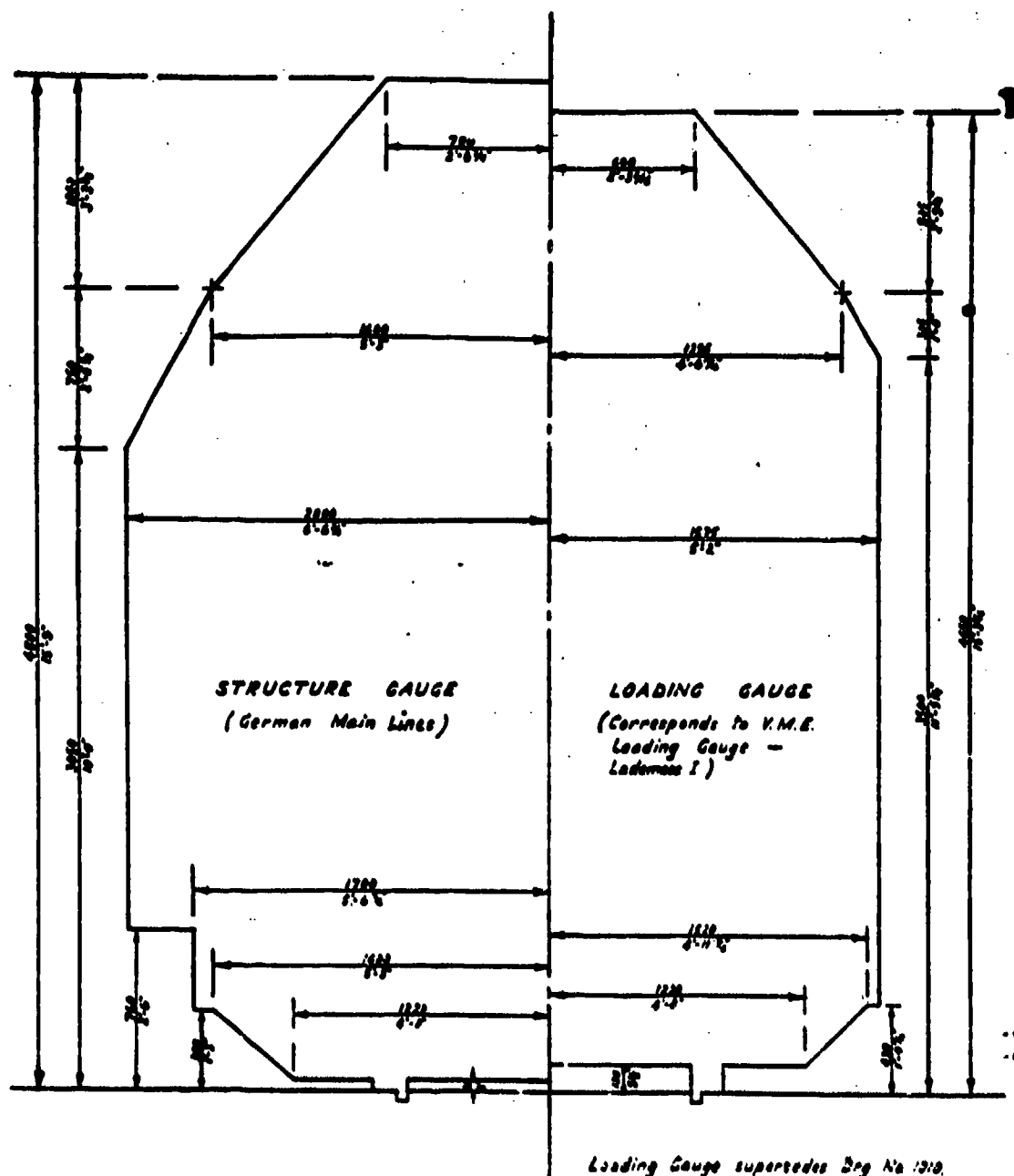
LOADING AND STRUCTURE GAUGE

Applicable to through traffic between
Holland & Germany

No. 3

I.S.F.D./C/316. Substitute for figure in text.

GERMAN STATE RAILWAYS
STRUCTURE & LOADING GAUGE.
Scale: 2 feet to 1 inch.



I.

Under conditions of high pressure, the daily capacity might be increased: at Watergraafsmeer and Rietlanden together to 3,000; at ^aJlismonde-^bFeyenoord to 2,400; at ^aAmersfoort and Groningen to 1,800; at ^aSusteren to 1,500; and at the others to 800 w. e. 200.

The capacity of the main lines is governed by the following factors:

(b) Passing-loops and arrival- and departure-sidings allow maximum train lengths of engine, 30 4-wheeled wagons, and brake van.

(c) The locomotive power, accommodation in sidings, available rolling stock, operating methods, &c., impose the following limitations on the carrying capacity of trains:

(1) Passenger trains: 13 8-wheeled vehicles or the equivalent in 4- or 6-wheelers, seating 1,400 passengers, net weight behind the engine approximately 400 tons, gross weight 500 tons. With double-heading this may be increased by 50 per cent. for part of the number of trains run.

(ii) Goods trains: 30 wagons, maximum load 15 tons, net load behind the engine 750 tons, gross weight, maximum 1,350 tons. With double-heading this may be increased by 20 per cent. for part of the number of trains run.

(d) The transport capacity is, in normal times, is highest on the Dutch railway system when passenger trains are limited to day-time, goods trains to night-time, as this allows trains of equal speed to be grouped together. This method is practicable in Holland, where even the longest distances are so short that no night passenger trains are required, and that goods trains can be run at night everywhere to assure collection of freight, transport, and delivery in the period from late afternoon one day to the morning of the next day.

(e) The capacity being directly dependent on the accommodation at the terminal for reception, handling, and dispatch, distinction must be made between the possible number of passenger and of goods trains in a section. Each passenger train requires the space of one platform and a short run-round time; goods trains need larger track accommodation and longer time for handling. As already stated, the Dutch railways are principally equipped for passenger traffic. Local goods traffic is small, and the only station where the handling of goods traffic of considerable tonnage is of note are those of the ports of Amsterdam and Rotterdam.

Furthermore, the fact that water-borne transport

* Some cases were also covered by a newspaper.

is cheaper, and railborne transport quicker, means that for passenger and perishable goods traffic the transshipment point is on the coast, but for goods, generally at a point as far inland as can be reached by wagging vessels. For this reason, Ijmuiden, Hook of Holland, and Flushing are well equipped for high-capacity passenger transport but not for heavy goods traffic, which must find its terminus at Amsterdam, Rotterdam, and Antwerp respectively.

In times of stress, therefore, men and small equipment can be carried to and from the former points, but heavy equipment must use the latter points.

The full peacetime capacity referred to above for the running of ordinary passenger trains cannot, however, be applied to the running of military transports under emergency and war conditions. The following figure may be considered as practical maxima for military traffic under such conditions:

DOUBLE-TRACKED MAIN LINES

Category (a) For prolonged periods, individual lines, in both directions, trains at 20 minute intervals, i.e. 72 trains per day.

.. (b) For limited periods, part of a day, or even for full 24 hours, trains may be scheduled at 15 minute intervals, i.e. 96 trains per day.

" (c) Tracks available, but staff and equipment, such as signalling, not in full working order, intervals of $\frac{1}{2}$ hour will still be practicable, i.e. 48 trains per day.

SINGLE-TRACKED LINES (including branch and terminating lines).

Category (e) 18 trains per day in each direction.

24	24	24	24	24
12	12	12	12	12

SINGLE-TRACKED SECTIONS OF OTHERWISE DOUBLE-TRACKED LINES, APPROXIMATELY 10-30 MILES IN LENGTH (or single-tracked sections of similar length connected up at each end with double-tracked lines).

Category (c) 24 trains per day in each direction.

10	(b)	32	11	11	11	11
11	(c)	18	11	11	11	11

SINGLE-TRACKED SECTIONS OF OTHERWISE DOUBLE-TRACKED LINES, UP TO APPROXIMATELY 10 MILES IN LENGTH (or single-tracked sections of similar length connected up at each end with double-tracked lines).

Category (e) 36 \ trains per day in each direction.

(These figures might in some cases be increased according to the nature and equipment of individual sections.)

(g) Vulnerable points

The large rivers divide the country into three distinctly separated parts:

(i) North and South Holland, Utrecht, Gelderland, enclosed by North Sea, IJsselmeer, rivers IJssel and Rhine;

(ii) Zeeland, North Brabant, Limburg, south and west of river Meuse;

(iii) Rest of the country, east of river Jhelum, Jhelmeer, North Sea.

g) **Reinigung**

Very large bridges across the wide rivers on the routes covered by this report connect the various parts. These bridges are:

Mr. J. Edgar Hoover	Director
Mr. Clegg	Chief Clerk
Mr. Glavin	Chief of Bureau
Mr. Ladd	Chief of Bureau
Mr. Nichols	Chief of Bureau
Mr. Rosen	Chief of Bureau
Mr. Tracy	Chief of Bureau
Mr. Egan	Chief of Bureau
Mr. Gurnea	Chief of Bureau
Mr. Hendon	Chief of Bureau
Mr. Pennington	Chief of Bureau
Mr. Quinn	Chief of Bureau
Mr. Nease	Chief of Bureau
Mr. Gandy	Chief of Bureau

RAILWAYS

Deventer	Bridge over River IJssel	Route 12.
Wieringerwerf	" " " " " " "	Route 14.
Culemborg	" " " " " " "	Route 15.
Zaltbommel	" " " " " " "	Route 17.
Heilum	" " " " " " "	
Nijmegen	" " " " " " "	
Oss	" " " " " " "	

of Bridges giving a summary of the information available, and their classification as to vulnerability.

Mention must be made of a projected railway across the Zuidplaspolder dam between (i) and (iii), connecting North Holland province with north Germany. This railway would open an important link, between (i) and (iii), free from river crossings. So far as is known this line across the dam has not yet been constructed.

For a list of the above and other bridges in the area of Holland covered by this report, see Schedule

GERMANY

(1) General description of system

The lines described in this report are contained in the following railway divisions:

Köln	Münster
Essen	Kassel
Wuppertal	Oldenburg
Frankfurt	Hanover
Mainz	Hamburg

Since they are for the most part selected through-routes, it is unnecessary in this context to give a full description of the respective divisions. The Ruhr area, however, is in a rather different category, since a good deal of the close network there is covered.

The Ruhr-Rhine, the rich coal and iron district of Rhineland Prussia, is the heart of Germany's heavy industries, and it has remained so despite the enemy's efforts to decentralize to other less vulnerable areas. In the Ruhr is to be found a concentration of railways without parallel anywhere else in the world. Thus in the most important (Ruhr) of the Reichsbahndirektionen (railway divisions) serving the Ruhr, lying within an area about the size of Luxembourg only, there is concentrated a total route length of 1,834 km. (779 miles) and a total track length of 5,403 km. (3,350 miles) of railway, or more than in the whole of Norway. In all the three main railway divisions (Essen, Köln, Wuppertal) serving the Ruhr there are as many as 41 marshalling yards of major importance, with a total daily capacity of nearly 150,000 wagons, and in a typical pre-war year (1935) these three Ruhr divisions were responsible for 25 per cent. of the total wagon loadings and nearly 12 per cent. of the total wagon and kilometrage of the whole German State Railway system.

Hamm, which is the principal eastern railway exit from the central Ruhr area, is by far the largest single traffic centre in the whole of Germany, and normally dispatches at least 75,000 tons of traffic northwards and eastwards daily. Hamm marshalling yard has a capacity of as many as 10,000 wagons per day.

At the western end of the central Ruhr area is Duisburg-Ruhrort, which stands at the junction of the Ruhr and Rhine rivers, and is the largest inland port in Europe. In peace-time Duisburg-Ruhrort harbour handled about 14 million tons per annum (or one-third of the traffic dispatched or received in the Ruhr area via the Rhine waterway), and 40,000 vessels called there each year. Some impression of the industrial concentration in the Ruhr is conveyed by the fact that within 50 miles of Duisburg-Ruhrort there was produced, in 1913, 80 per cent. of the German iron production, and 75 per cent. of the German coal production, while the population within that radius was 10 per cent. of that of all Germany.

The area to the south of this is covered by the report on the railways of South-West Germany.

(2) Organization and personnel

(a) ORGANIZATION

The great majority of the railways in Germany (and in the area covered by this report) are under the control of the Deutsche Reichsbahn, or German State Railway. A diagram of the Reichsbahn organization is attached in Appendix 1. The functions and responsibilities of the principal elements of the system are as follows:

Manager of the State Railway. On the one hand, as Minister, this official is directly responsible to the Führer and Reich Chancellor for the general control, regulation, and inspection of all means of transport (including the railways) in Reich territory; on the other hand, as General Manager of the Reichsbahn, he is the highest authority in the technical, operational, and economic management of the State Railway system. By vesting both these functions in a single office, the German Government thus ensured its complete control over both the policy and the actual working of the whole railway system.

State Secretary of the Ministry of Transport and Deputy General Manager of the German State Railway ("Staatsssekretär im Reichsverkehrsministerium und Stellvertreter Generaldirektor der Deutschen Reichsbahn")

As implied by his title, this officer is the deputy and assistant to the Minister and General Manager in both facets of his work. It is noticeable that, in practice, the State Secretary has become largely concerned with the maintenance of contacts between the Reichsbahn and other forms of transport on the one hand, and the public and outside bodies on the other; he frequently represents the Ministry and State Railway at official conferences and functions, and generally relieves the Minister of secondary duties which might interfere with the latter's primary work of control and management.

Advisory Committee of the German State Railway ("Beirat der Deutschen Reichsbahn")

This body was formed to "advise the Minister of Transport on fundamental and important railway questions," and superseded the Verwaltungsrat, or Administrative Council, of the old Reichsbahn-Gesellschaft in 1937. It includes influential representatives of industry, trade, and public life throughout the Reich; the Committee has always been purely advisory and has had no executive powers, but the recent co-optation into it of such important Government officials as the Minister of Armaments and Munitions, the Inspector-General of the Luftwaffe, the Führer's Deputy, the Director-General of Labour, and the Leader of the Labour Front, and the increase of membership to 18, would seem to reflect the German Government's recognition of the absolutely vital part played by railway transport in Germany's war strategy, and of the need for the closest co-operation between the Reichsbahn and all branches of the Government, the armed forces, industry, and trade. As now constituted, therefore, the Beirat may in practice have considerable influence in the determination of priorities.

Railway Departments of the Ministry of Transport ("Eisenbahnabteilungen des Reichsverkehrsministeriums")

The Ministry (at Berlin) includes the following railway departments:

I. Traffic and Rates Department

("Verkehrs- und Tarifabteilung")

II. Operating and Civil Engineering Department

("Betriebs- und Bauabteilung")

Sub-department IIA Civil Engineering

("Bauabteilung")

III. Materials, Locomotives, and Purchasing Department

("Material-, Lokomotiv- und Beschaffungsabteilung")

IV. Financial and Legal Department
("Finanz- und Rechtsabteilung")
Sub-department IVA—Legal
("Rechtsabteilung")

V. Staff Department
("Personalabteilung")

In addition there are two "Gruppen" ("groups") in the Ministry, dealing respectively with general administrative questions ("Gruppe A") and military transport ("Gruppe L").

The head of each of the railway departments has the title of Ministerialdirektor (Ministerial Manager), and is responsible to the Minister in a general way for the work falling within his section. This does not mean that his position is analogous to that of a Chief Officer or Departmental Manager in British railway practice; since the Reichsbahn organization is essentially "divisional" rather than "departmental" in character, the position of a Ministerialdirektor is more strictly comparable to that of a Vice-President or Assistant General Manager on a British railway.

Together with the Minister and the State Secretary, the Ministerial Managers form a Vorstand (Executive Committee) under the chairmanship of the Minister; this body constitutes a small but effective executive nucleus for the whole system.

Chief Audit Office ("Hauptprüfungsbüro")

The head of this office is responsible to the Minister, but otherwise the office functions independently, without interference from other railway departments. The Chief Audit office controls and delegates its lower functions to subsidiary Audit Offices working with the local Railway Divisions and the Railway Central Offices.

State Railway Divisions ("Reichsbahndirektionen"; abbreviated "R.B.D.")

These are the geographical divisions of the system, and they constitute, in effect, the broad basis of the whole organization of the Reichsbahn. At the beginning of 1938 (before the increase in their number resulting from German territorial acquisitions), these Railway Divisions numbered 26 in the whole Reich. As mentioned in paragraph 1 above, the three principal Railway Divisions covered by this report are the Essen, Köln (Cologne), and Wuppertal Divisions; in addition, there are lines in the divisions of Frankfurt, Mainz, Münster, Kassel, Oldenburg, Hanover, and Hamburg.

(N.B. In 1940, the Eupen and Malmédy districts of Belgium were incorporated into the Reich, and the lines in those districts (including the Montzen marshalling yard) were taken over by the R.B.D. Köln).

It is reported (20/11/43) that owing to severe damage to the R.B.D. offices in Essen, Hamburg, Wuppertal and Köln, the staffs of these four railway administrative centres were, together with that of Kassel and Karlsruhe, to be housed in premises at Linz, formerly occupied by the R.B.D. Linz, whose staff is moving to a place south of the Tauern Tunnel, believed to be Mallnitz in Carinthia. R.B.D. Mainz is also reported to have moved to Bad-Münster.

The Railway Divisions were evolved in their present form after many vicissitudes, and though they vary somewhat in route length and extent of traffic, they now have a common form of internal organization. As a result of considerable decentralization of authority by the Ministry, the R.B.Ds. exercise very extensive powers in their respective areas, and have a comparatively free hand in the local development, control, and operation of traffic. At the head of each Division is its President (Präsident), whose position is similar to that of a Divisional General Manager in British railway practice. The R.B.D. Presidents are appointed directly to the Minister and are responsible in concert with the Reichsbahn Minister to

the Ministry; they also hold regular Presidential Conferences under the chairmanship of the Minister, where their common general policy is formulated.

One in every three of the Divisions has additional sections of its management dealing with the control of major workshops not only in its own Divisional area, but also in the two neighbouring Divisions (e.g. the Workshop Section of the Köln Divisional management controls all the principal workshops not only in the Köln Division area, but also in the Essen and Wuppertal Division areas).

The regional control of the various lines forming a R.B.D. is carried out through "Amtsvorstände" (District Offices), i.e. Betriebsämter (District Operating and Engineering Offices), Verkehrsämter (District Traffic Offices), and Maschinenämter (District Mechanical and Running Offices). The District Officers in charge of these offices are directly responsible to the R.B.D. management and they supervise and direct the work of local "Dienststellen" (Service Points), i.e. Bahnhöfen (Stations), Güterabfertigungen (Goods Depots), Bahnmeistereien (Permanent Way Sections), and Betriebswerken (Running Depots). Details of the organization of the various Amtsvorstände and Dienststellen are given below.

District Operating and Engineering Offices
("Betriebsämter")

The average length of line controlled by a Betriebsamt is approximately 180 route kilometres (about 110 route miles). In view of the nature of his combined duties, the District Officer in charge of each Betriebsamt is a trained Civil Engineer. The Betriebsamt deals with the maintenance of way and works (including signal and telegraph equipment) on the one hand, and train operating, etc., on the other.

District Traffic Office ("Verkehrsamt")

A Verkehrsamt covers, on an average, a route length of line of about 470 kilometres (about 300 route miles), or nearly three times as much as that covered by a Betriebsamt. Despite this, the total number of staff controlled by a Verkehrsamt is much smaller than that of a Betriebsamt. The Verkehrsamt deals with general commercial matters, claims, the control of ticket inspection, etc.

District Mechanical and Running Offices ("Maschinenämter")

In general a Maschinenamt corresponds to a District Locomotive Superintendent's Office in British railway practice, though it also deals with technical mechanical questions involved in the running of carriage and wagon stock in its area. The average length of line covered by a Maschinenamt corresponds closely to that of a Verkehrsamt. The District Mechanical and Running Superintendent controls the Locomotive and Rolling Stock Running Repair Shops ("Betriebs- und Betriebswagenwerke") and the Locomotive Depots in his area; he has no direct connection with the Main Repair Shops ("Ausbesserungswerke") which, as mentioned above, are controlled directly from certain of the R.B.Ds.

New Works Office ("Neubaubüro")

These offices are set up for the execution of large-scale civil engineering works which cannot be effectively supervised by the District Operating and Engineering Offices.

Survey Office ("Vermessungsbüro")

Each R.B.D. has a Survey Office comprising a fully qualified staff of surveyors.

Chief District Office ("Haupt-Direktion")

As mentioned in the description of the R.B.D. above, the chairmanship of these Main District Offices is held by the Ministerialdirektor of the R.B.D. in which they are located. The District Offices are responsible to the Minister and the Reichsbahn Minister for the work done in their respective areas.

Werkstättenwesen" (Administrative Divisions for Workshops). The local management of each *Ausbesserungswerk* is in the hands of a *Werkstättendirektor* (Works Superintendent). A list of *Ausbesserungswerke* on the routes covered by this report is given in paragraph 8 (e) below.

Permanent Way Sections ("Bahnmeisterien")

There are on an average about 8 Permanent Way Sections under the control of each *Verkehrsamt*, the average route length of each Permanent Way Section being approximately 23 kilometres (14½ route miles). The *Bahnmeister* (Permanent Way Inspector) in charge of each section is held responsible to a high degree in an executive capacity for its maintenance, the Gangers being correspondingly relieved of most of such responsibility.

Stations ("Bahnhöfe")

Stations are graded into four classes, according to their size and importance. In addition there are "Haltepunkte" (Halts or minor Stations) and "Haltestellen" (Stopping points or local halts).

A 1st Class Station may be administered by four officials—a Station Master, a Chief Booking Clerk, a Parcels Agent, and a Cashier. The Station Master is responsible to the *Betriebsamt* for the actual operation of the station, while the other three officials are responsible to the *Verkehrsamt* for the commercial work. At 2nd Class Stations, the appointments of Cashier and Chief Booking Clerk may be combined, operating and parcels work remaining under separate heads; or, alternatively, the position of Cashier may be kept separate, and booking office and parcels work amalgamated under a single chief. At 3rd Class Stations, the division between the operating and commercial functions is still generally maintained, the whole commercial work being controlled by one man, while operating remains in the hands of the Station Master. In the case of 4th Class Stations, all functions, commercial and operating, are controlled by a single official.

According to a report dated November 19, 1943, the German railways have introduced a number of mobile stations with the necessary equipment to operate in the bombed areas until normal conditions have been restored.

It has not been possible to ascertain the extent of the use of these mobile stations.

Main Goods Stations and Parcels Offices ("Stützstellen für Abfertigungstellen")

These are rated as "independent" in that they are not controlled from the *Bahnhöfe*, but direct from the *Verkehrsämter*; this corresponds to British railway practice, in which the larger goods stations are similarly controlled direct from the District Traffic Managers' Offices.

Locomotive Running Depots and Rolling Stock Shops ("Betriebs- und Betriebswagenwerke")

There are, on an average, 4-5 of these depots and shops under the control of each *Maschinenamt*; the Main Railway Repair Shops (*Ausbesserungswerke*) have no control over them. A list of the Locomotive Running Depots (i.e. Engine Sheds, Roundhouses, etc.) on the routes covered by this report is given in paragraph 8 (e) below. The Locomotive Running Depots, and Carriage and Wagon Depots, are managed by Shed Foremen, as in Great Britain.

State Railway Construction Division ("Staatliche Bauverwaltung")

There are 2 of these Divisions, which rank with the ordinary R.B.D.s. They are centred on Berlin and München (Munich).

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respectively at Berlin and München (Munich). They deal centrally with questions of stores, purchases, technical design and development, etc., for the whole of the Reichsbahn. Subsidiary to these Central Offices are several *Stützstellen* (Supporting Offices or "Abnahmestellen") (including ones at Köln and Dortmund, and a special one for Ruhr coal at Essen), and Test Offices ("Versuchsstellen").

General Operating Control Offices ("Generalbetriebsleitungen")

There are 3 of these offices in the Reich (at Berlin, Essen and München), and they deal with operating questions of a wider scope than can be covered by the R.B.D.s, such as arranging schedules for long-distance through goods services, the allocation of goods wagons to R.B.D.s, and the use of marshalling yards for traffic passing beyond divisional boundaries. Before the present war, they were known as "Oberbetriebsleitungen" and ranked in importance with the R.B.D.s, but they have since been given their present title, and their status has been raised, empowering them to issue orders to the Divisional Managements. The lines in Western Germany lie within the area of the *Generalbetriebsleitung West* (Essen).

In addition to the various elements of the Reichsbahn organization described above, there are also centralized sections dealing with such subjects as Publicity, Electrification, etc.

Also, since the outbreak of the present war, new offices have been set up in Germany to allocate traffic between the various forms of transport; they are known as Central, Regional, and District Traffic Offices, and there is also now a Central Goods Directing Office dealing with questions of priorities and loading space.

Private railways in the area of this report are not generally of more than local importance.

(b) PERSONNEL

The average number of personnel employed the Reichsbahn during a typical pre-war year (1936) was 659,943, made up as follows:

	Percentage of total staff
Administrative Staff	7.0
Railway Maintenance Staff	12.6
Line Inspection Staff	4.6
Operating and Despatch Staff	34.1
Train Crews	6.3
Locomotive Staff	10.3
Main Repair Shops Staff	13.3
Running Depot and Technical Staff	10.3
Marine Staff	0.1

The Reichsbahn staff is divided throughout into two classes: Officials ("Beamte") and Workmen ("Arbeiter"). This division is not strictly comparable to that between Salaried and Wages staff in British railway practice. It is actually a division between permanently appointed staff with pension rights, and non-appointed staff.

The technical training of German railway personnel is normally of the highest order, and the German has proved himself to be by nature a conscientious, competent, and highly efficient railwayman; the standard of engineering workmanship, inspection, and operation on the German railways ranks with the best in the world.

Since the outbreak of war, however, heavy demands have been made on the Reichsbahn for the provision of trained railwaymen for the German Army transportation service and for the operation and control of railways in German-occupied territories. These demands have been particularly severe in the case of the railways of occupied Russia, where German railwaymen have had to be provided not only to supervise the conversion of track to the standard European gauge, but also to carry out practically the whole work of railway operation. All are not directly comparable with the standard of the German railways.

As a result of the heavy demands made on the Reichsbahn staff during the war, the R.B.D.s have been

to make up the deficiency wherever possible by the re-employment of retired railwaymen, the drafting of foreign railwaymen (e.g. French and Belgian) into Germany, and the engagement of large numbers of female and juvenile workers. In April, 1943, the number of women employed by the Reichsbahn (in both administrative and train operating work) was reported to exceed 100,000, and as this number was evidently insufficient, more were stated to be in course of enlistment.

All these large-scale staff changes will have implied a certain reduction in morale and efficiency, but despite this, the general standard may still be taken as relatively high.

(3) Mileage and gauges

(a) LENGTH BY GAUGES

At the end of 1937 (i.e. before the incorporation of the Austrian Federal Railways into the Reichsbahn), the total length of the whole Reichsbahn system was as follows:

	Km.	(Miles)
Route length:		
Single-track line	31,476	(19,538)
Double-track line	22,798	(13,914)
Triple- or multiple-track line	654	(406)
Total route length	54,928	(33,878)
Track length:		
Running tracks	76,775	(47,948)
Other tracks (sidings, yards, etc.)	43,174	(26,770)
	119,949	(77,018)

(b) LOADING AND STRUCTURE GAUGES

The standard gauge lines of the German State Railway conform to the general loading gauge (Lademass I) of the Union of Central European Railway Administrations ("Verein Mitteleuropäischer Eisenbahnverwaltungen").

A full diagram of both the loading and structure gauges applicable to the standard gauge German lines is attached as Fig. No. 3. The main dimensions of these gauges are as follows:

Loading gauge:	Mm.
Maximum width from 430 mm. (1 ft. 5 in.) to 3,500 mm. (11 ft. 6 in.) above rail-level	3,130 (10 ft. 4 in.)
Maximum width at 3,805 mm. (12 ft. 6 in.) above rail-level	2,790 (9 ft. 2 in.)
Maximum width at 4,650 mm. (15 ft. 3 in.) above rail-level	1,130 (4 ft. 6 in.)
Maximum height above rail-level	4,650 (15 ft. 3 in.)
Structure gauge:	
Minimum width from 730 mm. (2 ft. 6 in.) to 3,050 mm. (10 ft. 0 in.) above rail-level	4,000 (13 ft. 1 in.)
Minimum width at 3,800 mm. (12 ft. 5 in.) above rail-level	3,200 (10 ft. 6 in.)
Minimum width at 4,300 mm. (14 ft. 1 in.) above rail-level	1,350 (4 ft. 5 in.)
Minimum height above rail-level	4,200 (13 ft. 9 in.)

(c) Permanent way

There was formerly a great variety of permanent way construction in Germany, but latterly the Reichsbahn has used standardized weights, types, and dimensions of permanent way material, and this standard track is known as "Einheitsbauwerk". The details given in the following paragraphs pertain to mainline track of this standard type, unless otherwise specified.

(1) TYPE, LENGTH, AND WEIGHT OF RAIL

Rails of standardised "Niederdruck" section are standard throughout Germany.

The main line of the standard Reichsbahn and Reichsbahn system is:

Width of web: 14 mm.
Width of foot: 14 mm.
Width of rail: 45 kg. per metre (111 lb. per yard)
Section modulus: 234 cm.³
Moment of inertia (about axis): 1,771 cm.⁴
Tensile strength at least 70 kg./mm.² (1,444 tons per sq. in.).

A diagram of the section of these rails is attached as Appendix 10.

The standard length of these rails is 30 m. (98 ft. 5 in.), but Germany has also for several years past been using considerable numbers of longer 60 m. (196 ft. 10 in.) rails on main lines. Also long welded rails have been laid on bridges and in tunnels, thermal and electric resistance welding being used in this connection.

(2) TYPE OF RAIL FASTENING

For the standard type track, rail fastenings are as follows:

(a) Timber sleepers:

Bearing plate fixed to sleeper by coachcrews; rail fixed to bearing plate by a clip with bolts; wood packing between rail and bearing plate.

See
Appendices
7 and 8

(b) On steel sleepers:

Bearing plate welded to sleeper; rail fixed to bearing plate by a clip with bolts; wood packing between rail and bearing plate.

Rail joints are supported, contiguous timber sleepers (bolted horizontally) or a form of double steel sleeper being used. Fishplates are of 4-hole type, 580 mm. long and weighing 9.2 kg.

(c) TYPE AND SPACING OF SLEEPERS

Timber sleepers are of both hard wood (oak or beech) and soft wood (pine or fir), and are creosoted by the Rüping process. Their dimensions are 2.6 m. (8 ft. 6 in.) long x 260 mm. (10 in.) wide x 160 mm. (6 in.) high.

Steel sleepers (of which there is a large proportion in Germany) are of inverted trough type, and have the following dimensions:

Length: 2.5 m. (8 ft. 2 in.).
Width at top: 135 mm. (5 in.).
Width at base: 260 mm. (10 in.).
Height: 100 mm. (4 in.).
Thickness: 9 mm. (1 in.).

As mentioned in paragraph 3 (b) above, a form of double steel sleeper is used at rail joints, its dimensions being:

Length: 2.5 m. (8 ft. 2 in.).
Width at top: 135 mm. (5 in.) and 135 mm. (5 in.).
Width at base: 440 mm. (1 ft. 5 in.).
Height: 100 mm. (4 in.).
Thickness: 9 mm. (1 in.); 9.5 mm. between nearest edges of bearing surfaces.

Of all European countries, Germany has the greatest experience of steel sleepers. Although from the engineering standpoint the wooden sleeper is preferred, Germany has used a large proportion of steel sleepers in the interests of national economy, and in support of the German steel industry. Wooden sleepers are, however, used as far as possible on trunk routes, as giving a more elastic track and being easier on the ballast, and also in industrial areas, since, unlike steel sleepers, they are immune to the action of industrial gases.

The spacing of sleepers is 1,250 mm. between centres, giving 17 sleepers under each 20 m. rail length. As mentioned in paragraph 3 (b) above, thermal and electric resistance welding is used at rail joints. The maximum number of fishplates per track is 10.

The size of the ballast must be between 35 and 70 mm. diameter.

Standard main-line track sections:

Top width of ballast:	
Single-track lines	3.0 m. (10 ft. 6 in.)
Double-track lines	5.7 m. (18 ft. 9 in.)
Depth of ballast below bottom of sleepers	370 mm. (14 in.)
Slopes of ballast 1:1.25	
Formation cambered for drainage.	
Bottom width of ballast:	
Single-track lines	4.5 m. (14 ft. 11 in.)
Double-track lines	8.10 m. (26 ft. 7 in.)

(e) STANDARD OF MAINTENANCE:

Good.

The following table gives total figures of track and turnout renewals throughout the whole Reichsbahn system prior to the outbreak of war in 1939:

Year	Km. of track renewed each year	Turnouts, etc., renewed each year
1926	4,043	15,668
1927	4,179	15,335
1928	3,369	10,046
1929	2,848	6,367
1930	1,545	7,181
1931	1,326	4,581
1932	1,350	3,587
1933	1,258	3,512
1934	1,066	3,812

As the table indicates, the volume of renewals declined considerably in the thirties, but improved standards of construction were introduced, and single rails (not included in the above figures) were renewed on a larger scale than ever before; also it must be borne in mind that the relatively high renewal figures in the twenties resulted from the heavy renewal programme necessitated by the poor condition of the track at the end of the Great War.

Despite certain British reports to the contrary, the physical condition of the German permanent way at the outbreak of the present war in 1939 was excellent, and the standard of maintenance high.

(f) PERMANENT WAY DEPOTS, WORKSHOPS, AND STORES

There is a main Reichsbahn permanent way depot and workshops in the Ruhr area; this is located at Witten (in the Essen R.B.D., and lying between Bochum and Hagen), and it ranks in the Reichsbahn organization as an "Ausbesserungswerk," the last known number of employees there being 972 (figure for May, 1937).

There are numerous private steel works in the Ruhr area which produce rails, turnouts, etc., for the German railways, e.g. Krupps of Essen, the Bochumer Verein, etc.

(g) MAXIMUM PERMISSIBLE AXLE-LOADS

So far as railway locomotives and rolling stock are concerned, the maximum axle-load permitted in their construction on the Reichsbahn is 20 tonnes (plus 5 per cent. tolerance).

With regard to the track itself, the usual maximum axle-load permitted on main line sections ("Hauptbahnen") of the Reichsbahn is 20 tonnes, though there are some main-line sections with lower permissible axle-loads (down to 16 tonnes); on secondary lines ("Nebenbahnen") of the Reichsbahn the maximum permissible axle-load is usually 16-18 tonnes, though there are some secondary sections with considerably lower axle-loads.

1. CURVES

The percentage of the whole Reichsbahn system curves is given in the following table (1937):

Curves with radius of 250 m. or above	21.3%
" " " " " " " " " " " "	19.7%
Curves with radius of 250 m. or below	58.9%
" " " " " " " " " " " "	40.3%
" " " " " " " " " " " "	19.3%
" " " " " " " " " " " "	11.5%
" " " " " " " " " " " "	0.6%

The latter percentage is made up as follows:

Curves with radius of 250 m. or above	21.3%
" " " " " " " " " " " "	19.7%

With regard to the minimum radius, curves of less than 180 m. radius are not allowed on main lines; on secondary lines, curves of 100 m. radius are permitted, unless traversed by main line stock. New main line vehicles must be built to take curves of 150 m. radius.

(i) GRADIENTS

The percentages of the whole Reichsbahn system on various gradients are given in the following table (1937):

Total route length of system, km.	54,328
Level sections:	
Route length in km.	15,439
As percentage of total route length	28.3%
Graded sections:	
Route length in km.	38,889
As percentage of total route length	71.7%
The latter percentage is made up as follows:	
Gradients up to 5 per mille	40.3%
" " of 5 to 10 per mille	19.3%
" " of 10 to 25 per mille	11.5%
" " over 25 per mille	0.6%

Gradients outside stations must not exceed 25 per mille (1 in 40) on main lines, and 40 per mille (1 in 25) on secondary lines. Gradients outside station limits greater than 12.5 per mille (1 in 80) on main lines are subject to special Ministry approval. In stations (sorting humps, etc., excepted), gradients must not exceed 2.5 per mille (1 in 400).

In the area covered by this report, gradients are generally light.

(5) Signalling

(a) GENERAL METHODS

The working of trains on the German State Railway is conducted throughout on the space interval, or absolute block system, in the sense in which that term is used in Great Britain, assisted by the interlocking of points and signals; the signalling equipment used is well constructed and maintained. The signal aspects are few, simple, and easily understood, and although some minor differences are to be found in this respect between various parts of the system, there is practically none in the fundamental principles on which they are based, and a very large measure of uniformity and standardization already obtained before the outbreak of the present war.

(b) SIGNAL TYPES AND ASPECTS

Main signals or "Hauptsignale" (i.e. "home" or "starting" signals) are of the two-position upper-quadrant semaphore type, moving to 45 degrees in the upper right-hand quadrant (trains run right-handed) and showing a green light for "proceed," and moving to horizontal and showing a red light for "stop." Not more than 3 arms are allowed on one signal post at junctions or turnouts; the additional one or two arms are normally in line with the post and practically invisible. Both the two- and three-armed aspects, with respectively both or all three arms inclined at 45 degrees and showing green lights, indicate "proceed at reduced speed" over any route requiring such action. Advanced starting signals are practically unknown.

Advance signals or "Vorsignale" (i.e. "distant" signals) are of disc type, and are provided in connection with all main signals; the disc revolves on a horizontal spindle to present its edge when "off." To mark the site of the signal when the disc disappears, a white board with two black V-marks, point to point, is placed by the base of the signal, and there are also three white warning approach boards in rear, the first the driver meets being 250 m. from the advance signal itself. The two are coloured green, and at night the signal shows two under lights placed horizontally, "on" and "off" green, and at night "on" and "off" red, and at night "on" and "off" red.

and white semaphore arm, with central pivot, below the disc and normally in line with the post. When the main signal ahead shows "proceed at reduced speed," the disc remains displayed and the semaphore moves to the 45-degree position, a green light appearing below the upper amber light. Advance signals are installed at a distance of 1 km. from the main signals to which they apply.

Point indicators, consisting of lanterns with milk-glass slides, are installed at all points, except where there is no shunting; a special combined type is used at double-slip crossings, to avoid a multiplicity of lanterns. There are no ground shunt signals, as used in Great Britain, and thus shunting prohibition signals (or closed-track indicators) are necessitated, to limit shunt moves as required, and protect running movements against them; these closed-track indicators have a black bar (horizontal when "on," diagonal when "off") on a milk-glass background, and when "on," they order an absolute stop. When "off," however, they do not constitute an instruction to move, and are therefore often supplemented by "wait" and "draw forward" signs, consisting respectively of a large orange "W" board and the letter "V" in white lights.

The various signal types and their aspects are shown in Appendix 13.

(c) SIGNAL AND POINT OPERATION, INTERLOCKING, AND AUTOMATIC TRAIN CONTROL

In the operation of signals and points, the standard mechanical apparatus is the double-wire system, although rod working is still used in places. All points are trailable and fitted with either the toggle or hook type locking; for new standard long-tongue turnouts at high-speed junctions, a modified form of hook lock, known as the claw lock, has been introduced. All facing points are properly detected. Mechanical locking bars are largely replaced by electric route locking, and track circuit point locking is also found. Signals are generally operated by camplate mechanisms, ensuring good indications and smooth working.

There were 17,800 mechanical signal boxes on the whole Reichsbahn system in 1937. Frames are of the lever and drum type, except for some of the crank handle type at certain small stations. Point levers are generally free to be moved in any order with signals at "danger." Interlocking is by small "route handles" ("Fahrstrassenhebel"), which must be operated before the relative signal lever can be pulled, and there is thus practically no conditional locking. Block working inside station limits is controlled by an official called a "Fahrdienstleiter," who sanctions all movements; the signal box in which he is stationed is known as a "controlling signal box" ("Befehlstellwerk"), and any others at the same station are subordinate to it.

Between stations, Siemens and Halske lock-and-block apparatus is used on double and single track line, except where traffic is light and the telegraph system suffices. The block is worked by a.c. from magneto generators, or motor generators at busy places. There is, however, a certain amount of d.c. station block equipment. There are numerous intermediate blockposts, often controlling crossing barriers. The separation between section and station block working is a peculiar feature of German signalling and makes numerous signal repeaters necessary. Treadle release for the block is often combined with an insulated rail to obtain a last-vehicle action, especially for route locking. Track circuiting is found at many stations, but the extensive use of steel sleepers (see paragraph 3.2) above has led to the development of axle counting apparatus, now installed at a number of places. On double lines, block working is on the normally free system.

With regard to power signalling, there were in 1937 on the whole Reichsbahn system 1,250 power signal boxes, of which 1,000 were of the "block" type, and 250 of the "route" type. The "block" type is of the "B" type, with a central pivot, and the "route" type is of the "R" type, with a central pivot.

Using much space, have been installed, and an example of such a locking frame, at Dortmund, is shown in Appendix 14 attached. Mechanical locking has so far been usually retained, the absence of conditionals making this comparatively simple. The signal mechanisms not only have a clutch, but are returned to normal by power. The block working is combined with the power frames in many ways; lamp indications have been increasingly used. The ordinary a.c. block apparatus in power boxes is sometimes worked from a distance by solenoid action. For hump marshalling yard working, which has been the object of much special research by the Reichsbahn, deck pattern frames are frequently used (see Appendix 14, for example at Wanne-Eickel yard), and many important yards have magazine point control and rail brakes of various types. Wireless is used in some cases for communication with the hump yard driver.

With regard to automatic train control, the Reichsbahn has developed this extensively, and several important routes in the area covered by this report (e.g. Oberhausen-Hamm-Götenloh, Essen-Recklinghausen-Münster, Düsseldorf-Wuppertal-Hagen-Hamm, Köln-Duisburg-Oberhausen) are equipped with A.T.C. on the intermittent inductive system, with track magnets placed on the right-hand side of each track and with locomotive magnets fixed below locomotive cabs. Visual cab signals are not used, the working being based on the vigilance principle and direct observation of the fixed signals. The driver's action is not interfered with unless he fails to acknowledge an adverse advance ("distant") signal, when passing it, by depressing a vigilance button, or to reduce speed in accordance with the signal indications. The observation of permanent way and other speed restrictions is enforced and absolute stop signal action is provided, the control system thus constituting a most comprehensive one.

Secondary and light railways ("Nebenbahnen") are naturally worked with signalling equipment of a simpler order than that on main lines, and special simplified signalling regulations apply to these secondary sections.

(d) TELEGRAPHS AND TELEPHONES

There is no block bell signalling, as used in Great Britain, the lock and block being worked without it. Train description and other messages are sent on Morse inker instruments which are much used. Bell communication of a special form exists from station to station, and sometimes direct between major stations and to junctions. Large signal gongs ("Lautwerke") are installed at these main stations, with others on the same circuit at intermediate block posts, small stations, platelayers' huts, etc. Each down train departure is signalled by 3 blows, and each up train departure by 5 blows given twice. An emergency signal of 30 blows orders all who hear it to take instant measures to stop the traffic. There are telephone boxes at every kilometre along main lines, arrows on the telegraph posts showing the direction of the nearest. From these, at any hour, a responsible official at a bell signalling station can be spoken to; on learning of an accident, his first duty is to give the emergency signal.

The Reichsbahn telegraph and telephone systems are of a most complete character, with much equipment of the most modern type, including high-speed telegraphs, automatic telephones, carrier transmission, and some wireless services. There are also numerous electric clock and time signal installations, and subsidiary devices. Train despatching, or traffic control, has been successfully adopted on important sections of the Reichsbahn, including some in the area covered by this report.

GENERAL EFFICIENCY

In normal circumstances, the signalling and train control system of the German railways works smoothly and well, and ample attention is paid to its maintenance. The Reichsbahn's authorities are well equipped to deal with any emergency.

(6) Electrification

None of the lines covered in this report is electrified.

(7) Locomotives

(a) NUMBERS AND TYPES

The locomotive stock of the whole Reichsbahn system at the end of 1937 (i.e., before the incorporation of the Austrian Federal Railways into the Reichsbahn) was as shown in the following table:

Steam locomotives with tenders:	Number
With 2 coupled axles	8
" 3 " "	4,513
" 4 " "	4,188
" 5 " "	3,518
" 6 " "	44
Total	12,269
Tank locomotives:	
With 2 coupled axles	184
" 3 " "	3,742
" 4 " "	2,316
" 5 " "	1,622
" 6 " "	11
" 8 " "	22
Total	7,897
Total, steam locomotives	20,166

Locomotives of special types	2
Electric locomotives:	
With 2 or 3 driving axles	77
" " " "	361
" " " "	85
Total	543
Total, all locomotives	20,711*
Railcars:	
Steam	18
Electric	1,153
Oil and other types	808
Total	2,019

The steam locomotive stock of the Reichsbahn may be broadly classified under two heads—firstly, locomotives of former constituent systems of the Reichsbahn (Prussian State Railways, Bavarian State Railways, etc.), and secondly, locomotives of standard types ("Einheitslokomotiven") built since the formation of the Reichsbahn. The second class includes the special war-time locomotive types ("Kriegslokomotiven") designed to accelerate locomotive production and make the most economical use of available materials.

The following table shows the classification of the Reichsbahn steam locomotive stock under the above-mentioned heads, and also according to main types and series:

Main type	Classification	Series	Remarks
S	Express train locomotives with tenders.	01 01 ¹⁰ 02 02 ¹ 03 03 ¹⁰ 05 06 17 ³ 17 10-12 18 18 ⁹ 18 ¹ 18 ³ 19 ⁶	Einheitslokomotive. " " " " " " Former Prussian S10 ³ class. " Prussian class S10 ³ . " Bavarian S/36 class. " Saxon XVIII H class. " Württem C class. " Baden IV h ¹⁻³ class. " Saxon XX HV class.
P	Passenger train locomotives with tenders.	24 37 0-1 38 2-3 38 ¹ 38 10-40 39 0-2	Einheitslokomotive. Former Prussian P6 class. " Saxon XII H2 class. " Bavarian P3/3H class. " Prussian P6 class. " Prussian P10 class.
G	Goods train locomotives with tenders.	41 43 44 45 50 52 55 25-26 57 10-40 58 2-3 58 ¹ 58 ³ 58 10-22 59 ⁶	Einheitslokomotive. " " " " " Kriegslokomotive. Former Prussian G8 ¹ class. " Prussian G10 class. " Baden G12 class. " Saxon XIII H class. " Württem G12 class. " Prussian G12 class. " Württem K class.
St	Express train tank locomotives.	61	Einheitslokomotive.
Pt	Passenger train tank locomotives.	62 64 70 ⁶ 74 4-13 75 ⁶ 75 3, 10-11 75 ¹ 77 ¹ 78 0-10	Einheitslokomotive. " " Former Prussian T12 class. " Württem T3 class. " Baden VI c ¹ class. " Saxon XIV H F class. " Bavaria Pt16 " Prussian T12 class.

* Of these, there are only about 1 per cent. that have not yet been replaced by new ones.

Main type	Classification	Series	Remarks
C ₁	Express train tank locomotives.	80	Einkessellokomotive.
		81	"
		84	"
		85	"
		86	"
		87	"
		89	"
		93 5-20	Former Prussian T14 ¹ class.
		94 ¹	" Western Tn class.
		94 5-18	Prussian T16 ¹ class.
		94 20-21	Saxon XI HT class.
		95 ¹	Russian Tso class.
		96 ¹	Bavarian Gtaz4/4 class.
Z	Rack locomotives.	97 ¹	Former Bavarian PzL3/4 class.
		97 ²	" Western E+12 class.
L	Light railway locomotives.	98 ¹	Former Bavarian PzL3/4 class.
K	Narrow-gauge locomotives	99 ¹	Einkessellokomotive (1 m. gauge).
		99 ²	" (900 mm. gauge).
		99 ³	" (750 mm. gauge).

The series index numbers shown in the above table are followed by a set of three or four figures indicating the number of an individual locomotive in its particular series. Thus an engine numbered 03 124 is an express train locomotive with tender, is of the 03 "Einkessellokomotive" series, and is locomotive number 124 of that series.

There is a further method used to classify the Reichsbahn steam locomotives for operating purposes, and known as the "Betriebsgattung." In this classification, the main type letter (as given in the

above table) is used, followed by the number of coupled axles, the total number of axles, and the average axle-load in tonnes. Thus a locomotive of series 18 (a locomotive of the former Bavarian S 3/6 Class) has the "Betriebsgattung" rating X.36.17, i.e. it is an express train tender locomotive with three coupled axles, a total of six locomotive axles, and an average axle-load of 17 tonnes.

The following table shows the principal dimensions of certain of the main classes of steam locomotives of the Reichsbahn:

Series (see heading table)	Operating classification (see above)	Wheel arrangement* (no. in T indicates tank loco)	Cylinders			Boiler pressure	Driving wheels	Weight of loco. only in running order		Capacity of tender or tank		Length of loco, and tender or buffer
			No.	Diam.	Stroke			Total	Adhesive	Coal	Water	
01	Sy6.20	4-6-0	2	600	660	16	2,000	111.1	99.7	10	34	23,940
02 ¹	Sy6.20	4-6-0	4	550	660	25	2,000	106	53	10	32	23,905
03	Sy6.17	4-6-0	2	570	660	16	2,000	100.5	54.3	10	34	23,905
18	Sy6.17	4-6-0	4	440	610	16	1,870	97	53	9	30	...
24	Pz1.15	2-6-0	4	500	660	14	1,500	57.6	45.4	6	17	16,995
37 ¹	Pz1.19	2-6-0	3	500	660	14	1,750	100	77.7	7	31.5	...
43	Gy6.20	2-10-0	2	720	660	14	1,400	110.8	76.6	10	32	21,620
44	Gy6.20	2-10-0	3	600	660	16	1,400	110.1	75.2	10	30	21,620
50	Gy6.15	2-10-0	2	600	660	16	1,400	106.5	75	8	26	21,040
52	Gy6.15	2-10-0	2	600	660	16	1,350	95.7	70.5	10	30	21,075
57 ¹	Gy5.15	0-10-0	2	600	660	16	1,400	72	72	7	18.5	18,220
64	Pz17.20	4-6-4T	2	600	660	14	1,750	123.6	60.8	4.5	16	17,140
65	Pz15.15	2-6-4T	2	500	660	14	1,500	74.9	45.5	3	8	11,400
81	Gy14.17	2-6-4T	2	500	550	14	1,100	67.5	37.5	3	8	11,400
85	Gy17.20	2-10-4T	2	700	660	14	1,400	113.6	79.7	3	16	16,900
86	Gy14.15	2-6-4T	2	500	550	14	1,100	58.5	36.6	3	8	11,400
87	Gy15.17	0-10-4T	2	600	550	14	1,100	55.6	35.6	3	8	11,400
89	Gy15.15	0-6-4T	2	500	550	14	1,100	65	45.8	2.6	4.8	11,400

* In Germany, wheel arrangements are indicated by the number of axles, the number of coupled axles being shown by a letter and the number of leading and trailing axles by figures. A 4-6-0 locomotive is thus a 4T in German notation, while a 2-8-0 is a 2T.

Elevation diagrams of certain of the standard Reichsbahn locomotive types are given in Appendices 15 and 16 attached. Appendix 17 also gives a photograph of a wartime locomotive ("Kriegslokomotive") of series 43.

Details of the types and dimensions of Reichsbahn electric locomotives are not given, as they do not operate on the lines covered by this report.

diesel engines have been widely used on the Reichsbahn for road, forest and industrial services.

It should be very clearly pointed out, however, that the use of diesel engines on the Reichsbahn is not a new development. The first diesel locomotive was built in 1902, and the first diesel engine was built in 1903. The first diesel locomotive was built in 1902, and the first diesel engine was built in 1903.

however, been withdrawn since the outbreak of the present war. The "H10" train sets originally consisted of 2 cars, powered by a Maybach 410 hp diesel engine, with electrical transmission.

Recently, the through-traffic services, local services, and express light-gauge trains. The main reason for these services are of numerous types, with the use of diesel engines and diesel transmission systems. Typical are the Maybach engines of 410 hp, which are associated with the use of electrical transmission, and the use of diesel engines of 410 hp, which are associated with the use of electrical transmission.

The use of diesel engines on the Reichsbahn is not a new development. The first diesel locomotive was built in 1902, and the first diesel engine was built in 1903. The first diesel locomotive was built in 1902, and the first diesel engine was built in 1903.

of 375-425 h.p. for as transmission is concerned, mechanical drive has been widely and successfully employed for powers of 175-300 h.p.; for outputs over 300 h.p., electric transmission has given good performance, but with pressure-charged engines of 600-650 h.p. the weight ratio of electric transmission is unsatisfactory, and this had led to the use and development of lighter hydraulic transmission systems.

(b) ADEQUACY OF LOCOMOTIVE STOCK

Prior to the present war, the locomotive stock of the German railways was adequate to deal with the traffic normally handled, and to cover additional traffic commitments at peak periods. After the outbreak of war, however, there developed a definite shortage of locomotives in Germany and German-occupied Europe generally, and this came about as the result of two major factors—firstly, the great increase in traffic, both in terms of tonnage handled and length of haul, which took place on the German railways as a result of the war (see paragraph 9 (a) below); and secondly, the necessity for dispersing a considerable proportion of the German locomotive stock over vast areas of occupied Russia, where practically the whole motive power park had to be provided from German sources.

It may in fact be stated that the German transport problem during this war has until recently been fundamentally one of a shortage of locomotives. To alleviate the effects of this shortage in the Reich itself, locomotives were drawn into Germany from

other German-occupied countries such as France and Belgium wherever possible, thus causing serious operating problems and a strangulation of essential commercial traffic in these countries. At the same time Germany stimulated the production of new locomotives throughout occupied Europe, but actual output appears to be lagging considerably behind the production programme envisaged, and only recently have the German authorities begun to feel the benefits of the rationalisation measures which they introduced in the locomotive industry earlier in the war. These measures included the concentration of production firstly on a simplified version of the "series 50" 2-10-0 goods locomotive known as the "transition locomotive" ("Übergangslocomotive"), and latterly on the "series 52" 2-10-0 goods locomotive known as the "war locomotive" ("Kriegslocomotive"). As mentioned under paragraph 7 (a) above, the latter type was designed to make the most economical use of available materials and to accelerate output; it is claimed to effect a great saving in production man-hours.

(c) LOCOMOTIVE RUNNING DEPOTS AND WORKSHOPS

The following is a list of locomotive depots (engine sheds) in the area covered by this report, listed under the R.B.Ds. controlling them. The symbols used to indicate their type are as under:

Type: (Rect. = through or dead-end rectangular shed(s); RHL = Roundhouse or Half-roundhouse with radial tracks and Tbl.

Locomotive sheds

Division	Location	Type	with approximate stabling capacity	Route No.
Essen	Essen-Frintrop	RH	up to c. 20 locos.	18
	Essen-Hbf.	RH	over 30 "	14
	Gelsenkirchen	RH	c. 20-30 "	18, 20, 22
	Herne	RH	c. 20-30 "	22
	Recklinghausen	RH	c. 20-30 "	18
	Wanne-Eickel	RH	over 30 "	18, 22
	Kettwig	RH	up to c. 20 "	20
	Mülheim-Styrum	RH	over 30 "	14
	Duisburg Hbf.	RH	over 30 "	11, 18
	Emmerich	Rect.	up to c. 20 "	14
	Oberhausen	RH	c. 20-30 "	14, 18
	Wesel	Rect.	up to c. 20 "	9, 14
	Dortmund Hbf.	Rect.	over 30 "	21, 22
	Dortmund MY	Rect.	over 30 "	22
	Dortmunderfeld	Rect.	over 30 "	21
	Langendreer	RH	c. 20-30 "	14
	Hamm	Rect.	over 30 "	19, 21
	Meerhoog	"	"	14
Wuppertal	Düsseldorf Hbf.	"	"	7, 19, 20
	Düsseldorf-Derendorf	RH	over 30 "	18, 20
	Elberfeld-Steinbeck	Rect.	over 30 "	19
	Wuppertal-Langerfeld	RH	over 30 "	19
	Wuppertal-Vohwinkel	RH	over 30 "	19
	Hagen-Eckersy	RH	over 30 "	19
	Holzwickede	RH	up to c. 20 "	19
	Schwerte	RH	over 30 "	19
	Arnsberg	Rect.	c. 20-30 "	14
Cologne	Freudenberg	"	"	14
	Köln Betriebsbf.	"	"	3, 4, 5, 6, 10, 18
	Köln-Eifelhof	Rect.	over 30 "	5
	Köln-Gereon	RH	up to c. 20 "	3, 4
	Neuwied	"	"	6
	Rheinberg (Mosel)	RH	"	52, 53, 54
	Köln-Lindenthal	RH	"	5
	Köln-Nippes	Rect.	over 30 "	10
	Köln-Noll	RH	over 30 "	6
	Süd-Pont	Rect.	over 30 "	6, 13
	Hörsing	Rect.	over 30 "	11
	Sieglar	RH	c. 20-30 "	10, 12
	Sieglar (Gf.)	RH	over 30 "	7
	Sieglar	RH	over 30 "	7, 8, 10
	Sieglar	RH	c. 20-30 "	10, 12

Locomotive sheds—contd.

Division	Location	Type with approximate n. ling capacity	Route No.
Köln—(contd.)	Engers	RH c. 20-30 loco.	6
	Aachen Hbf.	RH c. 20-30 "	3, 7
	Lins	" "	6
	Bonn	RH up to c. 20 "	5
	Krefeld Hbf.	RH c. 20-30 "	10, 11
	Krefeld Gbf.	RH up to c. 20 "	10, 11
	Aachen-West	RH c. 20-30 "	1, 2, 3, 7
	Aachen Roths Erde	RH c. 20-30 "	3
	Düren	RH c. 20-30 "	3, 8
	Stolberg Hbf.	RH c. 20-30 "	3
Mainz	Wiesbaden	RH c. 30-35 "	53
	Oberlahnstein	RH c. 20-25 "	53
	Niederlahnstein	Rect. c. 10-15 "	52, 53
	Bingerbrück	RH c. 20-25 "	54
	Mainz	RH c. 20-25 "	54
	Mainz-Bischopshausen	" "	54
Frankfurt	Frankfurt	RH & Rect. c. 90-120 "	52, 53, 54
	Limburg	" c. 25-30 "	52
Hanover	Bremen Hbf.	RH "	18, 23, 24, 26
	Bremen MY	RH "	24
	Bremen Walls	RH "	24
	Speichenbüttel	RH "	24, 25
Hamburg	Hamburg (Harburg)	(?) RH "	23
	Hamburg (Wilhelmsburg)	" "	23
	Hamburg (Hbf.)	RH "	23
Kassel	Kassel	RH c. 30-40 "	14
	Scherfede	" c. 20-25 "	14
	Warburg	RH c. 20-25 "	14
Münster	Münster	Rect. c. 20-30 "	18, 21
	Haltern	RH up to c. 20 "	9, 18
	Osnabrück Hbf.	RH c. 40-45 "	12, 18
	Osnabrück Gbf.	" "	12, 18
	Rheine Passagierbahnhof	RH up to c. 20 "	12
	Rheine MY	RH up to c. 20 "	12
	Erden	" "	26
Oldenburg	Oldenburg Hbf.	RH c. 20 "	26, 27
	Oldenburg MY	" "	26, 27

Generally it may be said that at important operating centres in Germany, several separate engine sheds at different points are preferred to a single concentrated running depot. Thus in the immediate vicinity of Köln (Cologne) there are six separate locomotive depots, while Dortmund and Duisburg have four separate depots each. The roundhouse is the usual type of engine shed in Germany, and rectangular

sheds are generally found at large centres only. Engine sheds are normally equipped with minor workshops capable of effecting ordinary running repairs.

So far as the main Reichsbahn workshops ("Ausbesserungswerke") are concerned, the following list gives details regarding those in the area covered by this report.

Principal repair shops

Division	Location	Classification	Route No.
Eisen	Mülheim-Speldorf	Locomotives	14
	Recklinghausen	Carriages and wagons	18
	Duisburg	Wagons	11, 18
	Oberhausen	Carriages and wagons	14, 18
Wuppertal	Schwerte	Locomotives	19
Ahn	Köln-Nippes	Carriages and wagons	10
	Krefeld-Opsum	Carriages and wagons	10, 11
	Lins	"	6
Frankfurt	Nied	Locomotives	52, 53, 54
	Frankfurt (West)	Carriages and wagons	52, 53, 54
	Limburg	Carriages and wagons	52
Hamburg	Hamburg (Glückstadt and Harburg)	Locomotives, carriages and wagons	23
Kassel	Kassel	Locomotives, carriages and wagons	14
Münster	Osnabrück	Wagons	12, 18
Oldenburg	Oldenburg	Wagons	26, 27

In addition to the major locomotive, carriage and wagon repair shops maintained by the Reichsbahn in the Ruhr area and listed above, there are in that area:

Fried. Krupp A.G., Essen

A large area of the extensive Krupp Works is devoted to locomotive production. The Krupp Works have with the exception of Henschel (Kassel), the largest locomotive output in the "Old Reich" area; their estimated pre-war capacity was 100-120 main line engines per annum, while their monthly output for September 1942 is reported as 21 locomotives. Since then the works (including the railway shops) have been severely damaged in air raids.

Arm. Jung Lokomotivfabrik, G.m.b.H.,
Jungbushal (Kirchen am Sieg)

Locomotive production works of considerable capacity; work-shops include forge (area 7,650 m.²), machine shop (5,400 m.²), boiler shop (4,000 m.²), etc. Their estimated pre-war capacity was 50 main line locomotives per annum, while their monthly output for September 1942 is reported as 5 locomotives.

Vereinigte Westdeutsche Waggonfabrik
A.G. ("Westwagen") Köln-Düren

These works rank with the Linke-Hofmann works (Essen) as the most important builders of goods and passenger rolling stock in Germany. "Westwagen" also controls rolling stock workshops in Mülheim. Production at the "Westwagen" works has been eased by the reduction of the number of wagon types, and the output of goods wagons has been increased by the adoption of the continuous belt assembly method.

Waggonfabrik Talbot A.G. Aachen

Goods and passenger rolling stock production works of moderate capacity.

Waggonfabrik Urdingen A.G. Urdingen

Goods and passenger rolling stock production works of moderate capacity. Shops at both Urdingen and Düsseldorf.

The German locomotive and rolling stock industry, in addition to supplying the Reichsbahn and other German lines, had built up an extensive export trade, and German-built railway engines and vehicles are in operation in many parts of the world.

Besides the private construction firms in the Ruhr area listed above, there are also numerous undertakings in that area which supply, in addition to other industrial products, specific parts for railway locomotives and rolling stock, e.g. the Bochumer Verein, supplying railway wheelsets, etc.

(d) FUEL AND LUBRICANTS

The coal consumption of the whole Reichsbahn system in a typical pre-war year (1936) was 14,463,000 tonnes, and of this amount 12,714,000 tonnes (88 per cent.) was used as locomotive fuel; this figure represents a consumption of 13.72 tonnes per 1,000 engine-kilometres. Locomotive coal consumption in the area covered by this report only may be estimated at about 2½ million tonnes per annum.

The great majority (approximately three-quarters) of the total German coal output comes from the Central Ruhr area ("Ruhr-Kohlen-Revier"); a small proportion also comes from the Aachen coalfield, which is also within the area covered by this report. The Ruhr coal ("Steinkohle") used for locomotive purposes is of relatively good quality, having a general calorific value of 6,400-7,400 per kilogram; it is, however, somewhat below the standard of the best British locomotive coals, which have calorific values of up to as much as 8,600 per kilogram. A typical composition of Ruhr coal would be as follows:

	Percentage
Volatile matter	25
Fixed carbon	65
Ash	8
Moisture	2

Approximately 13 per cent. of the German railways' coal supply is normally in the form of briquettes made up from slack, etc., and having a calorific value of 6,400-7,200 per kilogram.

Ruhr and Aachen (and also Saar) coal is supplied to the Reichsbahn by the Rheinisch-Westfälisches Kohlen-Syndikat, with its headquarters at Essen. In addition to the pit coal produced in the area covered by this report, there is also a considerable production of lignite ("Braunkohle") on the west side of the Rhine in the Köln (Cologne) area ("Eifelkohle") and

Köln (Rhein) area; this district is, in fact, the second largest lignite producing area in the Reich.

For the inspection and receipt of coal supplies for the Reichsbahn from all the West German coal districts referred to above, there is a special Reichsbahn "Kohlen-abnahmeamt" at Essen; this is responsible to the "Reichsbahn-Zentralamt" at Berlin (see paragraph 2 (c) above).

Various factors, such as the necessity of supplying Italy's coal requirements, have rendered Germany's coal position more difficult since the war, and the supply of coal for railway purposes in Germany has occasionally suffered in consequence.

With regard to the consumption of heavy oil for railway operation, etc., this amounted to 38,000 tonnes for the whole of the Reichsbahn system in 1937; the approximate average calorific value of this oil was 9,700 per kilogram.

As regards lubricating oil, shortages have been frequently reported during the present war. In this connection, however, it is essential to distinguish between a general shortage of railway lubricants and local shortages or shortages of specific grades. Reports of shortages of lubricants and consequent operating troubles have been received every winter since the war began, but while there may have been temporary local shortages, possibly of certain grades only, there has as yet been no evidence of any widespread or serious lubricating difficulties on the Reichsbahn.

(e) WATER SUPPLY

Water supply for railway purposes is generally satisfactory throughout Germany. There were 1,881 railway watering installations on the whole Reichsbahn system in 1937; the number of stations with mechanically operated watering plants was 939, compared with the total number of 8,368 stations.

As important railway centres, marshalling yards, etc., large water-towers, frequently of brick or concrete construction, and with capacities of up to as much as 1,000 m³, are to be found.

Water cranes are of the usual Continental type, with rigid arms swinging horizontally.

Water-troughs between the rails, as used in Great Britain, are not employed on the German railways.

Water flowing is carried out in many cases by the addition of lime and soda, and in the case of particularly hard water, by the liming process.

(8) Rolling stock

(a) NUMBERS AND TYPES

The carriage and wagon stock of the whole Reichsbahn system at the end of 1937 (i.e. before the incorporation of the Austrian Federal Railways into the Reichsbahn) was as shown in the following table:

Passenger cars per:	Number
With 2 axles	18,809
" 3 "	29,328
" 4 "	14,898
" 6 "	198
Total number of passenger carriages	63,233
Total number of axles	198,148
No. of 1st Class seats	15,931
" 2nd "	304,747
" 3rd "	3,250,813
Total number of seats	3,571,491
Average number of passenger carriages per km.	1.9
Luggage and parcel vans:	
With 2 axles	14,360
" 3 "	3,490
" 4 "	2,584
Total number of luggage and parcel vans	19,434
Total number of axles	67,770
Average number of luggage vans per km.	0.9
Goods wagons:	
Covered wagons with 2 axles	189,447
" " 3 "	541
" " 4 "	609
Total number of covered	190,597
Total number of axles, covered wagons	393,499
Average load capacity per axle, covered wagons	7.3
Open wagons with 2 axles	304,140
" " 3 "	164
" " 4 "	11,970
Total number of open wagons	316,274
Total number of axles, open wagons	716,750
Average load capacity per axle, open wagons	8.7
Division of open wagons:	
High-sided	274,917
Low-sided and flat	71,357
Special wagons:	
Total number of special wagons	37,803
Total number of axles, special wagons	78,623
Average load capacity per axle, special wagons	7.6
Total number of all goods wagons	574,099
Total number of axles, all goods wagons	1,178,762
Average load capacity per axle, all goods wagons	8.4
Average number of goods wagons per km.	10.6
Number of privately-owned wagons	41,176
Number of axles, privately-owned wagons	84,361
Number of railway service wagons (1936 figure)	17,038
Number of axles, railway service wagons (1936 figure)	41,164

With regard to Reichsbahn coaching stock, this is largely standardized in types and dimensions. The national symbol for German State Railway coaching vehicles is DR; the other symbols shown on Reichsbahn passenger stock conform to the international (R.I.C.G.) classification lettering, as follows:

- A = 1st Class passenger carriage
- B = 2nd Class passenger carriage
- C = 3rd Class passenger carriage
- AB = 1st and 2nd Class passenger carriage
- ABC = 1st, 2nd, and 3rd Class passenger carriage
- PA = 1st Class Pullman
- PAB = 1st and 2nd Class Pullman
- PABC = 1st, 2nd, and 3rd Class Pullman
- W = Dining car
- W1 = Dining car, 1st and 2nd Class
- W12 = Dining car, 2nd Class
- WR = Restaurant car

- PV = 1st Class van
- PVB = 2nd Class van
- PVAB = Composite luggage and mail van
- SW = Sleepers
- W1 = Sleeping car, 1st and 2nd Class
- W12 = Sleeping car, 2nd Class
- WR = Restaurant car

As a suffix to the above international symbols, Reichsbahn passenger stock with more than 2 axles shows the number of axles. The Reichsbahn also uses the following further symbols:

- g = Corridor vehicle with vestibule connections
- l = Vehicle with open-type gangway

A passenger carriage marked ABC4g is thus a 1st, 2nd and 3rd Class composite corridor coach with 4 axles, and vestibule connections.

Passenger stock is generally of steel construction. All corridor coaches are fitted with end doors only. In the 1st and 2nd classes, upholstered seats are provided; the 3rd class has wooden seats only. Passenger stock is equipped with electric lighting and steam heating (the latter is frequently of the Pintsch low-pressure type). The following are the dimensions of a typical German standard passenger carriage (1st and 2nd Class composite express corridor coach).

Type of carriage	AB4g
Class of accommodation	1st and 2nd Class
Number of axles	4 (2 bogies)
Tare weight of carriage	39.1 tonnes
Length over buffers	21.845 m.
Length of body	20.525 m.
Width of body over 4 air plates	2.925 m.
Height of body above rail level	3.775 m.
Distance between bogie centres	14.600 m.
Bogie wheelbase	3.000 m.
Length of 1st and 2nd Class composite	2.300 m.
Length of vestibule	0.900 m.
No. of 1st Class seats	8
No. of 2nd Class seats	30

Another important type is the C4 carriage, which is a bogie vehicle with 50 3rd class seats and a tare weight of 44 tonnes.

In addition to Reichsbahn coaching stock, considerable numbers of sleeping and dining cars belonging to the Mitropa Company ("Mitteleuropäische Schlafwagen und Speisewagen Aktiengesellschaft" or Central European Sleeping and Dining Car Company) are normally operated over German Lines. Prior to the present war, the Mitropa Company owned 344 sleeping cars and 381 dining cars.

Restaurant cars were withdrawn generally on the Reichsbahn in June, 1940, as a result of war conditions, and were replaced by ordinary coaches.

With regard to Reichsbahn goods wagon stock, this is, like the coaching stock, largely standardized in types and dimensions. There are two main types, known as "Einheitswagen" (standard wagons) and "Austauschbauwagen" (wagons with interchangeable parts). The various classes of "Austauschbauwagen" are made up from parts which conform to the German Industry Standards (D.I.N.) and General Wagon Standards (W.A.N.); they are introduced as an addition to the "Einheitswagen" classes in order to facilitate the rationalization of the German wagon-building industry.

All German wagons bear symbol letters indicating their general type; the symbol letters are shown in the tables below. The symbol letter is followed by the name of one of the R.R.s, the letter here used indicates the Railway Division to which the wagon belonged, but is a further indication of the wagon type and may differ according to the wagon. An "Einheitswagen" or an "Austauschbauwagen" is a wagon marked with the letters "E" or "A" respectively, followed by the letters of the R.R. to which it belongs. Thus a wagon marked DR E 1000 is a 1st Class "Einheitswagen" of the Deutsche Reichsbahn.

The following are the symbols for the various types of German wagons:

"REICHSTWAGEN" (Standard Wagons)—Dimensions

Class symbol and division (see above)	Type of wagon	Body dimensions			Floor area	Tare weight		Load weight	Capacity	Wheelbase		Door		No. of axles
		Length	Width	Height		Without hand brake	With hand brake			Without hand brake	With hand brake	Width	Height	
G Kaiser München O Dresden	Closed wagon	770	249	1115 ^a 1125 ^b	21.3	10.5	11.2	15.0	17.5	4.5	4.5	1.5	2.0	2
	Closed wagon (long)	1070	249	1125 ^a 1135 ^b	28.0	12.5	13.0	15.0	17.5	7.0	7.0	2.0	1.535	2
K Wuppertal V	Wagon with lifting cover	770	249	1125 ^a 1145 ^b	14.9	10.0	10.5	15.0	17.5	3.5	3.5	1.5	..	2
H Hamburg O Halle	Covered wagon with open board sides and a deck	670	244	1125 ^a 1135 ^b	18.5	11.5	12.0	15.0	17.5	3.5	3.5	1.5	0.95	2
	Open wagon with wooden sides	670	273	1.0	18.4	9.5	10.0	15.0	17.5	4.0	4.0	1.5	..	2
O München O Halle	Open wagon with metal sides	770	281.5	1.5	14.9	9.0	9.5	15.0	17.5	3.5	3.5	1.5	..	2
	Open wagon (long)	770	273	1.55	21.3	10.5	11.0	20.0	21.0	4.5	4.5	1.5	..	2
K Stuttgart S	Flat wagon with removable side staves	1070	247	..	27.0	9.5	10.0	15.0	17.5	6.5	6.0	..	..	2
A Augsburg S Köln	Flat wagon with side stanchions	1200	273	..	33.7	10.5	..	15.0	17.5	..	8.0	..	..	2
H Halle H Regensburg	Flat wagon (long) with side stanchions	1900	273	..	41.4	..	20.0	35.0	36.75	10.0	..	..	..	4
	Robber wagon or horse truck	800	205	..	20.0	9.5	10.0	15.0	17.5	4.5	4.5	..	..	2

^a To top of side.^b To eave height of roof.

"AUSTAL-SCHNABUWAGEN" (Wagon with interchangeable parts)—Dimensions

Class symbol and division (see above)	Type of wagon	Body dimensions			Floor area	Tare weight		Load weight	Capacity	Wheelbase		Door		No. of axles
		Length	Width	Height		Without hand brake	With hand brake			Without hand brake	With hand brake	Width	Height	
G Kaiser O Dresden	Closed wagon	770	276	1110 ^a 1125 ^b	21.0	11.5	12.0	15.0	17.5	4.5	4.5	1.5	2.0	2
	Closed wagon (long)	1070	276	1110 ^a 1125 ^b	29.4	12.5	13.0	15.0	17.5	7.0	7.0	2.0	2.0	2
K Wuppertal V	Wagon with lifting cover	670	240	1125 ^a 1145 ^b	19.0	11.0	11.5	15.0	17.5	4.0	4.0	1.5	..	2
H Hamburg O Halle	Covered wagon with open board sides and a deck	770	275	1125 ^a 1135 ^b	21.3	10.5	11.0	15.0	17.5	4.5	4.5	1.5	0.95	2
	Open wagon with wooden sides	670	276	1.0	18.4	9.5	10.0	15.0	17.5	4.0	4.0	1.5	..	2
	Open wagon (long)	770	273	1.55	21.3	10.5	11.0	20.0	21.0	4.5	4.5	1.5	..	2
K Königsberg S Stuttgart	Flat wagon with removable side staves	1070	270	..	29.0	10.5	11.0	15.0	17.5	7.0	7.0	..	..	2
A Augsburg S Köln	Flat wagon with side stanchions	1200	280	..	36.4	11.5	..	20.0	21.0	..	8.0	..	..	2
H Halle H Regensburg	Flat wagon (long) with side stanchions	1800	275	..	49.7	..	25.0	40.0	40.5	12.0	..	..	..	4
	Robber wagon or horse truck	815	250	..	20.4	..	10.5	15.0	17.5	4.5	4.5	..	..	2

^a To top of side.^b To eave height of roof.

The above represent the principal types of wagons on the Reichsbahn, but there are, of course, many other types in use for special traffic, etc. Thus as an example, an SNa wagon is equipped to carry heavy loads or is a well wagon; the "SS" classification indicates that it is a long wagon of open type without sides, while the suffix "r" shows it to be a "flatbed wagon" (i.e. for heavy loads).

It is of note that flat wagons constructed on the German railways or military loads, tanks, guns, road vehicles, etc. have been in service since 1914.

The Reichsbahn pre-1939 wagon stock is reported to have included about 13,000 "convertible" wagons for use in connection with international traffic to and from the broad-gauge U.S.S.R. railways. Altogether there were some 20,000 wagons of this kind, with interchangeable axles, in use in Eastern Europe before the present war. The German wagons of this type had the suffix "r" after their Class symbol; thus Gc. and Rc. wagons are respectively closed and flat side-stave types with interchangeable axles for both the 1,415 mm. and 1,524 mm. gauges.

The Reichsbahn wagon stock also included a number of wagons conforming to both the German and British loading gauges, for use in connection with the Harwich Ferry service to England. The German wagons of this type had the suffix "L" after their class symbol; thus GcL and RcL wagons are respectively closed and flat side-stave types with interchangeable axles for both the 1,415 mm. and 1,524 mm. gauges.

At present, the German railway authorities are reported to be planning to construct a large number of new wagons for use in connection with international traffic to and from the U.S.S.R. railways.

war caused a shortage of wagons such in Germany. This shortage was not as acute as that of locomotives, but the Reichsbahn had to take active measures to deal with it. These measures included the more rapid loading and unloading of wagons by trailers (to ensure a better average wagon turn round and increased utilization of the available stock), and the overloading of wagons by up to 5 tonnes in excess of their normal permissible load; the latter measure was withdrawn during 1933, as a result of either an easing of the wagon situation or a marked deterioration in the general condition of wagons, but was partially re-imposed later in the year.

(b) BRAKING EQUIPMENT

Compressed air brakes manufactured by the Knorr Bremsen A.G. of Berlin are the standard on the German railways. The main types are the Knorr-Knorr and Hildebrand-Knorr brakes, and there are three principal classifications for all continuous brakes, viz:

Specialty powerful and quick-acting continuous brakes.

Quick-acting continuous brakes.

Slow-acting continuous brakes.

The Knorr type brakes have been found reliable in use, and as they are of solid construction they are not subject to damage. A prominent feature is their graduated application and graduated release. Stock fitted with Knorr brakes can be worked with Westinghouse-fitted stock, and vice versa, so that German wagons can be operated elsewhere in Europe, while rolling stock from other European countries can run over the Reichsbahn.

Appendix 19 and 20 give the layout and details of two of the known brake patterns, i.e. the Knorr-Knorr goods train brake ("Kkg" brake), and the Hildebrand-Knorr goods train brake ("Hkg" brake) respectively.

All passenger stock and the majority of the goods stock is fitted with the continuous brake; other goods vehicles are piped. All new vehicles are produced complete with the compressed-air brake fittings. In view of the considerable numbers of foreign wagons not fitted with either brakes or pipes in circulation on the German railways, the Reichsbahn has evolved a form of temporary detachable air brake pipe which can be attached to such wagons to enable them to run in fully fitted trains. In accordance with international agreement, German wagons show a single horizontal white corner band when piped only, and two or three bands when fully fitted with continuous brakes.

In addition to the air brakes, some wagons are fitted with handbrakes of the spindle type, operated from an end platform; the brake handle is then usually enclosed in a small caboose.

(c) BUFFING AND DRAW GEAR

Standard-gauge Reichsbahn stock is normally fitted with spring-loaded side buffers; the buffer springs are of the volute and ring types. Sectional diagrams of these buffers are given in Appendix 22 attached.

With regard to couplings, these are normally of a screw and link type; with the exception of special vehicles, Reichsbahn passenger and goods stock has continuous draw-bars. Diagrams of the draw-gear of goods wagons are given in Appendix 21 attached.

Scharfenberg automatic centre-buffer couplers have been fitted in some cars on rail-cars and other such special types of vehicle.

(d) ROLLING STOCK WORKSHOPS

A full list of the main Reichsbahn repair shops ("Ausbesserungswerke"), including those dealing with carriage and wagon repairs, in the area is given in Appendix 23 attached.

Details of the main and paying work on passenger and goods stock in the year covered by the report are given in the next paragraph.

(9) Traffic

(a) NATURAL AND ARTIFICIAL

Traffic statistics for the whole Reichsbahn system for 1937 (i.e. before the incorporation of the Austrian Federal Railways into the Reichsbahn) were as follows:

Passenger traffic:	Number
Number of 1st Class passengers carried	899,373
" " 2nd " " " "	94,324,579
" " 3rd " " " "	1,712,427,879
Total number of passengers, all classes	1,807,651,731
Number of passenger-km., 1st Class (thousands)	100,058
" " 2nd " " " "	2,116,745
" " 3rd " " " "	4,284,660
Total number of passenger-km., all classes (thousands)	50,898,503
Average length of passenger journey (km.)	27.7
Loggia and parcels traffic:	
Number of tonnes carried	459,828
" " tonnes-km. (thousands)	35,896
Goods traffic:	
Number of tonnes of express goods carried	2,995,773
" " " " slow goods carried	446,341,854
" " " " service traffic carried	30,411,783
Total number of tonnes of goods, all classes	449,748,350
Number of tonnes-km., express goods (thousands)	530,869
" " " " slow goods (thousands)	71,879,028
" " " " service traffic (thousands)	7,554,448
Total number of tonnes-km., all classes (thousands)	79,957,436
Average length of haul per tonne (km.)	159.8

As regards the dependence of the life of the community on railway transport, Germany's railways may be considered by all criteria to constitute the greatest single factor in maintaining the economic life of the nation; in war-time, they also have to shoulder a heavy share of the burden imposed by the national war effort. As one of the primary land powers on the Continent, and as a powerful industrial and commercial nation, Germany has naturally fostered the development of her means of internal communication to the maximum, and of these she has paid the greatest attention to her railways, as being the most suitable for heavy movements over long distances at relatively high speeds. The particular importance of the Ruhr railways in Germany's general railway network has been emphasized in paragraph 1 above, and also earlier in the present paragraph.

(b) WEIGHTS AND SPEEDS OF TRAINS

Average gross train weights for the whole Reichsbahn system in 1936 were as follows:

	Average No. of axles per train	Average gross weight of train (Tonnes)
Passenger trains	22.5	308
Goods trains	72.8	701

In relation to the above gross weight, the average net goods train load in the same year was 307 tonnes.

As regards train speeds, passenger trains are classified by index letters which give an indication of their speeds, viz.:

FDt - "Fernschneltriebwagen." These were very fast main-line diesel railcar services, with maximum speeds of up to 160 km. h. (100 m.p.h.), and overall speeds of over 100 km. h. (62 m.p.h.). On one of these services, the overall speed was in 1937 as much as 137 km. h. (85 m.p.h.). As mentioned under paragraph 8 (d) above, these FDt services have been withdrawn since the outbreak of war.

FD - "Fernpostzug." This is the fastest class of train in the German stock, with overall speeds of up to 160 km. h. (100 m.p.h.).

100 km./h. (70 m.p.h.). Prior to the war, however, one of these sections had an overall speed of as much as 119½ km./h. (74½ m.p.h.).

D "Schnellzug." These are ordinary trunk express train services (corridor stock, with overall speeds normally between 70 and 90 km./h. (44-56 m.p.h.), though one pre-war 'D' service had an average throughout speed of as much as 111½ km./h. (69½ m.p.h.).

E "Eilzug." These are fairly fast services (non-corridor stock) with average speeds normally up to about 70 km./h. (44 m.p.h.), though one pre-war 'E' service had an average throughout speed of 90 km./h. (55.9 m.p.h.).

F "Personenzug." This is the lowest class of passenger train, similar to the French "train omnibus," consisting of 4- or 6-wheel non-corridor stock, and having average speeds of about 40 km./h. (25 m.p.h.).

(N.B. In addition to the index letters given above, each passenger train is numbered. In many cases, trains in connection bear the same number, but with a different hundreds figure, e.g. trains D.122, D.222, and D.322 connect with train D.27. The index letter is not used in the case of "Personenzüge".)

The throughout speed of main-line goods trains is normally about 20-25 m.p.h., in peace-time the normal permissible goods train speed was 70 km./h. (43.5 m.p.h.), and 75 (46.6 m.p.h.) in the case of trains formed of appropriate rolling stock.

(c) TRAFFIC CONTROL

Reference to this has already been made in paragraph 3 above. A system of train dispatching and

traffic control has been successfully used on main line railways of the Reichsbahn.

(d) SPECIAL FEATURES AND DIFFICULTIES OF OPERATION

Right-hand running is the rule on double-track sections of the Reichsbahn.

A special feature of railway operations in the Ruhr area is the bulk loads of coal and other heavy traffics normally worked. The great train weights involved in these bulk movements have already been mentioned in paragraph 9 (b) above.

Difficulties of operation have been caused in the Ruhr area by heavy British air bombing during the present war; the density and complexity of the Ruhr railway layout has, however, implied a wealth of alternative routes. The method recently adopted by the Reichsbahn after devastating night bombing attacks on any particular industrial and communications centre in the Ruhr, has been to impose an embargo on ordinary commercial traffic to that centre until a sufficient measure of repair and re-organisation has taken place there to enable such traffic to be satisfactorily handled.

(e) MARSHALLING YARDS AND TERMINAL FACILITIES

The Reichsbahn operating organization is unique in that goods train services in peace-time are based on marshalling yard working, in contradistinction to the British, American and French systems, where the services are based on the hour of departure from the originating city and the required hour of arrival at the destination city.

In war, as in peace, German freight services depend on the working of the marshalling yards and the vital area of the whole of the Reich in this respect is the Ruhr, which has as main yards in the Essen Division, 12 main yards in the Köln Division, and 7 main yards in the Wuppertal Division. A list of marshalling yards covered by this report, together with the daily capacity of each, is given below:

Marshalling yards

Division	Location	Max. capacity (wagons per day)	Route No.
Köln	Hohenbudberg	6,700	11
	Köln-Eifelstr.	6,000	5
	Köln-Kalkstr.	4,500	6
	Köln-Nippes	3,500	10
	Köln-Oberstr.	2,000	1, 4
	Köln-Deutz	..	18
	Aachen-West	3,000	1, 2, 3, 7
	Koblenz (Mosel)	2,600	52, 53, 54
	Koblenz (Lützel)	2,600	5
	Rheydt	2,500	7
	Krefeld	2,000	10, 11
	Neuss	2,200	7, 8, 10
	Stolberg	2,000	3
	Düren	..	3
Essen	Hamn	10,000	19, 21
	Essen-Frinrop	5,400	18
	Bochum-Süd	..	14
	Wanne-Eickel	5,200	18, 22
	Langendreer	5,000	14
	Dortmund Vbf.	4,800	22
	Duisburg Hbf.	3,600	18
	Dortmunderfeld	3,000	21
	Mülheim-Ruhr-Speldorf	3,000	14
	Herne	2,400	22
Wuppertal	Gelsenkirchen Hbf.	2,000	18, 20, 22
	Vohwinkel	2,800	19
	Hengstey, Hagen	2,150	19
	Schwerte	2,200	19
	Düsseldorf-Düsseldorf	2,100	18, 20
	Langerfeld	..	19

Marshalling yards—(contd.)

Division	Location	Max. capacity (wagons per day)	Route No.
Mainz	Oberlahrstein	2,000	53
	Bingerbrück	2,000	54
	Wiesbaden-Biertrich-Oh	..	53
	Mainz-Bischolheim	2,000	54
Frankfurt	Frankfurt-Main (Güterbahnhof)	2,700	52, 53, 54
	Frankfurt-Oh	..	52, 53, 54
Kassel	Kassel	2,300	14
Münster (Westphalia)	Osnabrück	2,100	12, 18
	Rheine	2,000	12
	Linden	..	26
	Kirchweyhe	3,000	18
	Münster	2,000	18, 21
Oldenburg	Oldenburg	2,000	26, 27
Hannover	Bremen Rangier Bf.	4,100	24
	Speckenbüttel	..	24, 25
Hamburg	Hamburg (Wilhelmsburg)	4,800	23
	Hamburg-Harburg	..	23

In view of the particularly important part played by marshalling yards in the operation of the Reichsbahn, Germany has been one of the leading countries in marshalling yard design, operation, and technique. Marshalling yards in Germany are mostly of the mechanized hump type, with wagon retarders (normally hydraulic rail brakes of the Frölich or Thyssen pattern), and with "cut card" working.

With regard to the terminal facilities, these are normally adequate, though at many of the centres covered by this report, their efficiency has now been considerably reduced by damage resulting from British air bombing.

(10) Capacity

In the Ruhr area especially, railway capacity is generally high, owing to the large proportions of double- and multiple-track lines, and to the shortness of block sections. Certain double-track sections in the area may be able to sustain a maximum frequency of as much as 144 trains per day each way (i.e. 1 train each way every 10 minutes). In view, however, of the fact that in many cases the terminal facilities at individual centres would be insufficient to deal with this number of trains, and also in the absence of special organization, the practical capacity of double-track main lines in the Ruhr area is not likely to exceed 60-72 trains per day each way for all purposes (i.e. 1 train each way every 20-24 minutes).

Single-track lines in the area may be taken as having a capacity of between 16 and 24 trains per day each way, according to the traffic frequency which they were laid out to handle.

(11) Vulnerability of system

The density of the railway network in the area covered by this report implies a wealth of alternative routes in the event of the cutting of main lines, and this has been evidenced by the ability of the Reichsbahn to maintain the great majority of the rail traffic in the area in the face of repeated and devastating British air bombing attacks. Even on the occasion of the simultaneous cutting of several lines in the Ruhr by the breaching of the Möhne dam in May, 1943, there was no serious long-term interference with the main through traffic, as soon as damaged telegraph and telephone circuits had been restored, and the necessary traffic diversions and other emergency working arrangements had been established.

(a) BRIDGES

For a list of the larger and more vital railway bridges in the area of Germany covered by this report, see Schedule of Bridges, giving a summary of the information available and their classification as to vulnerability.

(b) TUNNELS

The following is a list of the railway tunnels in the area of Germany covered by this report:

Route No.	Distance		Between	Length approx.	Track
	Miles	Km.			
3			Eilendorf and Stolberg Hbf. Stolberg Hbf. and Eschweiler Horrem and Gross-Königsdorf	217 m. 255 m. 1,640 m.	DT " "
6	39½	93.7	Koblenz Ehrenbreitstein and Koblenz Hbf.	680 m.	DT
14	137	220.0	Aplerbeck Sud. and Griseke Oevertrup and Eichenohl Oevertrup and Eichenohl Nuttlar and Oberg Ellerhagen and Elsdorf-Wald	560 m. 680 m. 500 m. 250 m.	DT " " "
19	111	210.0	Schwerte and Hamm-Keser	280 m.	DT
20	11½	18.4	Hassel and Kettwig	1,000 m.	DT

Route No.	Distance		Between	Length approx.	Track
	Miles	Kms.			
52	16½	26.8	Namau (Lahn) and Oberrhof	110 m.	DT
	17½	27.6	Namau (Lahn) and Oberrhof	87 m.	"
	18½	29.7	Oberrhof and Laurenburg (Lahn)	60 m.	"
	22	35.4	Oberrhof and Laurenburg (Lahn)	50 m.	"
	25½	40.6	Laurenburg (Lahn) and Beldersheim	700 m.	"
	26½	42.4	Fachingen (Lahn) and Dins	550 m.	"
53	57½	92.1	Niederhausen and Niederjohach	100 m.	"
	22½	36.4	St. Goarhausen and Kaub	200 m.	DT
54	24½	39.3	St. Goarhausen and Kaub	150 m.	"
	21½	34.5	St. Goar and Oberwesel	300 m.	DT
55	22½	36.3	St. Goar and Oberwesel	300 m.	"
	23½	37.8	St. Goar and Oberwesel	300 m.	"
56	57	91.7	Mainz Hbf. and Mainz Sud	1,193 m.	"

(c) WORKSHOPS AND DEPOTS

The locations and details of railway workshops and depots in the area covered by this report are given in paragraph 7 (c) above, and layouts of certain of them are shown in the Appendices. Locomotive repair shops, running sheds, and installations generally should constitute suitable points for attack, and many have already been severely damaged in Allied air raids.

(d) TRAFFIC CENTRES AND MARSHALLING YARDS

The importance of marshalling yards in German goods traffic operation has already been emphasized, and a complete list of all the major marshalling yards in the area, together with their daily wagon capacities, is given in paragraph 9 (c) above.

Detailed description of lines

The following abbreviations are used in the detailed descriptions of lines:

- Cr = Crane
- DE = Dead-end
- DES = Dead-end siding
- Dt = Double track

ER = End-loading ramp

ES = Engine shed

I = Interchange with line of different gauge

J = Junction

LS = Loop siding

MY = Marshalling yard

PL = Passing loop

RH = Roundhouse

RpS = Repair shop

SER = Side and end-loading ramp

S.O. = Steam operated

SS = Electric sub-station

St = Single track

SY = Shunting yard

Tb = Turntable

W = Watering facilities (storage capacity in cubic metres in brackets)

w = Wagons

Wb = Weighbridge (capacity in metric tons in brackets)

Other operating facilities are written in full.

A list of the routes described will be found in the contents and they are also shown on a diagrammatic map.

ROUTE No. 1

ANTWERP-AACHEN (via MALINES AND LOUVAIN with alternative Route No. 1A via LIÈGE)

General details

- Gauge: 1,435 m. (standard gauge).
- Length: 169.3 km. (105½ miles).
- Track: Antwerp (Central) to Malines—Multiple (2 electrified).
Malines to Aachen—Double.
- Maximum permissible axle load: 20 metric tons.
- Gradients: For maximum gradients in Belgium, see App. 3 and 6.
- Curvature: For minimum curvature in Belgium, see App. 3 and 6.
- Traction: Steam.
Electric—Antwerp (Central) to Malines.
- Maximum distance between stations: 13.5 km. (8½ miles) Vervaux-Goreux to Kinkempois.
- Marshalling yards (MY):

BELGIUM			GERMANY		
Location	Max. capacity per 24 hours		Location	Max. capacity per 24 hours	
Antwerp Nord	Great capacity; over 1,000 wagons per 24 hours		Köln	Aachen West	3,000 wagons
" Antwerpen					
" Zaventem					
" Kiel					
" Sud					
Louvain					
Malines, Malines					
Liège, Liège A. & K.					
Liège, Liège A. & K.					
Liège, Liège A. & K.					

10 *Engine sheds (ES):*

BELGIUM	
Location	Stabling capacity
Antwerp Berchem	74 locos.
" Dam	140 "
" Sud	70 "
Malines (Muyssen)	50 "
Louvain	180 "
Tirlemont	50 "
Landen	45 "
Kinkempois (Liège)	63 "
Angleur (Renory)	50 "
Liège Guillemins	120 "
Pepinster	35 "
Ans	75 "

GERMANY	
Location	Type
Aachen West	RII

Stabling capacity
20-30 locos.

11. *Watering facilities:*

BELGIUM	
Antwerp Central	Fenne le Haut Clocher
Malines (Muyssen)	Kinkempois
Louvain MY	Chénée
Louvain (Passenger Stn.)	Pepinster
Tirlemont	Herbenthal
Landen	Ans
Waremmes	Liège Guillemins

GERMANY
No information available but adequate water supply assumed to exist, especially at all important stations.

12. *Vulnerable points (marked by asterisks in Detailed Description of line):*

- (a) *Marshalling yards and locomotive depots:* Described in paras. 9 and 10.
 (b) *Junctions at:* Antwerp, Malines, Louvain, Tirlemont, Landen, Verviers-Gorcux, Ans, Liège, Angleur, Pepinster, Verviers Central, Herbenthal and Aachen.
 (c) *Bridges (see Bridge Schedule):* Antwerp Central (viaduct), Km. 16.5, 116.7, 120.9, 123.6, 126.2, 130.3, 130.6, 132.5, 133.2, 133.7, 135.7, 136.2, 136.6, 137.1, 137.4, 138.3, 140.9, 141.3, 147.2, 148.7, 150.3, 154.2.
 (d) *Tunnels (see Tunnel Schedule):* Km. 107.2, 107.7, 411.0, 113.2, 114.6, 123.9, 126.4, 128.5, 130.5, 131.6, between km. 133.8 and 135.7, 136.2 and 139.7, km. 143.2, 144.8, 145.3, 145.6, between km. 145.8 and 147.2, km. 147.9, 148.4, 150.1, between km. 150.6 and 151.2, km. 152.9.

With reference to paras. (c) and (d) above (Bridges and Tunnels), it will be noted that until the line reaches the outskirts of Liège there are no tunnels and few bridges of importance. From Liège onwards the line follows the valley of the River Vesdre where numerous vulnerable bridges and tunnels exist.

13. *Capacity: 72 trains per day each way, of 500 tons net train load each.**Detailed description of line*

Distance from Antwerp		Stations	Engineering works	Details and facilities
Miles	Km.			
0	0	ANTWERP CENTRAL (For full description see p. 126)	On viaduct.	Terminal station with 10 platform tracks, W. ES in triangle near Berchem, Tbl. Carriage sidings. (For full description see p. 126.) J (facing) left with DT loop to Antwerp (Est). J (trailing) left with DT from Antwerp (Est).
1½	2	BERCHEM	..	Passenger station; 6 platform tracks ES (rectangular) in triangle north of Berchem station, stabling capacity 75 locos. 6 tracks continue to Mortsel; electric line on west, steam Brussels lines in centre, Lierre lines on east. J (facing) right with main electrified lines south to Malines.
2½	3.5	MORTSEL	Line crossed by overbridge carrying DT spur line from Boom-Lierre line.	Goods sidings (34 w). J (trailing) right with DT from Luythaegeen. J (trailing) left with DT from Krijgsbaan. J (facing) left with DT to Lierre.
3	4			
4½	7.9			
5½	9.0			
6½	10.6	VORDE DREE		
7½	12.1	HOVE HAAR		Electric double track line rejoins route and runs parallel as far as Mortsel.

Distance from Antwerp		Stations	Engineering works	Details and facilities
Miles	Km.			
6½	11.1	COUTICH CARRIERS	..	PL on right (330 yd.), 2 sidings left (330 yd.). SR. Single track to Boom on right. Wb. Single track to Liere on left. J (trailing) left with ST SO line from Liere.
7½	12.4		..	
9½	15.5		Line crossed by overbridge carrying narrow gauge Boom-Liere line.	
10	16	DUFFEL	..	2 sidings left (330 yd.). Goods sidings (70 w). SR steam lines only. Wb.
*10½	16.5		Bridges over R. Nethe (approx. 80 m. long) reported destroyed during hostilities in 1940 but restored by Germans. (No. 1 of Bridge Schedule.)	
11½	18.4	WAVRE STZ-CATHERINE	Bridge over road (approx. 25 m. long).	Steam lines only. PL left (220 yd.), goods siding (80 w).
11½	18.6		Line crossed by overbridge carrying steam lines over electric lines from West to East.	Down goods line junction with steam line. 2 pairs double track continue, electric on West side.
11½	18.8		..	J (facing) with up steam line only (goods line).
12½	19.6		Bridge—steam and electric lines over goods lines from Antwerp Sd; also over up-goods line spur to main steam line.	
13	21.2		..	J (trailing) left with goods lines (Eastern pair) from Antwerp Sd. J (trailing) right with steam line (Western pair) from Antwerp Sd.
14½	23.9	MALINES NECKERSPOEL (Goods)	..	Steam lines only, goods siding (335 w), SR (3 tracks), Cr.
14½	23.6		Line crossed by overbridge carrying DT main line.	Wb. Cr.
*15½	24.4	MALINES (MUYSEN)	..	MY (1500 w per day), double track from Louvain to Malines on left alongside yard with passenger station. 2 Tbls, ES (cap. 50-locos.) W. Double track to Malines on left.
18	29	HEVER	..	Wb.
18½	30	BINTRAAT	..	Halt.
20	32.2	BOORT-MEERBEEK	..	Goods siding (37 w). Wb.
22	35.5	HAECHT	..	PL left (620 yd.) and right (700 yd.). Goods siding (44 w) Wb.
22½	36.5	WESPELAER HEIKE	..	Halt.
23½	37.5	WESPELAER TILDONCK	..	Wb. PL left (700 yd.). Goods siding (63 w).
24½	39.9	HAMBOSCH	..	Halt.
26	42.0	WACKENZELACHEN STEENWEG	..	Halt.
27	43.5	WYOMAEI	..	PL left (350 yd.). Goods sidings (17 w). SR.
27½	44.2		..	J (facing) left by-passes Louvain. Wb.
27½	44.6		..	J (trailing) right with line from Brussels.

RAILWAYS

Distances from Antwerp		Stations	Engineering works	Details and facilities
Miles	Km.			
*28½	45.3	LOUVAIN MY		MY. Double track from Aerschot enters from left, and main line continues. 26 L.S. on left (mostly of full train length); group of 10 shorter sidings alongside Aerschot line. At end of yard on left, rectangular ES (cap. 180 locos.). Tbl. W. Behind ES on extreme left sidings to canal docks in town, passing under main line viaduct at Km. 46.5. On right 3 carriage sidings or passenger sidings. 8 tracks, across town street, and railway siding to canal docks. Immediately behind viaduct, siding to railway workshop on left.
28½	46.5		Viaduct.	
*29	46.8	LOUVAIN		3 platform tracks. 6 through main lines. Group of 10 short carriage sidings on right. Beyond station on right local goods yard; 9 long goods sidings, SR, sheds and covered transshipment platforms, 3 tracks. Cr (10t). W. MY (cap. 1,500 w + per day). Light railways, narrow gauge to Brussels, Dint, Gerbees-Loo, Jodoigne. J (facing) right DT to Ottignies. Group of 15 short sidings between present route and Ottignies line. Group of 8 sidings alongside Ottignies line on right.
31	50.1	CORBEKE-LOO		SR; DES (30w); Lt. rlys. (narrow gauge to Louvain); Wb.
32½	52.3	LOVENJOUR Halt		Wb.
32½	53.0		Bridge over road.	
34½	56.0	VERFAEZE		PL left 650 yd., right 900 yd. SR. DES (65 w). Wb.
36	58.0	ROOSEBEKE Halt		DES (38 w). Wb.
37½	60.3	CUMPTICE Halt		DES (41 w). Wb.
			Bridge over road and light railway c. 20 m. long.	
*39½	63.4	TIRLEMONT		4 platform tracks. DES (74 w). SR (2 track). Cr (10t). ES (cap. 50 locos.). Tbl. W. Transshipment siding, light rlys; narrow gauge to Aerschot, St. Trond, Beauvechain; Wb.
40	64.5			J (facing) right ST to Ramillies.
40½	65			J (facing) left with DT line to Drieslinter.
41½	66.5		Bridge over narrow gauge light railway. Hackendover-Gomsoncourt.	
43½	69.8	ESEMME		PL both sides (700 yd.). DES (49 w). SR. Wb for shipment siding.
43½	70.2		Bridge over narrow gauge light railway to St. Trond, Jodoigne.	
43½	70.6		Bridge over R. Petite Gette.	
44	70.8		Bridge over road.	
44½	72		Bridge over road.	
45½	73	NEERWINDEN		Halt. PL both sides (800 yd.). DES (50w); SR; Wb.
*47½	76.6	LANDRYN		Double-track line from Genloux (narrow gauge) to Landryn. 4 passenger platform tracks. DES (45 w); SR (4 track). ES (cap. 150 locos.). Tbl. W. W. 200 yd. to St. Trond. 200 yd. to Landryn.

RAILWAYS

33

Distance from Antwerp		Stations	Engineering works	Details and facilities
Miles	Km.			
47½	76.7		Bridges over road.	
49	78.9		Bridges over road, Hannut-St. Trond.	
49½	80.0	GINGELM		PL (620 yd.) on left; LS left (220 yd.); PL right (620 yd.); DES (46 w); SR; Wb.
50½	81.8		Bridge over road.	
50½	81.6		Bridge over road.	
52½	85	ROSOUX-MOYER	..	PL left (480 yd.), right (620 yd.). Goods siding (36 w); SR; Wb.
			Line crossed by over-bridge carrying narrow gauge light railway to St. Trond and Hannut.	
54½	87.6	CORSWAREM		DES (20 w); Wb; Cr (2 t).
55	90.1		Bridge over R. Geer.	
*56½	90.5	WAREMME	Line crossed by over-bridge carrying light railway (narrow gauge) to Hannut, Ans and St. Trond.	2 PL left (720, 650 yd.). 3 PL right (660, 470, 470 yd.). W; DES (54 w); SR; Cr (3-5 t); Wb.
58	93.2	BLESSET	..	Halt.
58½	93.9		Bridge over road.	
59½	95.5		Bridge over road.	
59½	95.9	REMICOURT	..	PL left (800 yd.), right (1,000 yd.); DES (45 w); SR (2 tracks); Cr (3 t); Wb.
60	96.6		Bridge over road.	
60½	97.8		Bridge over road.	
61½	98.6			Factory siding on right.
61½	99.3	MOMALLE		Halt. DES (36 W); Wb.
63½	101.7		Bridge over double track goods line from Tongres to Kinkempois. Rails not laid.	
64½	102.1		Bridge over road.	
64½	102.5	FREUX LE HAUT CLOCHER		PL left (760 yd.), right (800 yd.). DES (36 w); SR; engine siding, water tank and columns under construction in 1940; Wb.
64	102.9		Bridge over road.	
64½	104.1		Line crossed by over-bridge carrying light railway Tongres-Liège and alternative route to Kinkempois.	
*65	104.7	VOROUX GOREUX	..	Halt. J (facing) left with DT line to Liège. J (facing) right with avoiding line via Kinkempois. J (trailing) right with DT goods line from Tongres.
65½	105.7		..	
*66½	107.2		Tunnel 120 yd.	
*67	107.7		Tunnel 787 yd.	
67½	109		3 bridges over road.	
69	111		Tunnel 411 yd.	
69½	111.3		Bridge over road.	
70	112.7		Bridge spans Horlos valley, length 218 m. (No. 3 of Bridge Schedule).	
*70½	113.2		Tunnel 114 yd.	
*71	114.6		Tunnel 395 yd.	
71½	115.2		Bridge over coal mines, branch line from Jeneppe to Ans workshops.	
72	115.8		Workshops.	
*73	116.7		Viaduct—concrete arch over DT Namur-Liège-Guillemins line, the next arches across R. Meuse, the next arch over DT main line from Namur to Kinkempois. Curve to left to enter Namur-Liège.	
			Not part of Bridge Schedule.	

Distance from Antwerp Miles Km.	Stations	Engineering works	Details and facilities
*73 118.2	KINKERDING MY		Main line continues along outside of yard, which comprises a group of 20 sidings each (decreasing from train length to 350 yd.); 4 long arrival and departure sidings left; ES (cap. 63 locos.). Tbl; W; Rps. To left, curve to Liège-Guillemins (via J at 117 km., on route via Liège); left, DT to London. Line continues DT to Angleur, main line. Independent pair of tracks on right, high level to junction with alternative route through Liège (see above). 4 tracks to Angleur.
74 120.2	ANGLEUR (AQUENNES)		On left, group of 27 sidings (train length to 100 yd.). Main line continues East, DT right, off the main line.
*74 120.6	ANGLEUR		DT main line to Jemelle to the right; goods yard, 40 sorting sidings; DES (63 w); SR (2 tracks); ES (cap. 30 locos.); all alongside Jemelle line. 3 PL right, 2 PL left.
*75 120.9		Bridge over road. Bridge over R. Ourthe. (No. 5 of Bridge Schedule.) Bridge over road, c. 50 m. long.	
75 121.3	CHATELAIN		LS left (220 yd.), right (220 yd.). SR; Cr (10 t); W; Wb.
75 121.7		Bridge over road, c. 40 m. long.	
76 122.2		2 bridges over light railway to Verviers and Poulsein.	DT line to Battice leaves on left.
*76 123.1 *76 123.6	HENNE	Bridge over R. Vesdre. One steel span on masonry abutments and 2 stone arches, length c. 30 m. (No. 6 of Bridge Schedule.) Tunnel 220 yd.	Halt.
*77 123.9			
78 125.6	CHAUDFONTAINE		PL left (670 yd.) DES (38 w). SR. Cr. Wb.
*78 126.2		Bridge over R. Vesdre, steel span, masonry abutments. (No. 7 of Bridge Schedule.) Tunnel 110 yd.	
*78 126.4 78 126.5		2 bridges over R. Vesdre, steel span, masonry abutments. Bridge over road.	
78 126.9			
79 127.3 *79 128.5	LA BROCK	Tunnel 50 yd.	Halt.
80 129.9	TROOD		PL left (600 yd.); DES (33 w); SR; Cr (20 t); Wb. Standard gauge light railway to Poulsein on Liège-Jemelle line.
*81 130.3		Bridge over R. Vesdre, c. 30 m. long, steel span. (No. 8 of Bridge Schedule.) Tunnel 135 yd.	
*81 130.5 *81 130.6		Bridge over R. Vesdre c. 30 m. long, steel span. (No. 9 of Bridge Schedule.)	
*81 131.1 *81 131.5	CHATELAIN	Tunnel 120 yd.	Group of LS

Distance from Antwerp		Stations	Engineering works	Details and facilities
Miles	Km.			
82½	132.8	FRAIPONT	Bridge over R. Vesdre, masonry arches, 12 m. span. (No. 10 of Bridge Schedule.)	Halt.
82½	132.5		Bridge over R. Vesdre (No. 11 of Bridge Schedule.)	
83½	133.2			
83½	133.8	NEUVONVAUX FRAIPONT	2 tunnels, 210 yd. and 700 yd.	PL left (280 yd.); DES (35 w); SR; Cr (2½ tons) Wb.
84½	135.7		Bridge over R. Vesdre, masonry arches c. 30 m. long. (No. 12 of Bridge Schedule.)	
84½	135.9	COFFONTAINE	Bridge over R. Vesdre, masonry arches 20 m. long.	Halt.
84½	136.2		3 tunnels 200, 180 and 230 yd. between Vesdre bridges.	
85½	136.6		4 bridges over R. Vesdre, masonry arches c. 25, 25, 45 and 40 m. long respectively. (Nos. 14, 15, 16 and 17 of Bridge Schedule.)	
85½	137.1			
85½	137.4			
85½	138.3			
86½	139.7	PEPINOIR	2 bridges over R. Vesdre (c. 35 and 30 m. respectively), probably of high masonry arch type. (Nos. 18 and 19 of Bridge Schedule.)	J with DT line to Spa to right, station in angle, 2 PL left (700 and 740 yd.), DES (35 w); SR; Cr (2.5 t), LS (cap. 33 locos.), Tbl, W, Wb.
87½	140.9			
88	141.5			
88½	142.6	EMMVAL	PL left (540 yd.), right (500 yd.), DES (41 w), SR, Cr (3 t), Wb.	
89	143.2		Tunnel 400 yd.	J (trailing) left with ST line from Battin.
				J (facing) left with DT line to Verviers Ouest.
90	144.7	VERVIERS Central	Tunnel 110 yd.	LS, SR, W, Tbl.
90	144.8			J (trailing) left with DT line from Verviers Ouest where there are goods sheds, DES (266 w), SER, 8 sidings (train length), Tbl, W, Wb and MY (capacity over 1,500 w per day).
90½	145.1			
90½	145.2	VERVIERS PULAN	Tunnel 150 yd.	Halt.
90½	145.3		Tunnel 170 yd.	
90½	145.6			
90½	145.8	VERVIERS Est	2 PL left (600 yd., 370 yd.). DES. (124 w); SR (2 tracks); goods shed; factory sidings right and left. Wb.	
91½	147.2		Tunnel 130 yd.	
			Bridge over R. Vesdre, 5 masonry arches 90 m. long. (No. 20 of Bridge Schedule.)	
92	147.9		Tunnel 180 yd.	
92½	148.4		Tunnel 210 yd.	
92½	148.7		Bridge over R. Vesdre. (No. 21 of Bridge Schedule.)	
93½	150.1		Tunnel 180 yd.	
93½	150.3		Bridge over R. Vesdre, 21 masonry arches 10 m. each, height 18-20 m., c. 270 m. long. (No. 22 of Bridge Schedule.)	

RAILWAYS

Distances from Antwerp		Stations	Engineering works	Details and facilities
Miles	Km.			
53½	150½	DULMAYN GALEFFE		Graze yard; DES (16 w); SR; Cr.
94	151.2		Tunnel 55 yd. Bridges over road.	
94½	151.9	DORMAIN		Graze Yard, DES (86 w), SR. J with standard gauge light railway to Eupen.
95	152.9		Tunnel 70 yd.	
96½	153.9	WELKENRAEDT		Halt. Spur to left to join routes to Montzen (triangle) probably under construction (or abandoned). Dorella yards with some sidings on right. J (trailing) left with DT line from Montzen.
97	156.4		..	MY—about 15 LS on left decreasing from 400 to 200 yd.; about 10 short LS on right.
97½	156.9	WELKENRAEDT MY	..	4 through lines, platforms. Tbl, Wh, W, DES (30 w), SR (2 trucks), Cr on right. DT line to frontier at Raeren on right, see below: More long sidings, not all in use, on left and on right alongside main line to Aachen. This station was important as the frontier station up to 1928, since then many sidings have been out of use, but these may have been put into operation again after May, 1940.
97½	157.5	HERGENRATH	..	Halt.
100½	160.1	ARTENET	Viaduct over R. Gude c. 150 m. long, 40 m. high. Damaged, reported provisionally repaired for one track only. (No. 23 of Bridge Schedule.)	
100½	164.2			
100½	164.3	HERGENRATH		PL up and down side (330 yd.). DES (6 w), SR.
101	164.9		GERMAN FRONTIER	J (trailing) left with DT main line from Tbl (Route 2).
103½	166.3			J (trailing) left with line from Mönchen, Gladbach (Route 7) and Maastricht. ES at Aachen West, RH (2. 20/30 locos).
103½	169.3	AACHEN		

ROUTE No. 1A

VOROUX-GOREUX-ANGLEUR (Alternative route via Liège)

63	104.7	VOROUX-GOREUX		Halt. J (facing) right with DT line to Kinkempois (avoiding Liège).
66	106.4		Bridge over road.	
66½	106.9	BRENET-AWANS		PL right (100 yd.); 3 LS left (200 yd.); DES (16 w), SR. 3 factory sidings. Wh.
66½	107.3		Bridge over road.	
67	107.8		Bridge over road.	
68½	110.4	Ans		6 platform lines right (300 yd.). Tbl, ES (20/30 locos), W; Wh; 4 DES, 2 LS (100 w), SR; Cr; RPS. DT line to Eupen branches off to left. SR coal line branches off to right. Narrow gauge light rail way to St. Hubert.
69	111.1		Bridge over track carrying the heavy sidings	

Distance from Aachen		Stations	Engineering works	Details and facilities
Miles	Km.			
69½	111.3	MONTMAGNE	3 bridges over road. 2 bridges over road, one about 20 m. long.	Halt. — 2 L's.
69½	112.0			
70½	113.2			
70½	113.4	LIBON HAUT-PRE		LS right, DES (100 w), SR (4 tracks), Cr (10 t), Wh.
71	114.9		Over bridge carrying light railway to Liège. 4 bridges over road, each c. 20 m. long.	
71½	114.7			
		LIBON GUILLEMIN		DT line from Tongres. 6 platform lines, 2 bay platform lines far end of station, 2 PL on right, DES (107 w), SR (5 tracks), 2 Cr (5 t) left, Wh; SS (exp. 100 locom.) Th, W at end of station on left. DT line right to Namur—straight 4-track main line continues, but southern pair of tracks out of use.
72½	116.1		Line crossed by over-bridge carrying light railway to Florenville.	
72½	116.6		Bridge, 4-track, over R. Meuse (Val-Benoit Bridge) originally of Viaretti type (a parallel DT bridge). Destroyed by accident in 1922. Reconstruction de- layed by hostilities in 1940, but since rebuilt for 1 or 2 tracks only. C. 240 m. long, approached on embank- ments. Now probably plate girder type with 3 piers in river and 2 on each bank. Reported mined. New bridge on South side of tem- porary bridge is reported reconstructed, the tracks being not laid. (No. 2 of Bridge Scheldt.)	
72½	117.0			J (facing) left with DT line to Longden and to Viad. Southern pair of main line tracks to the right of Kinkempois, since de- struction of bridge, J with Northern pair of main line.
72½	117.3		Bridge over Kinkempois- Longden line.	
73	117.4	ANGLEUR (AQUEMES)		Halt. On left, group of 27 sidings (100 yd.).
73	117.6	ANGLEUR		Rejoins Kinkempois line. Goods yard, SR (2 tracks), 40 sorting sidings. DT from North (Vise) enters from left, 4 through tracks, 7 PL on left. DT main line from South, Kin- kempois, enters from right, main line rejoins.

ROUTE No. 2

ANTWERP-AACHEN (via Hasselt and Tongres)

General details

1. Gauge: 1,435 m. (standard gauge).
2. Length: 143.8 km. (92½ miles).
3. From Antwerp (Central) to Charrière de Deurne (Municipal) a distance of 14.3 km. (8.9 miles) to Aachen (Aachen) 140.5 km. (87.3 miles).
4. From Charrière de Deurne to Aachen (Aachen) 140.5 km. (87.3 miles).
5. From Aachen (Aachen) to Aachen (Aachen) 140.5 km. (87.3 miles).

6. Curves: Minimum radii of curves 729 m. between Nivelles and Aachen.
 7. Traction: Steam.
 Electric: Antwerp (Central) to Chaussée de Bouxne.
 8. Maximum distance between stations: 7.3 km. (4½ miles) Hamm to Diepenbeek.
 9. Marshalling yards (MY):

BELGIUM			GERMANY		
Location	Max. capacity per 24 hours	Division	Location	Max. capacity per 24 hours	
Antwerp Nord	All of great capacity: over 3,000 wagons per 24 hours each	Köln	Aachen West	3,070 wagons	
" Antwerp West					
" Zurenborg					
" Séd					

10. Engine sheds (ES):

BELGIUM			GERMANY		
Location	Stabling capacity	Division	Location	Type	Stabling capacity
Antwerp Berchem	75 locom.	Köln	Aachen West	RH	c. 20-30 locom.
" Dam	140 "				
" Séd	70 "				
Hamm	70 "				

11. Watering facilities (W):

BELGIUM			GERMANY		
Location	Watering facilities		Location	Watering facilities	
Lierre	Tongres	No information available but adequate water supply assumed to exist, especially at all important stations.			
Diest	Vind-Haut				
Hamm	Montzen				

12. Favorable Points (marked by asterisk in Detailed Description of line):

- (a) Marshalling Yards and locomotive depot: Described in paras. 9 and 10.
 (b) Junctions at: Antwerp, Liège, Aarschot, Diest, Hamm, Elzen, Tongres, Vind-Haut, Montzen, Boussier, Aachen.
 (c) Bridges (see Bridge Schedule): Antwerp Central (viaduct), Km. 14.1, 15.4, 119.2, 120.2, 121.2, 124.2, 125.2, 125.4.
 (d) Tunnels (see Tunnel Schedule): Km. 117.2, between km. 125.2 and 125.4, 125.6 and 125.8.
 With reference to paras. (c) and (d) above (Bridges and Tunnels), it will be noted that until the line reaches Tongres there are no tunnels and few bridges of importance. From Tongres onwards the line crosses the Albert Canal and the River Meuse.

13. Capacity: 72 trains per day each way, of 300 tons net train load each.

Detailed description of line

Distance from Antwerp Miles	Distance from Antwerp Km.	Stations	Engineering works	Details and facilities
0	0	ANTWERP CENTRAL (For full description see p. 126)		For facilities see Route 1 and 4.
0.8	13.5	LIÈGE	Bridge over R. Petite Nette. Span 25 m. Steel bridge on masonry abutments; small embankments on both sides. (No. 24 of Bridge Schedule.)	For facilities see Route 4.
0.8	14.1			
9.9	15.4		Bridge over R. Grande Nette. Steel span 19.5 m. on masonry abutments; embankments on both sides. (No. 25 of Bridge Schedule.)	J. (facing) left with DT line to Herentals.
10	16.3	KLOOSTERHIDE		Halt.
12	20.4	BERLAER		Goods siding (34 w); Wh.
14	23.6	MELCAUWEN		Goods siding (19 w); Wh.
16	27.1	HEIST-OP-DEN-BERG		PL right (300 yd.); siding left; goods siding (46 w); SR; Wh.
18	29.3	HEIDE LEE		Halt.
19	30.2	MECHEREN		Halt.
19	31.0	BO. AMSTERDAM		Halt.
19	31.1			Goods siding (46 w); Wh.

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Distances from Antwerp		Stations	Engineering works	Details and facilities
Miles	Fm.			
22	33.6	BROUWERSWYK	..	Halt. J (trailing) left with ST line from Brouwerswyk.
24	37.1		..	
		AARSCHOT	..	Halt. J (facing) with DT spur line into Aarschot Station 8 km. to right. Track leaves left, bypassing Aarschot.
24	39.8		..	J (trailing) right with DT line from Aarschot.
25	40.8		..	
26	42	LANGBORG	..	Halt.
29	47.8	TRIEVELT	..	PL left (300 yd.). Goods siding (20 w); Wh.
31	50.7	SCHEN	..	2 sidings right (300, 200 yd.); goods sidings (40 w); W; Wh; light railway to Mch. Branch line single track to Montaigne to right, on which is bridge over R. Demer. 5.7 Montaigne Station; terminus; 4 tracks (300, 200, 200, 200 yd.); Tbl; goods sidings (17 w).
34	55.8	DIFT	..	4 platform tracks, goods sidings (20 w); SR; W; Wh. Line to Huppen to the left (this line leaves the present route as double track but is single track from Schaffen onwards). Single track line to Drimlinter to the right. Light narrow gauge railways to Louvain and to Courcel.
			Bridge over river (Zwartsbock); approach on each side.	
38	61.1	ZELHEM	..	Goods siding (25 w); Wh.
39	63.6	LEINCHEN	..	Goods siding (10 w); Wh.
			Bridge over Kleine Mangelbeck and R. Demer.	
40	65.8	SCHUTTEN	..	PL right (250 yd.); goods sidings (18 w); Wh.
43	69.1	SPALBEEK	..	Halt.
44	70.9	KERMP VILLAGE	..	Halt.
45	72.5	KERMP	..	PL left (300 yd.); goods sidings (20 w); Wh.
45	73.5		..	J (facing) left with spur line bypassing Hamelt.
48	77.4	HAMELT	..	DT line from North from Dutch frontier from left. 7 platform tracks. 8 carriage sidings on right. Goods siding (87 w); SR (2 tracks); Cr on left; Wh. ES (cap. 70 locos.); W; Tbl in triangle between 73.5 and 77.4. MV, cap. over 1,500 w per day, on right from J 73.5 km. to end of station. 10 arrival and departure sidings, two track hump, 16 sorting sidings in groups, 2 DES (sorting), single track line to St. Trond to the right. Single track, narrow gauge light railways to Haslen, Tongres, Bouvy-Leopold.
52	84.7	DIEPENBEEK	..	PL left (300 yd.); goods siding (20 w); SR; Wh.

RAILWAYS

Distances from Antwerp		Stations	Engineering works	Details and facilities
Miles	Km.			
55	88.8	BEVERST	..	Goods siding (18 w). ..
56	90.8		..	1 (faring) left with ST line to Maastricht.
57	92.1		..	1 (trailing) left with ST line from Maastricht. Triangle.
58	93.2	BLAREN	..	PL left 480 yd., right 660 yd. DES (34 w); SR; Wh. Narrow gauge light railway to Goesk and to Liège.
59	93.3	MOERVELT	..	Goods siding (47 w).
61	95.1	ALT MOERVELT	..	Halt.
61	95.4	S'HEEREN EKEREN	..	Halt.
64	103.6	TONGRES	..	ST line from St. Trond from right. 3 platform lines; 3 PL; goods sidings (112 w); SR; Cr (3 t); Tb; W; Wh. Narrow gauge light railways to Hasselt, Puits in Haut Clochar, Liège, Lanaken. DT line to Liège leaves to the left.
66	105.6		Bridge over road (length c. 40 m.)	
68	107.1		Bridge over line Tongres to Liège.	
69	110.6	OLONE HAUT	..	Halt. Goods siding (23 w). No SR.
			Bridge over gardens c. 120 m. long with embankment on West and cutting on East.	
69	111.6		Bridge over valley and road (c. 75 m. long).	
69	112.4	BONS	..	Halt.
			Bridge over valley (c. 75 m. long). One central pier.	
70	113.8	ROCHENOR.	..	Halt.
71	114.9	BAMENOR	..	PL left (770 yd.), right (870 yd.); DES (37 w); Wh. Narrow gauge light railways to Bilzen, Liège, Olone and Dutch frontier at Maastricht.
73	117.9		Tunnel c. 1,650 m. long.	
74	119.2		Bridge over Albert Canal road (c. 260 m. long); lattice girders with 4 piers on West side of canal; em- bankment approaches. (No. 26 of Bridge Schedule.)	
74	120.2		Bridge over R. Meuse and road. Several steel lattice girder spans; total length c. 340 m. (No. 27 of Bridge Schedule.)	
75	121.2		Bridge over DT line Liège- Maastricht, DT line Viè- Montzen and siding (length c. 40 m.). (No. 28 of Bridge Schedule.)	
75	121.8	VIÉ-HAUT	..	4 platform lines; 3 PL; 2 short sidings left. DT spur to Liège turning sharply to the left to bridge at 112.2 (triangle). ES (10 en- gines); TB; W in triangle. DT spur line from Liège from left triangle.
76	123.7		..	..
77	124.0		Viaduct over river, road, and fields c. 100 m. long. (No. 29 of Bridge Schedule.)	

RAILWAYS

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<i>Distance from Aachen</i> Miles Km.	<i>Stations</i>	<i>Engineering works</i>	<i>Details and facilities</i>
78 126.9	VADRAC	..	PL left (840 yd.), right (840 yd.); DES (19 w).
81 130.9	FRANZ ST. MARTIN	..	PL left (730 yd.), right (640 yd.); DES (34 w); Wb.
84 135.6	REMERDAEL	..	PL left (730 yd.), right (640 yd.); DES (33 w).
84 136.3		Tunnel 2,483 m. long. Bridge over river and valley; low viaduct (c. 400 m. long) probably masonry, 14 arches; embankment ap- proaches. (No. 30 of Bridge Schedule.) Tunnel 770 m. long.	J (trailing) right with ST line from Battice.
85 138.9		..	..
85 139		Line crossed by bridge carry- ing ST line from Battice to Montzen.	..
85 139.1	HUNDL	..	..
87 141.1	MONTZEN	..	MY (cap. 1,500 w pop day). Separate up and down yards, each of about 80 arrival sidings train length (c. 750 yd.), two track hump and from 30 to 30 sorting sidings c. 600 yd. long, which latter are not all in use. Goods siding (303 w); SR c. 1.4; Wb; W; Tbl; centre of MY accessible from arrival and sorting sidings both sides. DT spur line to join double track line to Herbesthal to right.
89 143.8		Viaduct—steel girder steel spans on high concrete piers over valley and over line to Herbesthal—length c. 1,100 m. (No. 31 of Bridge Schedule.)	J (facing) right with DT main line to join Herbesthal-Aachen line.
89 144		..	..
91 147.1	BOTTELAR	..	DT main line from Herbesthal- Plombières enters station from left; PL left (700 yd.), right (700 yd.).
GERMAN FRONTIER			
92 148.8	AACHEN WEST	..	For facilities see Route 3. DT cir- cular line from Aachen Central continues to the North to Mün- chen-Gladbach (Route 7). At 4 km. north of Aachen J for Mar-tricht. ES roundhouse (c. 20-30 locos.).

ROUTE No. 3 AACHEN-KOLN (via Duren)

General details

1. Gauge: 1,433 m. (standard gauge).
2. Length: 78 km. (48 1/2 miles).
3. Track: Double.
4. Maximum permissible axle load: 20 metric tons.
5. Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
6. Curves: No information available.
7. Tunnels: Six in this route.
8. Aachen to Duren: 100 km. (60 miles) between Duren and Aachen.

9. *Marshalling yards (MY):*

Division	Location	Max. capacity per 24 hours
Köln	Köln Gerson	2,000 wagons
	Aachen West	3,000 "
	Stolberg	2,000 "
	Düren	"

10. *Engine sheds (ES):*

Division	Location	Type	Stabling capacity
Köln	Köln Betriebsbahnhof		Up to c. 20 locos.
	Köln-Gerson	RH	c. 20-30 "
	Aachen Hbf.	RH	c. 20-30 "
	Aachen West	RH	c. 20-30 "
	Aachen-Rothe Erde	RH	c. 20-30 "
	Düren	RH	c. 20-30 "
	Stolberg Hbf.	RH	c. 20-30 "

11. *Watering facilities:* No information available, but adequate water supply assumed to exist especially at all important stations.

12. *Valuable points (Marked by asterisk in Detailed Description of line):*

- (a) *Marshalling yards and locomotive depots:* Described in paras 9 and 10.
 (b) *Junctions at:* Aachen, Stolberg, Düren, Lövenich and Köln (Cologne).
 (c) *Bridges (see Bridge Schedule):* Km. 36.4.
 (d) *Tunnels (see Tunnel Schedule):* Between km. 12.2 and 16.8, km. 16.8 and 20.2, km. 59.3 and 64.3.

13. *Capacity:* 72 trains per day each way, of 500 tons net trainload each.

Detailed description of line

Distance from Aachen	Stations	Engineering works	Details and facilities
Miles Km.			
0	AACHEN-WEST	..	MY (3,000 w daily). ES (roundhouse type), c. 20-30 locos.; Tbl; Wb (50 t); Cr (40 t).
1 1/2 2.8	AACHEN CENTRAL (Hauptbahnhof)	..	3 island platforms with 10 platform faces; Wb (40 t); SER; Cr (5 t); ES (roundhouse type) c. 20-30 locos.
		Bridge over narrow gauge, light or tramway line. Bridge over narrow gauge, light or tramway line.	
3 4.8	AACHEN-ROTHE ERDE	..	Wb (40 t); SER; Cr (5 t); ES (radial tracks partly covered); cap. c. 20-30 locos.; Tbl. J (facing right with ST line to Walheim).
		Bridge over narrow gauge, light or tramway line.	
		Bridge over ST line to Haaren.	J (facing right with ST line to Haaren).
7 1/2 12.2	EILENDORF	Bridge over river. Tunnel, length 727 m. Bridge over ST line from Würselen and Mariadorf.	Wb (40 t); Cr (7.5 t).
10 16.8	STOLBERG Hbf	..	Wb (50 t); SER; Cr (7.5 t); ES (roundhouse) (c. 20-30 locos.); Tbl; MY (c. 2,000 w per day). J (trailing) right with DT line from Walheim. J (trailing) right with ST line from Würselen. J (facing) with ST line to Jülich.
		Bridge over ST line to Jülich. Bridge over R. Inde. Tunnel, length 255 m.	
12 20.2	ESCHWATER Hbf	Bridge over river. Bridge over ST narrow gauge or light railway to Jülich.	Wb (40 t); SER; Cr (7.5 t).
14 22.2	NÜLLINGEN		

Distance from Aachen		Stations	Engineering works	Details and facilities
Miles	Km.			
17½	28.2	LANGENWESIK	Bridge over river. Bridge over ST narrow gauge or light railway to Landerdorf.	SER; Cr (7.5 t).
*22½	36.4		Bridge over R. Roer (2 tracks), length 78 m. (No. 32 of Bridge Schedule.)	J (trailing) right with ST line from Heimbach.
*23½	37.9	DÜREN	Line crossed by overbridge carrying ST narrow gauge or light railway to Rösdorf and Merzenich. Bridge over river.	Wb (50 t); SER; Cr (12 t); E4 (roundhouse type) (c. 20-30 engines); Tbl; MY (auxiliary). J (facing) left with ST line to Jülich. J (facing) right with DT line to Lunkirchen.
29½	48	BUM	Bridge over river.	J (facing) left with DT line to Grevenbroich and Neuss (Route 8).
34½	55.7	SINDORF	Bridge over river. Bridge over R. Echl. Bridge over ST line Bergheim-Liblar.	Wb (40 t); SER.
35½	57.3	HORREM	Tunnel, length 1,620 m.	Wb (40 t); SER. J (trailing) left with ST spur from Bergheim.
40	64.3	GRAN-KÖNIGSDORF		Wb (40 t); SER.
*42½	68.5	LÖVENICH	Line crossed by overbridge (flyover) carrying ST spur line from Double line Köln-Bocklemund—Köln-Ehrenfeld to join present route.	J (trailing) left with DT from Rheydt (Route 4). J (facing) left with access line to Köln-Ehrenfeld. Güterbahnhof (goods station) with 40 main lines. J (trailing) right with ST loop connecting double line from Köln-Bocklemund.
			Bridge over road. Bridge over ST line from Köln-Bickendorf to Müngersdorf.	
			Bridge over DT line from Köln-Bickendorf to Köln-Melaten and Benzelrath.	J (trailing) left with line from Köln-Bickendorf.
			Bridge over Maarweg Street. Bridge over Jägerstrasse. Bridge over Venloerstrasse. Bridge over street.	
*46	74.4	KÖLN-EHRENFELD	Bridge over Subbelratherstrasse. Bridge over Herkulestrasse.	Wb (30 t); SER; Cr (15 t). J (facing) left with DT line to Köln-Nippes. J (facing) right with DT line to Köln West passing under present route from left to right (flyover).

RAILWAYS

Distance from
Aachen
Miles Km.
45 74.4

Stations

Engineering works

Details and facilities

Bridge *c.* 3 arch masonry
or reinforced concrete.
Span plate girder bridge.
Span plate girder bridge.

Bridge—1 metal span.
Bridge—1 span braced gir-
der; through or semi-through
type.
Line crossed by overbridge
carrying one track of Köln-
Hbf, Köln-West DT.
Through or semi-through
braced-girder span.

Route now divides into 2 separate
ST lines. *Left-hand track* crosses
road by bridge then crosses multiple
track Köln-Nippes to Köln Hbf
line by plate girder bridge, then
skirts North and East side of
Betriebsbahnhof, and main ES
area; joined by ST spur from
Köln-Nippes from left and crossing
road by plate girder bridge, then
rejoins route before bridge over
Maybach Strasse.

Right-hand track crosses road by
metal bridge, then crosses DT line
Köln-Nippes to Köln-West by
bridge, then passes under 1 track
of DT Köln-Hbf to Köln-West line
and is joined by multiple-track line
from Köln-Nippes from left; line
then skirts West side of Betriebs-
bahnhof and main engine area,
then is joined by second track of
double line Köln Hbf to Köln-
West. Line rejoins other track of
present route before bridge over
Maybach Strasse.

KÖLN BETRIEBSBAHNHOF
(Gereon Bahnhof—
Goods.)

ES; semi-roundhouse (cap. up to
20 locos.); Tbl behind ES; storage
sidings and carriage sheds.
MY (cap. 2,000 w per day).
Line consists of six running tracks.

Bridge over Maybach Strasse.
Bridge over Hansa Ring
(plate girder type).
Bridge over Gereons Wall.
Bridge over Plankgasse.
Bridge over Eintracht Strasse.
Bridge over Sals-Magazin
Strasse.
Bridge over Eigelstein Strasse.

48½ 78 KÖLN HAUPTBAHNHOF

PL 9 tracks running through
station served by similar number of
platforms under single-arched roof
span.

ROUTE No. 4

. ANTWERP-KÖLN (via ROERMOND, RHEYDT and GREVENBROICH)

General details

1. Gauge: 1.435 m. (standard).
2. Length: 209.5 km. (130 miles).
3. Tracks: Antwerp (Central) to Chaussée de Deurne—Multiple (2 electrified).
Chaussée de Deurne to Moll—Double.
Moll to Hamont—Single.
Hamont to Köln—Double.
4. Maximum permissible axle load: Antwerp-Dutch Frontier (Hamont)—20 met. tons.
Hamont-German Frontier (Vlodrop)—16 met. tons.
German Frontier-Dalheim—17 met. tons.
Dalheim-Rheydt—18 met. tons.
Rheydt-Köln—20 met. tons.
5. Gradients: Maximum gradient in Belgium 6 per mille.
6. Curves: Minimum radius of curves in Belgium 450 m.
7. Traction: Steam.
Electric from Antwerp (Central) to Chaussée de Deurne.
8. Approximate distance between stations: Belgium 124 km. 4 miles. Châtelet-Millegem.
Hamont 104 km. 64 miles. Châtelet-Millegem.
Châtelet-Millegem 104 km. 64 miles. Châtelet-Millegem.

9. *Marshalling yards (MY):*

BELGIUM			GERMANY		
Location	Max. capacity per 24 hours	Division	Location	Max. capacity per 24 hours	
Antwerp Nord	All of great capacity; over 3,000 wagons per 24 hours	Köln	Köln-Gereon	2,100 wagons	
" Austruweel					
" Zurenborg					
" Klei					
" Süd					
Montzen	Over 1,500 wagons				

10. *Engine sheds (ES):*

BELGIUM			GERMANY		
Location	Stabling capacity	Division	Location	Type	Stabling capacity
Antwerp Berchem	75 locos.	Köln	Köln Hbf.		
" Dier	140 "		Köln Gereon	RH	up to c. 2 locos.
" Süd	70 "		Rheydt	RH	up to c. 20-30 locos.
Moll	12 "				
HOLLAND					
Roermond					

11. *Watering Facilities (W):*

BELGIUM			GERMANY		
Antwerp Central	Herenthals		No information available, but adequate water supply assumed to exist, especially at all important stations.		
Lierre	Moll		HOLLAND		
			Budel, Roermond.		

12. *Valuable Points (marked by asterisk in Detailed Description of line):*

- (a) *Marshalling Yards and Loco. Depots*—described in paras. 9 and 10.
 (b) *Junctions at:* Antwerp, Lierre, Herenthals, Moll, Noerpel, Weert, Roermond, M. Gladbach, Rheinlanden, Rheydt, Grevenbroich, Cologne (Köln).
 (c) *Bridges (see Bridge Schedule):* Antwerp Central (viaduct), Km. 14.1, 27.4, 33.8, 54.2, 76.2, 93.9 and 115.1.

Capacity: Single track section, 20 trains of 500 tons net train load each, per day each way.
 Double track sections, 60 trains of 500 tons net train load each, per day each way.

Detailed description of line

Distance from Antwerp		Stations	Engineering works	Details and facilities
Miles	Km.			
0	0	ANTWERP (Central) (For full description see p. 126)	On Viaduct.	10 platform lines, carriage sidings. W. Tbl. ES in triangle near Berchem. J (facing) left with DT line to Chaussée de Deurne. J (facing) right with electric line to Malines.
1½	2.0	BERCHEM		Passenger station; 6 platform lines. 6 tracks continue to Mortsel, electric line West, steam Brussels' lines centre, Lierre lines East; crossovers both ways between centre and Lierre lines—4 tracks now leave electric lines.
2½	3.5	MORTSEL	Line crossed by overbridge carrying DT spur from Boom-Lierre line.	Goods siding (5½ w). Wb. J (trailing) right to Luythayen.
2½	4.0			J (trailing) left with DT to cross over Antwerp-Lierre to left; 4 tracks (Antwerp-Brussels and Antwerp-Lierre lines) continue side by side. J (trailing) right with DT line to Boom.
3	4.9			J (facing) right with DT line to Brussels. Lines again diverging line from Antwerp to Chaussée de Deurne and Klingshaan
3½	6.0			Hbf.
4½	6.7	LIERRE		Pl. right road. PLS 31 w.
5½	7.4	BOOM		Hbf.
6½	8.1	NOERPEL		
7½	9.0	WEERT		
8½	10.0	ROERMOND		

Distance from Antwerp		Stations	Engineering works	Details and facilities
Miles	Km.			
*8½	13.5	LEERNE	...	ST line from Craich from right; 4 platform tracks, LS and DES (75 w). SR. Cr (10 t). Tbl. W. Narrow gauge light railways to Antwerp, Boom, Malines, Aerschot, Turnhout. E.S.
*8½	14.1		Bridge over R. Petite Nethe—span 25 m. Steel bridge on masonry abutments, small embankments on both sides (No. 24 of Bridge Schedule.)	
9½	15.4			J (facing) right with DT main line to Aerschot.
9½	15.5	KERSEL	..	LS (26 w). SR.
11½	18.5	NYLEN	..	LS (29 w). SR.
15	24.0	BOUWEL	..	DES (58 w). SR. Narrow gauge light railway to Malines and Turnhout.
*17	27.4	●	Bridge over Albert Canal. Length c. 156 m. (No. 33 of Bridge Schedule.)	
*18½	30.1	HERENTHALE	..	ST line from Aerschot from right; 4 platform tracks; DES (49 w). SR. Cr. Tbl. W. Narrow gauge light railway to Aerschot and Turnhout.
			Site of former bridge over Scheldt-Meuse Canal. Destroyed May, 1940, canal filled up.	
19	30.8		2 bridges over R. Petite Nethe, small span.	
19½	31.1			J (facing) left with ST line to Turnhout and the Dutch Frontier at Baarle Naam. Line crossed by narrow gauge light railway, Aerschot-Turnhout.
20½	32.7		Small span bridge over R. Petite Nethe.	
20½	33.3		Bridge over road.	
*21	33.8		Bridge over Scheldt-Meuse Canal—no details available, but estimated to be c. 50 m. long. (No. 34 of Bridge Schedule.)	
22½	36.0	OOLEN	..	DES (15 w). Wb.
24½	39.3	LARUM	..	Halt.
26½	42.3	GHREL	..	PL right (400 yd.). DES (38 w). SR. Factory siding. Wb. Narrow gauge light railway to Malines and Turnhout.
30	48.5	MILLENGHEM	..	Halt.
*31½	51.3	MOLL	..	8 loops and sidings left (600, 500, 500, 400, 380, 300, 280, 280 yd.); 2 LS right (550 yd.); DES (68 w). SR. W. Tbl. Wb. ES (cap. 12 locos.).
32½	52.0			Standard gauge light railway to Turnhout, narrow gauge to Silheim.
32½	52.1			J (facing) right with DT line to Hasselt.
33½	54.0		Bridge over road.	
*34½	54.9		Bridge over Turnhout Canal—span about 20 m. Destroyed in May, 1940. (No. 35 of Bridge Schedule.)	
37½	60.3	HEERLEN		Glass factory, factory village.

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Distance from Antwerp		Stations	Engineering works	Tracks and facilities
Miles	Km.			
35½	56.9	ERIKAN WETZEL	...	2 PL right (600 yd.). DES (50 w). SR.
37	59.8		Bridge over road.	
37½	60.1		Bridge over Bourg-Loupold Canal, span c. 16 m.—no further details available.	
37½	60.9	ERIKAN (Factory)	..	Factory sidings—sine works.
38½	62.6	LOMMEL (Factory)	..	Factory sidings—sine works.
41	66.0	LOMMEL	..	2 PL right (550 yd.). DES (28 w).
44	70.8	OVERPELT (Factory)	..	Factory sidings to sine works and sawmill factory.
44½	72.2		Bridge over narrow stream —Helvenches Beck.	
45½	73.7	OVERPELT	..	Village stop.
*46½	75.0	NEERPELT	..	ST line right from Hasselt. 3 PL and LS right (550, 440, and 350 yd.). LS left (220 yd.). DES (77 w). SR.
47	75.8		Bridge over Hamont-Noer- pelt road.	
*47½	76.2		Bridge over Schelde-Meuse Canal—span c. 16 m. Des- troyed May, 1940. Reported replaced by temporary span. (No. 36 of Bridge Schedule.)	
48	77.1		..	ST line left to Dutch Frontier and Eindhoven.
48½	78.6		Small span bridge over irri- gation canal.	
49½	79.7	LILLE ST. HUBERT	..	PL. DES (26 w). Wb.
51½	83.1	HAMONT	..	8 PL and LS left (580, 580, 580, 630, 520, 480, 480, 350 yd.). PL right. DP (39 w). SR. Cr (5 t). WB.
52	83.7	BELGIAN-DUTCH FRONTIER		
52½	84.7	BEDEL	..	6 PL and LS left. W. Tbl.
*52½	83.9		Bridge over Zuid Willems- vaart Canal, a parallel steel lattice girder spans on con- crete and masonry abut- ments. (No. 37 of Bridge Schedule.)	
*59½	95.5	WEERT	..	LS left and right. DES right.
63	101.7		Bridge (DT) over Welsen Mederweert Canal.	
64½	103.7	KELPEN	..	DES left. LS right.
67½	108.2	BAKSEM-HEIJTHUIZEN	..	DES left. LS right.
			Bridge over tramway or light railway from Deurne to Vlodrop.	
70½	113.7	HARLEN	..	DES left. LS right.
*71½	115.1		2 ST (?) bridges over R. Maas. (No. 38 of Bridge Schedule.)	
*71½	119.6	ROERMOND	..	J. (trailing) left with ST line from Geldern. 10 LS and DES right. ES. J. (leading) right with DT line to Maastricht and Aachen. J. (leading) right with light railway to Mookwijk.

RAILWAYS

Distance from Antwerp		Stations	Engineering works	Details and facilities
Miles	Km.			
78	125.6	HAARENBOOM	..	2 DES left. LS right.
80 1/2	132.8	VLODDROP	..	6 LS left. 2 DES right.
83	133.4		DUTCH-GERMAN FRONTIER	
83 1/2	134.5	DALMEIN	..	J (trailing) right with ST line from Heel and Jülich.
85	136.7	ASSENACK	..	SER. Wb (40 t). Cr (6 t). Halt.
85 1/2	137.5		Road overbridge.	
86 1/2	142.1		Road overbridge.	
88 1/2	142.6		Bridge over road.	
88 1/2	142.7	WESBERG	..	SER. Wb (35 t).
89	143.2		2 Bridges over road.	
91	146.5	GENHAUSEN	..	Halt. SER. Wb (30 t).
92 1/2	148.6	M. GLADBACH RHEIN-DALEN	..	SER. Wb (30 t). J (facing) left with DT line to Hottensheim.
93 1/2	150.2		2 Bridges over road.	
93 1/2	150.4	GÜNNHOVEN	..	Halt.
94 1/2	151.6		(?) overbridge carrying DT line from (?) factory.	(?) J (facing) left. J (trailing) right with DT line from Aachen.
			Bridge over road.	
			Bridge over road.	
				J (facing) right with ST line to Jülich.
				J (facing) left with DT line to Krefeld (Route 7 to M. Gladbach).
96 1/2	154.9	RHEYDT VRS.	..	SER. Cr (6 t). J (trailing) right with ST line to Jülich.
97	156.1	RHEYDT	..	Wb (40 t). SER. Cr (30 t). MFY (2,500 wagons per 24 hours). ES (RH type with 2 Tbls) (cap. 20-30 locos). J (triangular) right with DT to Aachen (Route 7).
99	159.1	ODENKIRCHEN	..	SER. Wb (40 t).
			Bridge over river.	
102	164.0	HOCHNEUKIRCH	..	SR. Wb (40 t). Cr (5 t). J (facing) right with ST line to Jülich.
103 1/2	167.2	JÜCHEN	..	SER. Wb (40 t).
106	170.9	GÜNNERATH	..	J (trailing) left with DT line from Neuss (Route 8).
108 1/2	174.6	GREVENBROICH	..	SER. Wb (40 t). Cr (5 t).
			Bridge over tributary of R. Ertt.	
				J (facing) right with DT line to Düren (Route 8).
110 1/2	178.4	ERTWERK	..	Station for traffic to and from Ertwerk Works only.
112 1/2	181.0	ÜCKEN	..	SER. Wb (40 t).
			Bridge over tributary of R. Ertt.	

Distance from Antwerp		Stations	Engineering works	Details and facilities
Miles	Km.			
115½	185.9	REIMERSMAKERSHOF	..	SER. Wb (40 t). J (facing) right with ST line to Borgheln.
119½	190.4	SECOMMELEN	..	SER. Wb (40 t).
120½	194.4	PULDERM	..	SER. Wb (40 t).
124½	200.4	KÖLN-ROCKENBURG	..	SER. J (facing) right, with ST line pass- ing under E.T. from Aachen to join present route (Byover).
			Line crossed by Byover car- rying DT line from Aachen. Bridge over road.	J (trailing) right with DT line from Aachen. J (facing) left with access line to Köln-Ehrenfeld Güterbahnhof. (Goods station with 20 main tracks.)
			Bridge over road. Bridge over ST line from Köln-Nickendorf to Köln- Meinam and Bensebrath.	J (trailing) left with line from Köln-Nickendorf.
			Bridge over Maarweg Strasse. Bridge over Jäger Strasse. Bridge over street.	SER. Wb (30 t) Cr (15 t). Köln-Ehrenfeld Goods Station has 20 main tracks.
128½	205.9	KÖLN-EMMERFELD	..	J (facing) left with DT line to Köln-Nippes. J (facing) right with DT line to Köln West passing under present route from left to right.
			Bridge over Subbelrather Strasse. Bridge over Herkules Strasse.	Present route now divides into 2 separate ST lines. Left-hand track crosses road by 3 arch masonry or reinforced con- crete bridge, then crosses multiple track Köln-Nippes to Köln Hbf (1 span plate girder).
			Line crossed by Byover bridge, carrying over DT line to Köln West. Bridge carrying left-hand track of present route over road (3 arch masonry or reinforced concrete).	Right-hand track crosses road by metal bridge then crosses DT line Köln-Nippes to Köln West by braced girder bridge, then passes under 1 track of DT Köln Hbf to Köln West and is joined by multiple track from Köln-Nippes from left. Line then starts West side of Bettendorfbahnhof and main engine area, and is then joined by second track of DT Köln Hbf to Köln West line then crosses road by bridge over Maybach Strasse.
			Bridge carrying left-hand track of present route over road (1 span plate girder).	
			Bridge carrying left-hand track of present route over road (1 span plate girder).	
			Bridge over road (1 metal span) carrying left-hand track.	
			Bridge carrying right-hand track over DT of present route Köln-Nippes to Köln West (1 span braced non under through or semi- through type).	

RAILWAYS

Distance from Antwerp Miles Km.		Stations	Engineering works	Details and facilities
		Köln (Hauptbahnhof)		ES (half KII—capacity up to 20 locos). Tld; also Tld behind ES, numerous sidings (storage) and extensive carriage sheds.
		Köln (Gare)	Bridge over Maybach Stream. Bridge over Hanna Ring (plate girder type). Bridge over Gereons Wall. Bridge over Plankmann. Bridge over Elstracht Stream. Bridge over Salsengasse Stream. Bridge over Eigelstein.	MY (capacity 2,500 wagons per 24)
130	209.5	Köln Hauptbahnhof		Pl. 9 tracks running through station served by similar number of platforms under single-arched roof span. ES.

ROUTE No. 5 KÖLN-KOBLENZ (via BONN)

General details

- Gauge: 1'435 m. (standard gauge).
- Length: 90.5 km. (56½ miles).
- Track: Double.
- Maximum permissible axle load: 20 metric tons.
- Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
- Curvature: No information available.
- Traction: Steam throughout.
- Maximum distance between stations: 6.4 km. (4 miles). Bonn to Bad Godesberg.
- Marshalling yards (MY):

Division	Location	Max. capacity per 24 hours
Köln	Köln Eifelhof	6,000 wagons
	Koblenz (Lutzel)	2,500 "

10. Engine sheds (ES):

Division	Location	Type	Capacity
Köln	Köln-Hbf.	Rect.	Over 30 locos.
	Köln-Eifelhof	RH	
	Koblenz-Lutzel	RH	
	Bonn		Up to c. 20 locos.

11. Watering facilities (W): No information available, but adequate water supply assumed to exist especially at all important stations.

12. Vulnerable points (marked by asterisk in Detailed Description of line):

- Marshalling yards and loco depots: Described in paras. 9 and 10.
- Junctions at: Köln (Cologne), Kalcheuren, Bonn, Sinzig, Urmitz, Koblenz (Coblenz).
- Bridges: Between km. 83.9 and 88.7, and between 88.7 and 90.5.

13. Capacity: 72 trains per day each way, of 500 tons net train loads each.

Detailed description of line

Distance from Antwerp Miles Km.		Stations	Engineering works	Details and facilities
20	0	Köln Hauptbahnhof		Pl. 9 tracks running through station served by similar number of platforms under single-arched roof span. ES. Line runs North-West.
			Bridge over Eigelstein Stream. Bridge over Salsengasse Stream.	

Distance from
Köln
Miles Km.

Stations

Engineering works

Details and facilities

Bridge over Elzentracht Strasse.
Bridge over Plankgasse.
Bridge over Corona Wall.
Bridge over Hanna Ring
(plate girder type).
Bridge over Maybach Strasse.

Line turns West.
J (facing) right to ES and Köln-Nippes.

1 track crosses over Köln-Hbf to Köln-Nippes line by through or semi-through braced girder span bridge.

J (trailing) right from Köln-Nippes and Köln-Rheinfeld.
Line runs South-West.
J (trailing) left with DT line from Caroon goods station.

9½ 3.5 KÖLN-WEST

Bridge over Gladbacher Str.

PL. J (facing) left with DT line to Siegburg.

9½ 3.6 KÖLN-SÜD

..

J (trailing) left with DT line from Siegburg.

KÖLN-EVILTON

..

SER. Wb (40 t), Cr (15 t), ES (Rect. cap. over 30 locos.), MY (Cap. 6,000 w per day).

J (facing) right with ST line to Hermulheim.

J (trailing) right with ST line from Hermulheim.

9½ 11.8 KALSCHREUTHEN

..

SER; Wb (40 t).

J (trailing) right with DT line to Euskirchen.

J (trailing) right DT from Euskirchen.

J (trailing) right ST from Vorheim.

Bridge over stream.

J (facing) right ST to Vorheim.

Bridge crossed by overbridge carrying branch line Vorheim to Wesseling.

10½ 17.0 BRÜHL

..

SER; Wb (40 t); Cr (15 t).

Bridge over stream.

Bridge over tramway.

..

SER; Wb (30 t).

13½ 21.9 SEETHEN

..

SER; Wb (30 t).

17½ 28.1 RONDORF

..

Bridge over stream and road and ST line Bonn to Köln.

J (trailing) right with DT line from Bonn to Euskirchen.

21½ 23.3 BONN

..

SER; Wb (30 t); Cr (12 t); ES Roundhouse (cap. up to 20 locos.).

23½ 40.7 BAD GODENBERG

..

SER; Wb (30 t); Cr (2 t).

26½ 43.0 MEHLEN

..

SER; Wb (33 t).

29½ 47.7 ROLANDSECK

..

SER.

31½ 50.4 OBERWINTER

..

PL.

34½ 53.0 REMAGEN

..

SER; Wb (30 t); Cr (5 t).
J (facing) right with DT branch to Dürenfeld.
J (trailing) left with DT line from Köln via Unkel.

Bridge over stream.

36½ 59.0 SINZIG

..

SER; Wb (33 t); Cr (5 t).

40½ 64.8 NIEDERBREIBERG

..

Wb (33 t); Cr (5 t).

42½ 68.0 BROHL (BAD TONNUTZEN)

..

SER; Wb (33 t); Cr (5 t).

Line crossed by overbridge carrying light railway Brohl to Kempenich.

Distance from Köln		Stations	Engineering works	Details and facilities
Miles	Km.			
44½	71¼	NAMEN	..	PL.
47	75½	ANDERNAH	Line crossed by dyover carrying DT branch line to Mayen. Bridge over river.	SEB; Wb (40 t); Cr (3 t).
49½	79½	WERNTHURN	..	SEB; Wb (40 t); Cr (3 t).
*52½	83½	URBACH	..	SEB; Wb (40 t). J (trailing) left with DT Köln-Koblenz via Ling.
..	..	..	Line crossed by overbridge carrying main line Köln to Koblenz via Ling.	J (trailing) right ST branch Koblenz to Mayen.
*55	88½	KOBLENZ-LÜTZEL	..	PL; SEB; Wb (40 t); Cr (15 t); MY (2,600 w daily).
..	..	..	Bridge over R. Moselle.	J (facing) right with DT line to Trier. J (trailing) right with DT line from Trier.
*56½	90½	KOBLENZ Hbf.	..	PL; SEB.

ROUTE No. 6
KÖLN-COBLENZ (via LINZ)

General Details

1. Gauge: 1,435 m. (standard gauge).
2. Length: 98.6 km. (61½ miles).
3. Track: Double.
4. Maximum permissible axle load: 20 metric tons.
5. Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
6. Curves: No information available.
7. Traction: Steam throughout.
8. Maximum distance between stations: 6.6 km. (4 miles). Rheinbrohl to Leutesdorf.
9. Marshalling yards (MY):

Division	Location	Max. capacity per 24 hours
Köln	Köln-Kalk Nord Köln-Deutz	4,500 wagons

10. Engine sheds (ES):

Division	Location	Type	Stabling capacity
Köln	Köln Hbf.	..	..
..	Neuwied	RH	Up to 20 locos.
..	Köln-Kalk	RH	Over 30 locos.
..	Köln-Deutz	Rect.	Over 30 locos.
..	Engers	RH	c. 20-30 locos.
..	Linz	..	..

11. Watering facilities: No information available, but adequate water supply assumed to exist at all important stations especially.
12. Vulnerable points (marked by asterisk in Detailed Description of line):
 - (a) Marshalling yards and locomotive depots: Described in para. 9 and 10.
 - (b) Junctions at: Köln (Cologne), Troisdorf, Km. 49.3, Linz, Neuwied, Engers, Koblenz (Coblenz).
 - (c) Bridges (see Bridge Schedule): Km. 0.3, 30.4, between km. 78.2 and 80.1, km. 96.3.
 - (d) Tunnels (see Tunnel Schedule): Km. 93.7.
13. Capacity: 71 trains per day each way, of 500 tons net train load each.

Detailed description of line

Distance from Köln		Stations	Engineering works	Details and facilities
Miles	Km.			
0.0	0	KÖLN HAUPTBAHNHOF	..	PL: 3 tracks running through station served by similar number of platform under single arched roof. EN.
0.1	0.3		Bridge over Frankgasse. Bridge (Hohensollersbrücke) over R. Rhine (4 tracks). (No. 39 of Bridge Schedule.)	
0.1	1.2	KÖLN-DEUTH	..	ES (rectangular) (cap. over 30 locos.) 2 Tbl. MY.
			Line crossed by overbridge carrying DT from Köln-Mülheim to main line Köln Hbf to Koblenz via Line (present line).	J (facing) left with multiple track line to MY and Köln-Mülheim. J (facing) right DT to Köln-Mülheim. J (facing) right DT to MY.
			Line crossed by overbridge carrying road Deum-Mülheim Strasse. Bridge over DT line to Köln-Mülheim. Line crossed by bridge carrying Haupt Strasse. Line crossed by bridge carrying Reishover Strasse.	
0.1	2.6	KÖLN-KALK	..	MY (cap. 4,500 wagons per day) at Kalk Nord. ES, RH (cap. over 30 locos.) at Kalk Nord. J (trailing) right DT from Köln-Bonnster.
			Line crossed by overbridge carrying DT from Köln-Bonnster to Köln-Kalk Nord MY. Line crossed by overbridge carrying multiple track line from Gremberg MY to Kalk Nord MY.	J (facing) right with ST line to Raurath. J (trailing) left with ST line from Kalk Nord MY. ST line for 2,000 m.
3.1	6.2	GREMBERGHOVEN	..	Passenger only. J (trailing) right with DT line from Mülheim and Gremberg MY. J (trailing) right with line from Gremberg MY.
			Bridge over road.	
			Bridge over road.	
6.1	9.9	FORZ-URBACH	..	SER. Wb (330).
			Bridge over road.	
			Bridge over road.	
8.1	13.8	WALN	..	ES SER; Wb (300)
			Bridge over road.	
11.1	18.1	SPICH	..	Halt.
0.13	21.0	TRONISWOF	..	ES; SER; Wb (300); Cr (130); ES. Terminus of electric railway Siegen Zündorf. J (facing) left with ST line to Siegen.
14.1	22.4	TRONISCH WÄNDERS HALL	..	ER. Cr (30)

RAILWAYS

Distance from Köln		Stations	Engineering works	Details and facilities
Miles	Km.			
15½	25.1	MENDEN	Bridges over road.	
17	27.5		Bridges over stream Muh-	
17½	28.2		len Becken.	
18½	30.1	BRUEL	..	SER; Wb (30 t); Cr (3 t).
20½	33.1		..	J (trailing) right with line from cement works.
21	33.7	OSSENKAMP (Sieghrein)	..	SER; Cr (2 t); Wb (33 t).
22½	36.5	NIEDERDOLLENDORF	Bridge over road.	SER; Wb (33 t).
23½	37.4		Bridge over road.	
24	38.5	KÖNIGSWINTER	Bridge over road.	SER; Wb (33 t); Cr (3.5 t).
25½	41.1		..	Halt.
27	43.3	HONNEF	..	SER; Wb (30 t); Cr (3 t).
27½	44.8		Bridge over road.	
28½	45.9		Bridge over road.	
29½	47.0		Bridge over road.	
29½	47.4	UNKEL	Bridge over road.	SR.
30½	49.3		..	J (facing) left with line over Rhine to Remagen joining left bank route Köln-Kölnz.
31½	50.2	EPEL	..	SR.
32½	50.4		Line crossed by overbridge carrying Unkel-Remagen line.	J (trailing) left with DT line from Flammenfeld.
32½	51.9	..	Bridge over river.	
33	53.2	LINZ	..	SER; Wb (40 t); Cr (2 t); ES; KpS.
33½	54.5		Bridge over stream.	
			Bridge over line.	
			Bridge over stream (Leubsdorf Bach).	
34½	55.8	LEUBSDORF	..	Halt.
35½	57.7		Line crossed by overbridge carrying road.	
36	58	..	Line crossed by overbridge carrying road.	
			Bridge over road.	
37	59.5	..	Bridge over road.	
			2 bridges over roads.	
37½	59.9	HÖNNINGEN	..	SER; Wb (33 t); Cr (2 t).
			..	J (facing) left with line to Ehrenbreitstein.
39	62.8	REINBRÜHL	..	SR; Wb (33 t); Cr (3 t).
43	69.4	LEUTHDORF	..	
43½	69.7		Bridge over road.	
44	70.9		Line crossed by over-bridge carrying road.	
44½	72.1	FÜRSTLICH	..	
45½	73.6		Bridge over R. Wied 30 m. long.	
46	74.2	..	Bridge over road.	J (trailing) left with DT line from Augustenthal factory.
47	75.5	..	..	
47	75.8	NEUWIED	..	SER; Wb (30 t); Cr (3 t). Fac- tory siding. ES. J (facing) right to Rhine. J (trailing) left from ES. Small MY. J (facing) left with ST line to S. Simmerstein.

RAILWAYS

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Distance from Köln		Stations	Engineering works	Details and facilities
Miles	Km.			
48½	77.9		Bridge over road.	J (facing) left with L/F line across the Rhine to join main line Köln-Koblenz via Bonn.
48½	78.2		Line crossed by overbridge carrying DT line to Köln-Koblenz via Bonn. Bridge over ST line from Köln-Koblenz via Bonn	
49½	79.4			J (trailing) left with ST line from main line Köln-Koblenz via Bonn.
49½	80.1			
50½	81.1	Erbsen		SER; Wb (40 t); Cr (5 t). Factory sidings. EA (RH) capacity 20-40 locos.
51½	82.7		Bridge over Sayn Brücke. Bridge over road. Bridge over road.	J (facing) left with ST to Stier-shahn.
				J (trailing) right DT from Rhine.
52	83.8	BENROD		Wb (35 t).
53½	86.6	VALENDAR		SER; Wb (50 t); Cr (5 t).
57½	92.6	KOBLENZ- EHRNBREITSTEIN		
58½	94.2		2 bridges over Promenade. Bridge over Wendelinus Strasse.	
59	95		Bridge over Seitz Strasse.	J (facing) right to Horchheim Station and Frankfurt line.
59½	95.7		Tunnel (length c. 600 m.). Bridge over line Koblenz-Ehrenbreitstein-Koblenz-Horchheim.	J (trailing) left with main line from Rüdelsheim, Frankfurt, Ems and Giesen.
59½	96.3		Horchheim bridge over Rhine and railway (length c. 380 m.). (No. 40 of Bridge Schedule.) Bridge over Koblenz-Mainz line.	
61½	98.6	KOBLENZ HAUPTBAHNHOF		PL; SR.

ROUTE No. 52

KOBLENZ-FRANKFURT (via LIMBURG)

General Details

1. Gauge: 1.445 m. (standard gauge).
2. Length: 121.2 km. (75½ miles).
3. Track: Double.
4. Maximum permissible axle loads: 20 metric tons.
5. Gradients: No details available. Line follows valleys of rivers Rhine and Lahn to Limburg. Highest contour line (400 m.) at Idstein (81.5 km.).
6. Curvature: At 15.5 km.—Curve c. 400 m. radius inside river bend.
At 64.1 km.—Curve c. 330 m. radius length c. 300 m.
7. Traction: Steam throughout.
8. Maximum distance between stations: 6.9 km. (4¼ miles) between Obernhof and Lautenburg (Lahn).
9. Max. falling yards (MY):

Down	Up	Max. capacity per 24 hours
Köln	Koblenz (Mainz)	2,600 wagons
Frankfurt	Frankfurt-Main (Güterbahnhof)	2,700 "
	Frankfurt City	2,700 "

10. Engine shed (ES):

Division	Location	Type	Stabling capacity
Frankfurt	Limbürg	..	c. 25-30 locos.
"	Frankfurt	RH and Rect.	c. 90-120 "
Köln	Koblenz (Mosel)	RH	"
Mainz	Niederalhstein	Rect.	c. 10-15 "

11. Watering facilities (W): No information available, but adequate water supply assumed to exist, especially at all important stations.

12. Vulnerable points (marked by asterisk in Detailed Description of line):

(a) *Marshalling yards and locomotive depots:* Described in paras. 9 and 10.(b) *Junctions at:* Koblenz (Coblenz), Niederalhstein, Dies, Eschhofen, Frankfurt.(c) *Bridges (see Bridge Schedule):* Km. 2, 2.3, 6.4, 24.7, 43.4, 45.4, 47.2, 60.2, 96.7, 97.7, 103.5.(d) *Tunnels (see Tunnel Schedule):* Km. 10.8, 27.6, 29.7, 35.4, 40.6, 46.0, 92.1.

13. Capacity: 60 trains per day each way, of 400 tons net train load each.

Detailed description of line:

Distances from Koblenz		Stations	Engineering works	Details and facilities
Miles	Km.			
0	0	KOBLENZ	..	Main Passenger Station. MY 2,600 wagons per 24 hours. ES. J-for-lines (1) North to Köln, (2) West to Trier and Luxembourg, (3) South to Mainz, Wiesbaden, and Frankfurt via Bingerbrück (Route 54) and via Rüdeshelm (Route 53). Goods station on Trier line. SER; Wb (50 t), Cr (5 t). J (facing) left with DT SO line to Bingerbrück (Route 54).
1	0.8	..	..	..
1	0.7	..	Road over bridge	..
1	1.3	..	Bridge over railway.	Line passes over DT a.o. line to Bingerbrück (Route 54).
1	1.6	..	Bridge over arm of Rhine.	c. 110 m. long.
1	2.3	..	Bridge over Rhine and railway (Horchheim Bridge). (No. 4 of Bridge Schedule.)	380 m. long.
1	2.8	HORCHHEIMBRÜCKE	..	Line crosses DT line Köln-Rüdeshelm-Frankfurt.
2	4.3	..	..	J (facing) left with loop connection to DT a.o. line to Köln. Line turns South to run along right bank of Rhine.
2	4.6	NIEDERALHSTEIN	..	J (trailing) right with E a.o. line from Köln.
4	6.4	..	Bridge over R. Lahn.	ES rectangular (10-15 locos.); Tbl. J (facing) right with DT a.o. line Rüdeshelm-Frankfurt (Route 53). Line branches East and proceeds along course of Lahn.
6	10.0	FRIEDRICHSMÜHLEN	..	Skew. c. 400 m. long.
8	13.7	NIEVERN	..	J (trailing) right with loop connection to DT a.o. line Koblenz-Rüdeshelm-Frankfurt. (Route 53.)
9	15.5	EMS-LINDENBACH	..	..
10	17.3	BAD-EMS	..	Curve c. 300 m. radius inside river bend.
13	20.9	DAUSMAY	..	..
15	24.7	..	Bridge over R. Lahn.	..
15	25.2	NASSAU (LAHN)	..	..
16	26.8	..	Tunnel.	c. 300 m. long.
17	27.6	..	Tunnel.	c. 350 m. long. Line resumes open on left bank of river.
20	32.3	ORLASHOF	..	..
20	32.7	..	Tunnel.	c. 150 m. long.
22	35.4	..	Tunnel.	c. 150 m. long.

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Distance from Koblenz		Station	Engineering works	Details and facilities
Miles	Km.			
22½	36.4	LAURENBERG (LAHN)	Tunnel.	c. 700 m. long.
*25½	40.0			
26½	42.3	BALLAUWITZ		
*27½	43.4		Bridge over R. Lahn.	
*28½	45.4		Bridge over R. Lahn.	
28½	45.7	FACHINGEN (LAHN)		
*28½	46.0		Tunnel.	c. 500 m. long.
*29½	47.2		Bridge over R. Aar.	
*29½	48.0	DIEZ		J (facing) right with ST s.o. line Wiesbaden.
30½	49.5			J (trailing) left with DT s.o. line from Staffel. (J for ST s.o. lines from: (1) Westerburg; (2) Mom- mbaur.)
*32	51.5	LIMBURG (LAHN)		ES (25-30 locos.).
*34	54.8	ESCHMOEN		J (facing) left with DT s.o. line to Giessen. (Limburg-Giessen 63.8 km.). Line leaves Lahn and turns south along valley or tributary.
36	57.8	LINDELMOLENMAIER		
37	59.7		Road overbridge.	
*37½	60.2		Bridge over R. Wors.	
37½	60.9	NIEDERBRECHEN		
39½	63.1	OBERBRECHEN		
39½	64.1			Curve c. 350 m. radius, length c. 500 m.
41½	67.1	NIEDERSELTERS	Bridge over road. Road overbridge.	
44½	71.9	KAMBERG (NABAU)	Road overbridge. Bridge over road.	
47½	76.6	WORMDORF		
48	77.1		Bridge over road.	
48½	77.8		Bridge over road.	
50½	81.5	IDSTEIN	Road overbridge.	
52½	85.0	NIEDERSELBRACH	Bridge over stream (Dals).	Line follows course of Dals to Eppstein where stream joins the Schwarz.
53½	86.0			
54	87.0		Road overbridge. Road overbridge.	
55½	89.3	NIEDERHAYEN		
55½	89.9		Road overbridge.	
56	90.2			J (facing) right with ST s.o. line to Wiesbaden.
*57½	92.1		Tunnel.	c. 100 m. long.
57½	92.6	NIEDERJOHRACH		
59½	95.9	EPSTEIN		
*60	96.7		Bridge over road and R. Schwarz.	
*60½	97.7		Bridge over road and R. Schwarz.	
62	100.0	LUCKENACH		
64½	104.2	HOFHEIM (LAHN)		
65½	105.1			Line c. 100 m. only. North of line to Koblenz.
*67½	108.3		Bridge over R. Schwarz.	

RAILWAYS

Distance from Koblenz	Station	Engineering works	Details and facilities
Miles Km.			
65½ 105.4	KREITZ.	Road overbridge.	J (facing) left to Goods Station (Frankfurt-Hochst.).
68½ 109.8			Line passes under DT s.o. line from Rudesheim and Koblenz (Route 53).
68 109.9		Flyover.	J (unfacing) from right with DT s.o. line from Rudesheim (Route 53).
69½ 111.5			
69½ 111.9	FRANKFURT-HOCHST.		J (facing) left with DT s.o. line to Mainz Goods Station (North of main Passenger Station) (see Route 53).
70½ 113.2			
70½ 113.9	FRANKFURT-NIED		RpS locos. Total Staff 1,459.
72½ 116.7	FRANKFURT-GRUNHEIM		J (triangular) right with DT s.o. line from Bingerbrück (Route 54), also to Hanau, Würzburg, Ansbach (for München).
73½ 117.4			Line passes under DT line from main Goods Station (see Route 53 for details).
73½ 118.0			
73½ 118.5		Flyover.	
75½ 121.2	FRANKFURT (Main Station)		Terminus of Routes 32-4 from Koblenz. For description of station see Route 33.

ROUTE No. 33

KOBLENZ-FRANKFURT (via RÜDESHEIM and WIESBADEN)

General details

- Gauge: 1,433 m. (standard).
- Length: 134.6 km. (83½ miles).
- Track: Double.
- Maximum permissible axle load: 20 metric tons.
- Gradients: No information available, but line mainly follows course of River Rhine and Main.
- Curvature: No details available, but curves easy except between Braubach and Kamp.
- Traction: Steam throughout.
- Maximum distance between stations: St. Goarshausen and Kaub, 10.6 km. (6½ miles).
- Marshalling yards (MY):

Division	Location	Max. capacity per 24 hours
Frankfurt	Frankfurt-Main (Güterbahnhof)	2,700 wagons
	Frankfurt-Cst	2,700 "
Mainz	Oberlahnstein	2,000 "
Köln	Wiesbaden-Biebrich Ost	2,600 "
	Koblenz (Mosel)	2,600 "

10. Engine sheds (ES):

Division	Location	Type	Stabling capacity
Mainz	Niederlahnstein	Rect.	c. 10-15 locos.
	Oberlahnstein	RH	c. 20-25 "
	Wiesbaden	RH	c. 30-35 "
Frankfurt	Frankfurt	RH and Rect.	c. 90-120 "
Köln	Koblenz (Mosel)		

- Watering facilities (W): No information available, but adequate water supply assumed to exist, especially at all important stations.

12. Passenger cars (marked by asterisk in Detailed Description of line):

- Mainline goods and locomotive depots: Described in paras. 9 and 10.
- Locos. at: Koblenz (Coblenz), Niederlahnstein, Wiesbaden, Frankfurt
- Engine and Brake Schedules: 13, 21, 30 km. between 27.0 and 142.4 km. 30.3, 72.2, 82.1 and 142.4 km.
- Locomotive and Tunnel Schedule: 20 and 21 km.

- Locos. at: 21 km. each way, 27.0 km. each way, 30.3 km. each way.

Detailed Description of line

Distance from Koblenz		Stations	Engineering works	Details and facilities
Miles	Km.			
0	0	KOBLENZ Hbf →		Restricted goods facilities. SR. Main Passenger Station. J for lines (1) North to Köln, (2) West to Trier and Luxembourg, (3) South to Mainz, Wiesbaden (Route 54) and East to Frankfurt via Limburg (Route 52). J (facing) left with DT s.o. line to Bingerbrück (Route 54).
0	0.2			
1	0.7			
1	1.3		Road overbridge. Bridge over railway.	Line passes over DT s.o. line to Bingerbrück (Route 54). c. 110 m. long.
1.5	1.8		Bridge over arm of Rhine.	Bridge 380 m. long.
1.5	2.3		Bridge over Rhine, railway and road. (Horchheim bridge.) (No. 40 of Bridge Schedule.)	Line crosses DT line Köln-Rüdesheim-Frankfurt. J (facing) left with loop connection to DT s.o. line to Köln. Line turns South to run along right bank of Rhine.
1.5	2.8	HORCHEIMBRÜCKLE		Restricted goods facilities.
2	4.3			J (trailing) right with DT s.o. line from Köln.
2.5	4.6	NIEDERLAUFSTEIN		SER; Wb (32 t); Cr (3 t); ES Rect. (cap. 10-15 locos.); Tbl. J (facing) left with DT s.o. line to Limburg and Frankfurt (Route 52).
3	5.6		Bridge over R.	J (trailing) loop connection from DT s.o. Limburg-Frankfurt line (Route 52).
3	6.2			SER; Wb (40 t); Cr (10 t); MY (cap. 2,000 wagons per 24 hours); ES roundhouse type (cap. 20-25 locos.); Tbl.
4	6.5	OBERLAHNHAUSEN		Straight section to Braubach.
5	9.4		Bridge over road.	J (facing) left light railway to Nassatten.
6	10.1		2 bridges (road) and bridge over R. Schuler.	SER; Cr (10 t); Wb (40 t). Line follows curve beside Rhine to Osterpai.
6	10.5	BRABACH		SR (for cattle only). Line curves in opposite direction to Kamp.
10	16.4	OSTERPAI		SER.
13	22.3	KAMP (RHEIN)		SER.
17	27.6	KESTERT		SER. Short curve SE and then S.
20	32.1		Bridge over R. Stern. Bridge over R. Wellmicher.	SER; Wb (40 t). J (facing) left light railway line to Nassatten.
21	34.2	ST. GOARHAUSEN	Bridge over R. Hasen.	200 m. long.
21	34.0		Bridge over Schweizer valley.	c. 130 m. long.
22	36.4		Tunnel under Lorelei.	
24	38.6		Bridge over stream.	
24	39.3		Tunnel under Ross Stein.	
27	44.2		Bridge over Blucher valley.	
27	44.8	KAUB		SER; Wb (32 t); Cr (3 t).
30	47.8		Bridge over stream.	Short curve.
30	48.4	LOCHHAUSEN		Restricted goods facilities. Train goes down right village.
30	50.3		Bridge over stream. Bridge over R. Wippen.	

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Distance from Koblenz.		Stations	Engineering works	Details and facilities
Miles.	Km.			
31 1/2	51.3	LUDWIG (RHINE)	..	Cr (3 t); Wb (42 t); SER.
32 1/2	52.1		Bridge over stream.	
33 1/2	53.4		Bridge over stream.	Rack-and-pinion railway to Niederwald.
35 1/2	56.9	ASWMANNHAUSEN	..	SER; Cr (3 t). Line takes wide curve to Rüdeshelm.
39 1/2	63.1	RÜDESHHEIM (RHINE)	..	SER; Wb (40 t); Cr (3 t). Line curves inwards to Geisenheim.
39 1/2	63.9		..	J (facing) right, loop line to river-side under Rhine bridge.
40 1/2	64.9		..	J (facing) right, loop line from Rhine bridge.
41 1/2	67.1	GEISENHEIM	..	J (trailing) right, loop line from Rhine bridge.
42 1/2	68.4		Bridge over stream.	Cr (3 t); Wb (32 t); SER.
43	69.4		Bridge over road.	
44 1/2	71.4	OESTRICHWEINEL	..	SER; Wb (32 t); Cr (3 t).
44 1/2	72.2		Bridge over stream and valley (Pfingsbach).	
45 1/2	74.5	HATTENHEIM	..	SER; Cr (3.5 t).
46 1/2	74.8		Bridge over stream.	
47 1/2	77.0		Bridge over stream.	
48 1/2	77.6	ERBACH (RHINGGAU)	..	SER; Cr (2.5 t). Steam-tramway to Schlagenbad (8 km. North).
49	79.0		Bridge over stream.	
49 1/2	79.6	ELTVILLE	..	SER; Cr (5 t); Wb (40 t).
			Bridge over stream.	Straight section from Eltville to R. Walluf.
50 1/2	82.1	NIEDERWALLUF	Bridge over R. Walluf.	SER; Wb (40 t).
51 1/2	82.6		..	
52 1/2	84.2		Bridge over stream and road.	
53 1/2	85.9	WIESBADEN-SCHLEIBACH	..	SER; Cr (3 t); Wb (40 t).
			Railway crosses roads.	
55 1/2	89.0	WIESBADEN-BIEBRICH	..	MY; SER; Wb (32 t).
55 1/2	89.3		Road overbridge.	J (facing) left DT s.o. loop line to Wiesbaden Hbf.
56	90.0		..	
58	93.3	WIESBADEN Hbf.	..	SER; Wb (40 t). ES 30-35 locos., 2 RH, 2 Tbl. Terminus of ST s.o. lines from (1) Dietz junction for DT line Koblenz to Limburg. (2) Niederhausen—J for DT s.o. line Limburg-Frankfurt.
59 1/2	96.2	WIESBADEN OST	..	J (trailing) left ST to Zollhaus.
60	96.8		..	Passenger station only.
60 1/2	97.0		Road overbridge.	Wb (30 t); SER.
60 1/2	97.5		..	J (facing) left DT s.o. loop line to Mainz (R. 32.5 t).
61	98.3		..	Line passes under DT s.o. Wiesbaden-Mainz loop, and under DT Mainz-Frankfurt-Hochst line.
62	99.8		Road overbridge.	
62 1/2	101.1	MAINZ-KASTEL	..	Wb (40 t); SER; Cr (10 t).
63 1/2	101.9		Bridge over road.	
64 1/2	103.1		..	J (trailing) left DT s.o. line from Mainz to Wiesbaden.
65 1/2	104.1		Bridge under Mainz line.	

RAILWAYS

63

Distance from Koblenz		Stations	Engineering works	Details and facilities
Miles	Km.			
66	106.1	Hochheim (MAIN)	Bridge over road.	Cr (2 t); SER; Wb (3 t).
66	106.3		Bridge over road.	
70	112.5			
70	112.7	Flörsheim (MAIN)	Bridge over road.	SER; Wb (30 t).
70	112.8		Bridge over main motor road.	
71	113.3			Straight section almost to Frankfurt-Hochz. (11 km.).
71	115.7	EDDERHEIM	Bridge over stream.	Passenger station only.
74	120.0		Road overbridge.	
74	120.2			
76	122.4	FRANKFURT HOCHZ. WEST	..	Restricted goods facilities.
76	123.4		..	Line passes under DT 20. line from Limburg (Route 52).
77	124.4		..	J (trailing) left with minor branch line from Königstein.
77	125.2	FRANKFURT HOCHZ.	..	SER; Wb (60 t); Cr (35 t).
78	125.4		..	J (facing) left ST line to Ind Soden (5.5 km.).
78	126.7		..	J (facing) right DT loop line to Frankfurt (Nied and Gräfenheim) (Route 52).
79	127.2		Bridge over R. Nidda (c. 100 m. long).	J (facing) left, minor branch line to Cronberg (8.5 km.).
81	130.7		Bridge over main motor road.	J (facing) right, DT loop to Frankfurt.
81	131.7		..	J (facing) left DT joining Darmstadt-Frankfurt line.
82	133.2		..	
83	134.6	FRANKFURT (MAIN)	..	SER; Wb (51 t); Cr (25 t); MY (cap. 2,700 wagons per 24 hours); MY (Ost) (cap. 2,700 wagons per 24 hours); RpS (locomotives) at Frankfurt Nied. Loco. Depot (West station); 2 ES (1 Kil and 1 Rect. Tbls.).

ROUTE No. 54

KOBLENZ-FRANKFURT (via MAINZ)

General details

1. Gauge: 1'435 m. (standard).
2. Length: 129.2 km. (80½ miles).
3. Track: Double.
4. Maximum permissible axle load: 20 metric tons.
5. Gradients: No information available, but line follows course of Rhine. Main, and so heavy gradients are to be expected.
6. Curves: Sharp left curve at Spray (12.2 km.) following course of Rhine.
7. Tunnels: Steam throughout.
8. Maximum distance between stations: Rastheim-Koblenz, 11 km.
9. Motoring units (MY):

Plan	Loco
Nied	K. Main
Mainz	B. Main
	M. Main
Frankfurt	Frankfurt
	Frankfurt
	Frankfurt

RAILWAYS

10. Engine Sals (E.S.):

Division	Location	Type	Stabling capacity
Köln	Köblenz (Mödel)	RH	
Mainz	Bingerbrück	RH	1, 20-25 locom.
	Mainz	RH	1, 20-25 "
Frankfurt	Mainz-Bischheim	RH and Rect.	1, 50-120 "
	Frankfurt		

11. Watering facilities (W): No information available, but adequate water supply assumed to exist, especially at all important stations.

12. Takeable points (marked by asterisks in Detailed Description of line):

(a) Marshalling yards and locomotive depots: Described in paras. 9 and 10.

(b) Junctions at: Köblenz (Cöblenz), Bingerbrück, Mainz, Frankfurt.

(c) Bridges (see Bridge Schedule): Between 12.2 and 19.5 km., 19.5 and 24.4 km., 37.8 and 40.8 km., 45.9 km., between 55.3 and 60.7 km., 61.0, 73.4, 94.8 and 127.6 km.

(d) Tunnels (see Tunnel Schedule): 34.5, 36.3, 37.8 and 91.7 km.

13. Capacity: 72 trains per day each way, of 500 tons net train load each.

Detailed Description of line

Distance from Koblenz Miles	Km.	Stations	Engineering works	Details and facilities
0	0	KOBLENZ	..	Main Passenger Station. Restricted goods facilities. SR. MY (Mosel) (cap. 2,600 wagons per 24 hours). Loco. depot at MY. J for lines (1) North to Köln, (2) West to Trier and Luxembourg, (3) South to Mainz, Wiesbaden, and Frankfurt via Bingerbrück (Route 34) and via Rüdeshcim (Route 53), (4) East to Limburg and Frankfurt (Route 52). Goods station on Trier line; SER; Wb (50 t); Cr (5 t). J (facing) right with DT s.o. line to Frankfurt via Limburg (Route 52). Line passes under DT s.o. line to Limburg and Frankfurt (Route 52). Line follows left bank of R. Rhine to Frankfurt.
0	0.2		..	
1	1.0		Railway overbridge.	
2 1/2	3.6		Bridge over road.	
3 1/2	5.5	KAPPELLEN-STOLZENFELD	..	SR.
3 3/4	6.0		Bridge over road.	
4	6.7		Bridge over road.	
			Bridge over stream.	
4 1/2	8.6	RHEIN	..	SER.
4 3/4	11.3		Bridge over road.	Line curves right following R. Rhine.
5 1/2	12.2	SPAY	..	Restricted goods facilities. Line curves sharply left, following bend in Rhine. J (trailing) with ST s.o. line from Simmern.
			Bridge over R. Mühl.	
			Bridge over stream.	
6 1/2	14.5	REPPARD	..	Wb (40 t); Cr (5 t); SER.
			Bridge over R. Mittelbach.	
7 1/2	24.4	NAUEN	..	Restricted goods facilities.
8 1/2	33.2	HÜGENACH	..	Restricted goods facilities.
9	37.4		Bridge over road.	
			Bridge over road.	
9 1/2	41.4		Bridge over road.	Factory.
10 1/2	49.1	NEUGROSS	..	FR.
11 1/2	57.1		..	Overcurve, 1,200 m. long.
12 1/2	65.1		..	Overcurve, 1,200 m. long.
13 1/2	73.4		..	Overcurve, 1,200 m. long.
14 1/2	81.7		..	
15 1/2	89.6		..	
16 1/2	97.9		..	
17 1/2	106.2		..	
18 1/2	114.5		..	
19 1/2	122.8		..	
20 1/2	131.1		..	
21 1/2	139.4		..	
22 1/2	147.7		..	
23 1/2	156.0		..	
24 1/2	164.3		..	
25 1/2	172.6		..	
26 1/2	180.9		..	
27 1/2	189.2		..	
28 1/2	197.5		..	
29 1/2	205.8		..	
30 1/2	214.1		..	
31 1/2	222.4		..	
32 1/2	230.7		..	
33 1/2	239.0		..	
34 1/2	247.3		..	
35 1/2	255.6		..	
36 1/2	263.9		..	
37 1/2	272.2		..	
38 1/2	280.5		..	
39 1/2	288.8		..	
40 1/2	297.1		..	
41 1/2	305.4		..	
42 1/2	313.7		..	
43 1/2	322.0		..	
44 1/2	330.3		..	
45 1/2	338.6		..	
46 1/2	346.9		..	
47 1/2	355.2		..	
48 1/2	363.5		..	
49 1/2	371.8		..	
50 1/2	380.1		..	
51 1/2	388.4		..	
52 1/2	396.7		..	
53 1/2	405.0		..	
54 1/2	413.3		..	
55 1/2	421.6		..	
56 1/2	429.9		..	
57 1/2	438.2		..	
58 1/2	446.5		..	
59 1/2	454.8		..	
60 1/2	463.1		..	
61 1/2	471.4		..	
62 1/2	479.7		..	
63 1/2	488.0		..	
64 1/2	496.3		..	
65 1/2	504.6		..	
66 1/2	512.9		..	
67 1/2	521.2		..	
68 1/2	529.5		..	
69 1/2	537.8		..	
70 1/2	546.1		..	
71 1/2	554.4		..	
72 1/2	562.7		..	
73 1/2	571.0		..	
74 1/2	579.3		..	
75 1/2	587.6		..	
76 1/2	595.9		..	
77 1/2	604.2		..	
78 1/2	612.5		..	
79 1/2	620.8		..	
80 1/2	629.1		..	
81 1/2	637.4		..	
82 1/2	645.7		..	
83 1/2	654.0		..	
84 1/2	662.3		..	
85 1/2	670.6		..	
86 1/2	678.9		..	
87 1/2	687.2		..	
88 1/2	695.5		..	
89 1/2	703.8		..	
90 1/2	712.1		..	
91 1/2	720.4		..	
92 1/2	728.7		..	
93 1/2	737.0		..	
94 1/2	745.3		..	
95 1/2	753.6		..	
96 1/2	761.9		..	
97 1/2	770.2		..	
98 1/2	778.5		..	
99 1/2	786.8		..	
100 1/2	795.1		..	
101 1/2	803.4		..	
102 1/2	811.7		..	
103 1/2	820.0		..	
104 1/2	828.3		..	
105 1/2	836.6		..	
106 1/2	844.9		..	
107 1/2	853.2		..	
108 1/2	861.5		..	
109 1/2	869.8		..	
110 1/2	878.1		..	
111 1/2	886.4		..	
112 1/2	894.7		..	
113 1/2	903.0		..	
114 1/2	911.3		..	
115 1/2	919.6		..	
116 1/2	927.9		..	
117 1/2	936.2		..	
118 1/2	944.5		..	
119 1/2	952.8		..	
120 1/2	961.1		..	
121 1/2	969.4		..	
122 1/2	977.7		..	
123 1/2	986.0		..	
124 1/2	994.3		..	
125 1/2	1002.6		..	
126 1/2	1010.9		..	
127 1/2	1019.2		..	
128 1/2	1027.5		..	
129 1/2	1035.8		..	
130 1/2	1044.1		..	
131 1/2	1052.4		..	
132 1/2	1060.7		..	
133 1/2	1069.0		..	
134 1/2	1077.3		..	
135 1/2	1085.6		..	
136 1/2	1093.9		..	
137 1/2	1102.2		..	
138 1/2	1110.5		..	
139 1/2	1118.8		..	
140 1/2	1127.1		..	
141 1/2	1135.4		..	
142 1/2	1143.7		..	
143 1/2	1152.0		..	
144 1/2	1160.3		..	
145 1/2	1168.6		..	
146 1/2	1176.9		..	
147 1/2	1185.2		..	
148 1/2	1193.5		..	
149 1/2	1201.8		..	
150 1/2	1210.1		..	
151 1/2	1218.4		..	
152 1/2	1226.7		..	
153 1/2	1235.0		..	
154 1/2	1243.3		..	
155 1/2	1251.6		..	
156 1/2	1259.9		..	
157 1/2	1268.2		..	
158 1/2	1276.5		..	
159 1/2	1284.8		..	
160 1/2	1293.1		..	
161 1/2	1301.4		..	
162 1/2	1309.7		..	
163 1/2	1318.0		..	
164 1/2	1326.3		..	
165 1/2	1334.6		..	
166 1/2	1342.9		..	
167 1/2	1351.2		..	
168 1/2	1359.5		..	
169 1/2	1367.8		..	
170 1/2	1376.1		..	
171 1/2	1384.4		..	
172 1/2	1392.7		..	
173 1/2	1401.0		..	
174 1/2	1409.3		..	
175 1/2	1417.6		..	
176 1/2	1425.9		..	
177 1/2	1434.2		..	
178 1/2	1442.5		..	
179 1/2	1450.8		..	
180 1/2	1459.1		..	
181 1/2	1467.4		..	
182 1/2	1475.7		..	
183 1/2	1484.0		..	
184 1/2	1492.3		..	
185 1/2	1500.6		..	
186 1/2	1508.9		..	
187 1/2	1517.2		..	
188 1/2	1525.5		..	
189 1/2	1533.8		..	
190 1/2	1542.1		..	
191 1/2	1550.4		..	
192 1/2	1558.7		..	
193 1/2	1567.0		..	
194 1/2	1575.3		..	
195 1/2	1583.6		..	
196 1/2	1591.9		..	
197 1/2	1600.2		..	
198 1/2	1608.5		..	
199 1/2	1616.8		..	
200 1/2	1625.1		..	
201 1/2	1633.4		..	
202 1/2	1641.7		..	
203 1/2	1650.0		..	
204 1/2	1658.3		..	
205 1/2	1666.6		..	
206 1/2	1674.9		..	
207 1/2	1683.2		..	
208 1/2	1691.5		..	
209 1/2	1700.0		..	
210 1/2	1708.5		..	
211 1/2	1717.0		..	
212 1/2	1725.5		..	
213 1/2	1734.0		..	
214 1/2	1742.5		..	
215 1/2	1751.0		..	
216 1/2	1759.5		..	
217 1/2	1768.0		..	
218 1/2	1776.5		..	
219 1/2	1785.0		..	
220 1/2	1793.5		..	
221 1/2	1802.0		..	
222 1/2	1810.5		..	
223 1/2	1819.0		..	
224 1/2	1827.5		..	
225 1/2	1836.0		..	
226 1/2	1844.5		..	
227 1/2	1853.0		..	
228 1/2	1861.5		..	
229 1/2	1870.0		..	
230 1/2	1878.5		..	
231 1/2	1887.0		..	
232 1/2	1895.5		..	
233 1/2	1904.0		..	
234 1/2	1912.5		..	
235 1/2	1921.0		..	
236 1/2	1929.5		..	
237 1/2	1938.0		..	
238 1/2	1946.5		..	
239 1/2	1955.0		..	
240 1/2	1963.5		..	
241 1/2	1972.0		..	
242 1/2	1980.5		..	
243 1/2	1989.0		..	
244 1/2	1997.5		..	
245 1/2	2006.0		..	
246 1/2	2014.5		..	
247 1/2	2023.0		..	
248 1/2	2031.5		..	
249 1/2	2040.0		..	
250 1/2	2048.5		..	
251 1/2	2057.0		..	
252 1/2	2065.5		..	
253 1/2	2074.0		..	
254 1/2	2082.5		..	
255 1/2	2091.0		..	
256 1/2	2100.0		..	

RAILWAYS

65

Distance from Koblenz		Stations	Engineering works	Details and facilities
Miles	Km.			
*27½	42.4	ORRWIEL	..	Wb (40 t); Cr (3 t); SER.
27½	43.0		Bridge over road.	
28	45.1		Bridge over road.	
*29	45.9		Bridge over R. Blüchertal.	
29½	47.2	BACHARACH	..	Wb (40 t); Cr (2 t); SER.
31½	50.7	NIEDERHEIMBACH	..	Cr (3 t); SER (less than 7 m. long).
36½	55.3	TRECHTINGHAUSEN	Bridge over R. Morgenbach.	Restricted goods facilities. Immediately after station. J (facing) right with DT s.o. line to Kreuznach. J (facing) left with short dead end spur down to river.
*37½	60.7	BINGERBRÜCKE	..	Wb (60 t); Cr (3 t); SER; MY (cap. 2,000 wagons per 24 hours); ES (20-25 locos.) (RH); Tbl. c. 300 m. long.
*38	61.0		Bridge over R. Nahe.	
38½	62.1	BINGEN (RHINE)	..	Junction station. Wb (50 t); Cr (3 t); SER. Valley of R. Rhine now widens. This bridge carries DT s.o. line from Rüdesheim on the right bank of the R. Rhine across the river and the Koblenz-Mainz line (left bank) and on to Bad Kreuznach. There is also a connection between these 2 lines near Gau Algesheim. J (facing) right with ST s.o. line to Armsheim and on to Alzey. Restricted goods facilities. J (trailing) right with connection from Rüdesheim-Bad-Kreuznach line.
40½	65.0		Railway bridge over line.	
40½	65.6		Road overbridge.	
			Bridge over stream.	
43½	70.3	GAU ALGESHIM	..	Wb (40 t); Cr (2 t); SER.
45	72.3		Flyover.	Dead end ST s.o. line to Ingelheim-Rheinbf.-Jügensheim-Partenheim (21.5 km.).
*45½	73.4		Bridge over road.	
			Bridge over R. Selz.	
45½	73.4	INGELHEIM	..	Wb (40 t); Cr (2 t); SER.
			2 bridges over road.	
			Bridge over stream.	
49	78.7	HEIDENHEIM (RHEINHEIM)	..	Wb (33 t); Cr (3 t); SER.
50½	81.4	UNELBORN	..	Passenger station only.
52½	84.3	BUDENHEIM	..	Wb (40 t); Cr (2 t); SER.
			Bridge over road.	Line curves right following river.
55	68.4	MAINZ-MOMBACH	..	Wb (40 t); Cr (3 t); SER.
55½	89.0		..	J (facing) left with DT s.o. line to Wiesbaden.
55½	89.7		Bridge over road.	J (trailing) right with ST s.o. line from Armsheim. J (trailing) left with DT s.o. line from Wiesbaden.
			Bridge over road.	J (trailing) with ST connection from here to Wiesbaden. J (trailing) left with subsidiary line from exch. station (Mainz Hafen) and on to
			Bridge over road.	
			Road overbridge.	

RAILWAYS

Distance from Koblenz Miles Km.		Stations	Engineering works	Details and facilities
		MAINE HAFEN	..	Goods station. Wb (35 t); Cr (10 t); SER.
57	91.7	MAINE (Main Station)	.. Road overbridge. Tunnel (1,193 m. long).	Wb (60 t); Cr (10 t); SER; ES (20-25 tons.) (RH); Tbl.
58 58½	93.5 93.8	MAINE SÜD	..	J (facing) left with DT s.o. line to Worms. J (facing) right with connection to Worms line. Line passes over DT s.o. line to Worms.
58½	94.3		Bridge over line.	Near its junction with R. Main.
59	94.8		Bridge over R. Rhine (length 1,089 m.). (No. 75 of Bridge Schedule.)	Line follows valley of R. Main to Frankfurt.
59½ 61	96.3 98.3	MAINE-GUTTENBURG	.. Flyover.	Wb (40 t); Cr (5 t); SER. Connecting DT line from Mainz- Wiesbaden line. J (trailing) right with line above.
62	99.9	MAINE-BISCHOFHEIM	..	Wb (40 t); SER; MY (cap. 3,200 wagons per 24 hours). Loco. depot (50 locos.); ES (RH); Tbl. J (facing) left and right with short line to Griesheim.
63	101.3		..	J (facing) left with DT s.o. line to Griesheim.
64½	103.9	REINELHEIM	..	Wb (40 t); Cr (5 t); SER.
66½	107.3	RAUNHEIM	..	Wb (40 t); SER.
71½	115.3	KELSTELBACH	.. Road overbridge.	Wb (40 t); Cr (4 t); SER.
73½ 76½	118.6 122.7	FRANKFURT-SCHWANHEIM	..	Restricted goods facilities. J (trailing) right with DT s.o. line from Biblis.
76½ 76½	123.0 123.7	FRANKFURT-SPORTFELD	..	SER. J triangular with DT s.o. line to Offenbach, also to main MY East of main passenger station. Dis- tance to main MY c. 6.6 km. over further bridge across R. Main— 283 m., 4 spans.
78 79½	125.6 127.6	FRANKFURT-NIEDERRAD	.. Bridge over R. Main. (No. 76 of Bridge Schedule.) Bridge over railway.	283 m.—5 spans. Quadruple track. Line crosses loop line from Gries- heim. J (triangular) with DT s.o. line from Koblenz. (Route 32.) J (trailing) left with DT s.o. line from Bad Homburg. Line passes under DT s.o. line from main MY.
80½	129.2	FRANKFURT (MAIN)	..	Terminus station. MY North of passenger station (cap. 2,700 wagons per 24 hours). SER; Wb (31 t); Cr (25 t). Loco. depot North of passenger station. 4 ES—1 Rect., 3 RH. Tbl. R&S (Frankfurt-Niedr. loco. (100 8/10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100/101/102/103/104/105/106/107/108/109/110/111/112/113/114/115/116/117/118/119/120/121/122/123/124/125/126/127/128/129/130/131/132/133/134/135/136/137/138/139/140/141/142/143/144/145/146/147/148/149/150/151/152/153/154/155/156/157/158/159/160/161/162/163/164/165/166/167/168/169/170/171/172/173/174/175/176/177/178/179/180/181/182/183/184/185/186/187/188/189/190/191/192/193/194/195/196/197/198/199/200/201/202/203/204/205/206/207/208/209/210/211/212/213/214/215/216/217/218/219/220/221/222/223/224/225/226/227/228/229/230/231/232/233/234/235/236/237/238/239/240/241/242/243/244/245/246/247/248/249/250/251/252/253/254/255/256/257/258/259/260/261/262/263/264/265/266/267/268/269/270/271/272/273/274/275/276/277/278/279/280/281/282/283/284/285/286/287/288/289/290/291/292/293/294/295/296/297/298/299/300/301/302/303/304/305/306/307/308/309/310/311/312/313/314/315/316/317/318/319/320/321/322/323/324/325/326/327/328/329/330/331/332/333/334/335/336/337/338/339/340/341/342/343/344/345/346/347/348/349/350/351/352/353/354/355/356/357/358/359/360/361/362/363/364/365/366/367/368/369/370/371/372/373/374/375/376/377/378/379/380/381/382/383/384/385/386/387/388/389/390/391/392/393/394/395/396/397/398/399/400/401/402/403/404/405/406/407/408/409/410/411/412/413/414/415/416/417/418/419/420/421/422/423/424/425/426/427/428/429/430/431/432/433/434/435/436/437/438/439/440/441/442/443/444/445/446/447/448/449/450/451/452/453/454/455/456/457/458/459/460/461/462/463/464/465/466/467/468/469/470/471/472/473/474/475/476/477/478/479/480/481/482/483/484/485/486/487/488/489/490/491/492/493/494/495/496/497/498/499/500/501/502/503/504/505/506/507/508/509/510/511/512/513/514/515/516/517/518/519/520/521/522/523/524/525/526/527/528/529/530/531/532/533/534/535/536/537/538/539/540/541/542/543/544/545/546/547/548/549/550/551/552/553/554/555/556/557/558/559/560/561/562/563/564/565/566/567/568/569/570/571/572/573/574/575/576/577/578/579/580/581/582/583/584/585/586/587/588/589/590/591/592/593/594/595/596/597/598/599/600/601/602/603/604/605/606/607/608/609/610/611/612/613/614/615/616/617/618/619/620/621/622/623/624/625/626/627/628/629/630/631/632/633/634/635/636/637/638/639/640/641/642/643/644/645/646/647/648/649/650/651/652/653/654/655/656/657/658/659/660/661/662/663/664/665/666/667/668/669/670/671/672/673/674/675/676/677/678/679/680/681/682/683/684/685/686/687/688/689/690/691/692/693/694/695/696/697/698/699/700/701/702/703/704/705/706/707/708/709/710/711/712/713/714/715/716/717/718/719/720/721/722/723/724/725/726/727/728/729/730/731/732/733/734/735/736/737/738/739/740/741/742/743/744/745/746/747/748/749/750/751/752/753/754/755/756/757/758/759/760/761/762/763/764/765/766/767/768/769/770/771/772/773/774/775/776/777/778/779/780/781/782/783/784/785/786/787/788/789/790/791/792/793/794/795/796/797/798/799/800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000/1001/1002/1003/1004/1005/1006/1007/1008/1009/1010/1011/1012/1013/1014/1015/1016/1017/1018/1019/1020/1021/1022/1023/1024/1025/1026/1027/1028/1029/1030/1031/1032/1033/1034/1035/1036/1037/1038/1039/1040/1041/1042/1043/1044/1045/1046/1047/1048/1049/1050/1051/1052/1053/1054/1055/1056/1057/1058/1059/1060/1061/1062/1063/1064/1065/1066/1067/1068/1069/1070/1071/1072/1073/1074/1075/1076/1077/1078/1079/1080/1081/1082/1083/1084/1085/1086/1087/1088/1089/1090/1091/1092/1093/1094/1095/1096/1097/1098/1099/1100/1101/1102/1103/1104/1105/1106/1107/1108/1109/1110/1111/1112/1113/1114/1115/1116/1117/1118/1119/1120/1121/1122/1123/1124/1125/1126/1127/1128/1129/1130/1131/1132/1133/1134/1135/1136/1137/1138/1139/1140/1141/1142/1143/1144/1145/1146/1147/1148/1149/1150/1151/1152/1153/1154/1155/1156/1157/1158/1159/1160/1161/1162/1163/1164/1165/1166/1167/1168/1169/1170/1171/1172/1173/1174/1175/1176/1177/1178/1179/1180/1181/1182/1183/1184/1185/1186/1187/1188/1189/1190/1191/1192/1193/1194/1195/1196/1197/1198/1199/1200/1201/1202/1203/1204/1205/1206/1207/1208/1209/1210/1211/1212/1213/1214/1215/1216/1217/1218/1219/1220/1221/1222/1223/1224/122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ROUTE No. 7

AACHEN-DUSSELDORF (via RHEYDT, M. GLADBACH and NEUSS)

General details

1. Gauge: 1'435 m. (standard gauge).
2. Length: 85.5 km. (53 miles).
3. Track: Aachen to Neuss—Double.
Neuss to Düsseldorf—Multiple.
4. Maximum permissible axle load: Aachen to Neuss—20 metric tons.
Neuss to Düsseldorf—18 metric tons.
5. Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
6. Curvature: No information available.
7. Traction: Steam throughout.
8. Maximum distance between sheds: 7.2 km. (4½ miles) Herzogenrath to Palenberg.
7.2 km. (4½ miles) Geilenkirchen to Lind.

9. Marshalling yards (MY):

Division	Location	Max. capacity per 24 hours
Köln	Aachen West	3,000 wagons
	Rheydt	2,500 "
	Neuss	2,200 "

10. Engine sheds (ES):

Division	Location	Type	Stabling capacity
Wuppertal	Düsseldorf Hbf.	RH	Over 30 locos.
Köln	München-Gladbach	RH	Over 30 "
	Neuss	RH	c. 20-30 "
	Rheydt	RH	c. 20-30 "
	Aachen Hbf.	RH	c. 20-30 "
	Aachen West	RH	c. 20-30 "

11. Watering facilities: No information available, but adequate water supply assumed to exist especially at all important stations.

12. Vulnerable points (marked by asterisks in Detailed Description of line):

- (a) Marshalling yards and locomotive depots: Described in paras. 9 and 10.
- (b) Junctions at: Aachen, Wickrath, Rheydt, M. Gladbach, Neuss and Düsseldorf.
- (c) Bridges (see Bridge Schedule): Between km. 70.3 and 76.0, km. 79.8.

13. Capacity: 60-72 trains per day each way; of 500 tons net train load each.

Detailed Description of line

Distance from Aachen	Stations	Engineering works	Details and facilities
Miles Km.			
*0 0	AACHEN CENTRAL (Hbf)		5 island platforms with 10 platform faces. Wb (40 t); SER; Cr (5 t); ES roundhouse type (20-30 engines).
*1½ 2.9	AACHEN WEST		SER; Tbl; Wb (50 t); Cr (40 t); MY (3,000 wagons daily); ES roundhouse type (20-30 locos.).
		Bridge over road.	
4½ 6.7	RICHTZICH		Halt.
6 9.6	KOHLSCHEID		SER; Wb (31 t).
		Bridge over road.	J (facing) right with ST line to Würselen and main line Aachen-Düren.
		Bridge over R. Wurm.	
		Bridge over road.	
8½ 14.2	HERZOGENRATH		SER; Wb (40 t); Cr (4 t).
			J (facing) left with ST line to Schaesberg.
			J (facing) right ST to main line Aachen-Düren
		Bridge over road over line	
13 21.0	PALENBERG		
		Bridge over road over R. Wurm	
		Bridge over road	

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Distance from Aachen		Stations	Engineering works	Details and facilities
Miles	Km.			
13 1/2	25.5	GRILLENKIRCHEN	.. Bridges over road. Bridges over river.	SER; Wb (40 t).
20 1/2	33.7	LENDEREN	Bridges over road.	SER; Wb (40 t).
21 1/2	34.8	BRACHHELEN	.. Bridges over road. Bridges over R. Mühlensteich. Bridges over R. Roer. Bridges over R. Malefink. Bridges over Baaler-Brücke.	Wb (35 t). Line crossed by ST line Dalheim to Jülich.
24 1/2	39.9	BAAL	.. Bridge over road. Bridges over stream. Bridge over road.	SER; Wb (40 t). J (trailing) left with ST line from Dalheim.
28	45.4	ERKELING	..	SER; Wb (40 t).
31	50.0	HERRATH	..	..
*33 1/2	54.3	WICKRATH	..	SER; Wb (35 t). J (trailing) left with DT line from Dalheim. J (facing) left with DT line to Eicken. J (facing) right with DT line to Grevenbroich (Route 4). J (trailing) right with DT line from Grevenbroich (Route 4).
*35 1/2	57.1	RIEYDT	.. Several bridges through town.	Cr (30 t); Wb (40 t); SER; LS; MY (cap. 2,500 wagons per day); ES (cap. 20-30 engines); Tbl. J (facing) left with DT line to Viernum.
*37 1/2	60.8	MÜNCHEN-GLADBACH	..	SER; LS; ES (roundhouse, cap. over 30 locos.).
40 1/2	65.7	KOPSCHENBROICH	.. Bridge over road. Bridge over road.	..
41 1/2	66.3	KLEINENBROICH	2 bridges over road.	..
*43 1/2	70.3	BUTTEN	.. Bridge over Nord Kanal. Line crossed by dyover bridge carrying DT line Köln to Düsseldorf	Wb (40 t). J (trailing) right with DT line from Köln (Route 10).
•			Bridge over road.	
*47 1/2	70.0	NEUM	..	LS; DES; SER; Wb (30 t); Cr (25 t); MY (cap. 2,500 wagons per day); ES (roundhouse) (cap. over 30 locos.). J (facing) left with DT line to Krefeld. J (facing) right with ST line to Oberhausen. DT line from Krefeld from left runs parallel with present line.
			Line crossed by dyover bridge carrying DT line from ST line North of Krefeld. Bridges over Nord Kanal. Bridges over R. Roer. Bridges over R. Rhenish. No parallel line to Krefeld.	

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Distance from Aachen		Stations	Engineering works	Details and facilities
Miles	Km.			
49 1/2	83.1	DÜREN	..	DP.S; L.S.
53	85.5	NEUSS	..	ES; Wb (40 t); SER.

ROUTE No. 8 DÜREN-NEUSS

General details

1. Gauge: 1'433 m. (standard).
2. Length: 49.1 km. (30 1/2 miles).
3. Track: Double.
4. Maximum permissible axle load: 20 metric tons.
5. Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
6. Curvature: No information available.
7. Traction: Steam throughout.
8. Maximum distance between stations: Düren-Elsdorf, 15 km. (9 1/2 miles).

9. Marshalling yards (MY):

Division	Location	Max. capacity per 24 hours
Köln	Neuss	2,200 wagons

10. Engine sheds (ES):

Division	Location	Type	Stabling capacity
Köln	Neuss	RH	Over 30 locos.
	Düren	RH	c. 20-30 "

11. Watering facilities (W): No information available, but adequate water supply assumed to exist at all important stations especially.

12. Vulnerable points (marked by asterisks in Detailed Description of line):

- (a) Marshalling yards and locomotive depots: Described in paras. 9 and 10.
- (b) Junctions at: Düren, Grevenbroich and Neuss.
- (c) Bridges: Between Düren and 25.0 km.

13. Capacity: 60-72 trains per day each way, of 500 tons net train load each.

Detailed Description of line

Distance from Düren		Stations	Engineering works	Details and facilities
Miles	Km.			
0.0	0	DÜREN	..	SER; Wb (60 t); Cr (12 t); MY (auxiliary); ES roundhouse type (c. 20-30 locos.); Tbl. (facing) left with ST line to Jülich. (facing) right with DT line to Euskirchen.
			Line crossed by overbridge carrying ST narrow gauge or light railway to Roldorf and Merzenich.	
			Bridge over river.	(facing) right with DT line to Köln (Route 3).
			Bridge over river.	
			Bridge over autobahn Aachen to Köln.	
			Bridge over R. Wiebach.	
0.1	15.0	ELSDORF	..	SER; Wb (35 t).
			Bridge over road	
			Bridge over river.	(trailing) left with ST line from Jülich. (trailing) right with ST line from Köln.
1.1	21.1	BRUNNEN	..	SER; Wb (40 t).
			Bridge over river	
1.6	26.2	HAYEN	..	SER.

Distance from Duren		Stations	Engineering works	Details and facilities
Miles	Km.			
19½	31.3	GUNTORB	..	J (trailing, right with DT line from Köln. J (facing) left with DT line to Rheydt (Route 4).
*21½	34.3	GIRVENBOESCH	..	SER; Wb (40 t); Cr (5 t).
24½	39.4	KAPPELEN-WEVELINGHOVEN	..	SER; Wb (40 t); Cr (5 t).
			Bridge over road.	
27½	44.3	HOLZHEIM	..	J (trailing, right with ST line from Köln. Wb (30 t). J (facing) left with DT loop to M. Gladbach-Neues line. J (trailing) right with DT line from Köln. J (trailing) left with DT line from M. Gladbach.
*30½	49.1	NEUES	..	LS; DES; SER; Wb (30 t); Cr (25 t). MY (cap. 2,200 wagons per 24 hours). ES roundhouse (capacity over 30 locos).

ROUTE No. 9

ANTWERP-HALTERN (via BREDA, GOCH, WESEL and DORSTEIN)

General details

- Gauge: 1.435 m. (standard).
- Length: 242 km. (150½ miles).
- Track: BELGIUM: Antwerp-Eschen—Double.
HOLLAND: Eschen-Liempde—Double.
Liempde-Gennep—Single.
Gennep-Goch—Double.
GERMANY: Goch-Buderich—Single.
Buderich-Haltern—Double.
- Maximum permissible axle load: Antwerp-Eschen—20 metric tons.
Eschen-German Frontier—16 metric tons.
Hamum-Haltern—18 metric tons.
- Gradients: For maximum gradients in Belgium, see App. 8.
- Curvature: For curvature in Belgium, see App. 8.
- Traction: Steam throughout.
- Maximum distance between stations: BELGIUM: 11.4 km. (7½ miles) Uden-Mill.
GERMANY: 8.3 km. (5 miles) Wesel-Drevenack.
- Marshalling yards (MY):

HOLLAND		BELGIUM	
Rosendaal	1,200 wagons per 24 hours	Antwerp Nord	Great capacity: over 3,000 wagons per 24 hours each
		" Austruweel	
		" Zurenberg	
		" Kiel	
		" Süd	

10. Engine sheds (ES):

BELGIUM		Division	GERMANY		
	Stabling capacity		Location	Type	Stabling capacity
Antwerp Berchem	75 locos.	Essen	Wesel	Rect.	Up to c. 20 locos.
" Dam	140 "	Münster	Haltern	RH	Up to c. 20 locos.
" Süd	70 "				

HOLLAND
Rosendaal
Budel

11. Watering facilities (W):

BELGIUM
Antwerp Zurenberg
" Austruweel
" Eschen

GERMANY
No information available, but adequate
water supply assumed to exist, especially
at all important stations.

HOLLAND: Breda
Goes

12. Vulnerable points (marked by asterisks in Detailed Description of line):

(a) Marshalling yards and locomotive depots: Described in paras. 9 and 10.

(b) Junctions at: Antwerp, Rosendael, Breda, Tilburg, Breda, Beugen, Goch, Birten, Wewel, Herrest, Wervin, Haltern.

(c) Bridges (see Bridge Schedule): Antwerp Central (viaduct), 5-6, 65-0, 150-8, 150-7 km.

13. Capacity: Single track sections, 20 trains per day each way } of 400, 700 tons net train load each.
Double track sections, 60 " " " " " }

Detailed description of line

Distance from Antwerp Miles	Km.	Stations	Engineering works	Details and facilities
0	0	ANTWERP (ANVERS) (Central) (for full description see p. 126)	On Viaduct. 6 tracks leaving station.	Terminal station with 10 platform tracks (3 tracks electrified). 4 LS (carriage sidings); W; rectangular ES (cap. 39 locos.) and Tbl (22 m.) in triangle near Berchem station. J (facing) right, 6 tracks, electrified and s.o. to Berchem. J (trailing) right, 4 tracks s.o. from Lierre.
1	1.3		..	J (facing) right, 6 tracks, electrified and s.o. to Berchem.
1	1.8		..	J (trailing) right, 4 tracks s.o. from Lierre.
1 1/2	2.0	ANTWERP (Est)	..	4 platform tracks; DES (39 wagons).
2 1/2	4.6	ZURENBERG	..	MY, 10 sidings of train length. DES (400 wagons); SR. (large); Cr; W.
3	4.9		..	J (facing) left, with DT s.o. line to Stalvenberg and Bains-et-Entrepôts station and docks.
3 1/2	5.8	DAM		Passenger station.
4	6.6		Bridge 2 parallel DT over Albert Canal (length 78 m. 70. Destroyed 1940; temporarily reconstructed by Germans. (No. 42 of Bridge Schedule.)	
4 1/2	7.4	MERXEN	..	Halt.
4 1/2	7.7		..	DT line turns left to Antwerp-Nord MY.
5	8.2		..	DT turns right and later loops back to Antwerp-Nord MY.
5 1/2	9.0	AUTRUWEL	..	MY, 10 sidings of train length. DES (many), left; Tbl (22 m.); W.
7	11.4		..	J (trailing) ST s.o. from right from loop leading to Antwerp-Nord formation yard. Junction to east (up) main line only.
7 1/2	11.5	EECKEREN		DES (63 wagons); SR, left.
7 1/2	11.6		Line crossed by overbridge carrying DT line to Antwerp-Nord MY.	
7 1/2	12.0		..	J (trailing) left ST s.o. from Antwerp-Nord MY to West (down) track only.
8 1/2	13.2	ST. MARLARG	..	Halt.
9 1/2	14.2	HEIKENSTRAAT	..	Halt.
9 1/2	15.2	CAPPELEN	..	PL (80 m.) right; DES (30 wagons); left; SR
12	16.2	CAPPELENBOCH	..	Halt.
13	20.2	HEIDE	..	DES (17 wagons); SR left
13 1/2	22.7	KIJNIT	..	Halt.
15	24.2	CAMPDROET	..	PL (100 m.) right; DES (30 wagons); SR
15 1/2	25.1	WILDE	..	DES (10 wagons); SR left
16 1/2	26.0	FAUX	..	DES (10 wagons); SR left

Distance from Amberg		Stations	Engineering works	Details and facilities
Miles	Km.			
75½	121.5	VEHRL	..	2 train length Pt. left; 3 train length DES; SR right.
78	125.8		Bridges, ST, short spans, over narrow streams, flood openings.	
79	127.4		..	
79½	127.8	UDEN	..	DES; SR left; 2 train length; PL right.
85½	138.2		Bridges, 2 ST, short spans, flood openings.	
86½	139.2	MILL	..	2 train length DES left; PL, factory siding; SR right.
88	141.8		Bridges, ST, short spans over narrow streams.	
89½	144.3		..	
90	145.1	HAPS	..	DES; SR left; PL right.
*91½	147.7	BRUGEN	Overbridge carrying ST s.o. Nijmegen-Venlo line.	J (trailing) left with ST s.o. loop from high level Nijmegen line; PL and DES right.
93	149.7		Bridge, ST, short span over R. Vidsche Graaf (not navigable).	
93½	150.1	ONVELT	Bridge, short span, ST over narrow stream.	DES; SR left; PL right.
*93½	150.8		Bridge, ST, total length 1,300 ft., over R. Maas. (No. 43 of Bridge Schedule.)	
93½	152.9	GENNEP	..	DES; SR; shed left. Six train length LS and DES right. Tbl; W. German Frontier.
97½	156.7		..	Line is DT to Goch, then becomes ST.
99	159.3	HAMM	Bridge over river.	SR; Wb (30 t).
101	162.7	ASPERDEN AGENTUR	Bridge over road.	..
*102½	164.6	GOCH	..	J (trailing) left with DT line from Cleve.
107½	172.6	UDEN	3 bridges over road.	J (facing) right with DT line to Geldern (Route 17). Line becomes ST.
107½	173.5	UDENFELD AGENTUR	..	SER; Wb (35 t).
108½	175.1	UDENBRUCH	..	SR.
110½	177.8	LARBECK	Bridge over road.	Halt.
111½	182.9	NANTEN WEST	Bridge over road.	SR.
*115½	188.7	BIRKEN	..	SER; Wb (30 t).
113½	190.6	MENZELER-GINDERICH	..	J (trailing) left with ST from Cleve.
116½	192.8	BUCHHEIM	..	J (facing) right ST to Rheinbergen.
*122½	199.7		Bridge over R. Rhine (length 1,943 ft.) (No. 14 of Bridge Schedule.)	SR.
*125	201.0	WEST	..	J (trailing) right ST from Rheinbergen.
			..	Line becomes DT.
			..	ES Rectangular, up to 2, 20 ft. high; SER; Cr (20 t); Wb (30 t).
			..	J (trailing) left with DT line from Amberg (Route 14).
			..	J (facing) right with DT line to Oberhausen (Route 14).
			..	Line crossed by overbridge carrying 4 and 6 ft. g.

Distance from Antwerp		Stations	Engineering works	Details and facilities
Miles	Km.			
130	209.3	DREYENHAEK	Line crossed by overbridge carrying road.	S.R.
132½	213.1	DAMM	Line crossed by overbridge carrying road.	Halt.
135½	218.0	SCHARMURCK	Line crossed by overbridge carrying road.	
*140½	223.7	HERFORT-DORSTEN	Line crossed by overbridge carrying road. Line crossed by overbridge carrying road.	J (trailing) right with DT line Dorsten and Chadbeck. J (trailing) left with ST line from Borken.
145½	234.6	LIPPENBROOK	Line crossed by overbridge carrying road.	SER; Wb (35 t).
*150½	242.0	HALTERN		J (trailing) right with DT line from Recklinghausen (Route 18). ES roundhouse (cap. up to 20 locos.). SER; Wb (35 t).

ROUTE No. 10

ROTTERDAM-KÖLN (via BREDA, EINDHOVEN, VENLO, KEMPEN, KREFELD and NEUSS)

General details

- Gauge: 1'435 m. (standard gauge).
- Length: 251.3 km. (156½ miles).
- Track: HOLLAND: Rotterdam to Kaldenkirchen—Double.
GERMANY: Kaldenkirchen to Kempen—Single.
Kempen to Köln—Double.
- Maximum permissible axle load: HOLLAND: Rotterdam to Venlo—16 metric tons.
GERMANY: Venlo to Kaldenkirchen—20 metric tons.
Kaldenkirchen to Kempen—18 metric tons.
Kempen to Köln—20 metric tons.
- Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
- Curvature: No information available.
- Traction: Steam.
Electric—Rotterdam to Eindhoven (Holland).
- Maximum distance between stations: HOLLAND: 11.2 km. (6½ miles) Breda to Gilze-Rijen.
GERMANY: 9 km. (5½ miles) Krefeld-Oppum to Osterath.
9 km. (5½ miles) Osterath to Neuss.
- Marshalling yards (MY):

HOLLAND		GERMANY	
Location	Max. capacity per 24 hours	Location	Max. capacity per 24 hours
Hoofddijk Eindhoven	2,800 wagons 1,000 "	Köln Köln-Nippes Krefeld Neuss	3,500 wagons 2,000 " 2,000 "

10. Engine sheds (ES):

HOLLAND		GERMANY	
Location	Distance	Location	Type
Rotterdam (Deltische-poort)	Köln	Köln Hbf	Rect.
Dordrecht		Köln-Nippes	Rect.
Lage Zwaluwe		Kempen	RH
Eindhoven		Neuss	RH
Venlo		Krefeld Hbf	RH
		Krefeld Gbf	RH

Shedding capacity
Over 1,000
1,200
Over 1,000
1,200
Over 1,000
Over 1,000

11. Watering facilities:

HOLLAND

Rotterdam—Delftische-Poort
Dordrecht
Lage Zwaluwe
Breda

Eindhoven
Helmond
Blarik
Venlo

GERMANY

No information available, but adequate water supply assumed to exist, especially at all important stations.

12. Vulnerable points (marked by asterisks in Detailed Description of line):

(a) *Marshalling yards and locomotive depots:* Described in paras. 9 and 10.

(b) *Junctions at:* Rotterdam, Dordrecht, Lage Zwaluwe, Breda, Tilburg, Boxtel, Eindhoven, Blarik, Venlo, Kaldenkirchen, Greifath, Kempen, Benrad St. Tonia, Krefeld, Neuss, Köln (Cologne).

(c) *Bridges (see Bridge Schedule):* Km. 2.3, 2.6, 18.2, 31.8, 39.8, 45.3, 118.5, 134.3, 157.0.

13. Capacity: Single track section 20/25 trains per day each way } of 500 tons net train load each.
Double " " 60 " " " " " }

Detailed description of line

Distance from Rotterdam Miles	Km.	Stations	Engineering works	Details and facilities
0.0	0	ROTTERDAM-DELFTISCHE-POORT (For full description see p. 126)	..	Through station with 2 through and 6 bay platforms. MY; W; RPS; ES; Tbl; SSr— Power Station in town.
1 1/2	1.9	ROTTERDAM BEURS	On viaduct.	DT.
*1 1/2	2.3		Bridge over R. Lek, length 1,312 ft. DT. (No. 45 of Bridge Schedule.)	
*1 1/2	2.6		Bridge over R. Lek. 11 fixed lattice girder spans with lift bridge between them. DT. (No. 46 of Bridge Schedule.)	
2	3.1	FEYENOORD	..	
*3 1/2	5.7	ISSELMONDE	..	MY (hump), 360 m. 50 train length DES left. (cap 2,800 wagons per day); DT spur from North end of yard to Feyenoord goods yard and Pernis docks. ST loop from South end of yard to Pernis docks and Feyenoord goods yard.
6	9.6	BAARENDRICHT	..	PL left; DES; SR right.
9 1/2	14.7	OUDE	..	PL 1,200 yd. long, off right main line only.
11	17.6	ZWIJNDRECHT	..	SSr left; PL; 2 DES; SR right.
*11 1/2	18.2		Bridge, 4 lattice girder spans and one swing span, DT, over river Oude Maas. (No. 47 of Bridge Schedule.)	
*12	19.3	DORDRECHT	Electrified section to Rotterdam begins.	3 DES; SR; Cr; sheds, large sleeper depot, left. 8 LS; ES (small); Tbl right. W. Passenger and goods rolling stock stabled. J (Facing) ST to Nijmegen to left.
18	28.8	WILLEMSDORP	DT ends, single line runs to South end of Moerdijk bridge, where DT begins again.	Halt.
*19 1/2	31.8		Moerdijk (ST) bridge over river Hollandsch Diep. (No. 48 of Bridge Schedule.)	
*20	31.9	LAGE ZWALUWE	..	10 LS; ES; Tbl; W; left 2 DES, right. J (Facing) ST from Moerdijk, cut in use in 1941. J (Facing) left ST to 't-Hertogenbosch. J (Facing) ST to Rosendaal right.
20 1/2	32.8			
22 1/2	36.2	LANGERWEG	..	PL right. DES, SR left.
*24 1/2	39.8		Bridge, DT, swing, over R. Maas. (No. 49 of Bridge Schedule.)	

Distance from Rotterdam Miles Km.		Station	Engineering works	Details and facilities
*97	157.0		Bridge DT over R. Maas; reported damaged but re- suscitated service resumed by May, 1941 (No. 53 of Bridge Schedule.)	
*98	157.6	VENLO		J (trailing) left ST from Geldern (Germany). 2 DES; Cr; SR; left ES; Tbl; W; 10 LS right. J (facing) ST to Roermond right.
101	162.1		GERMAN FRONTIER	
*101	162.8	KALDENKIRCHEN	Bridge over road.	SER; Wb (50 t); Cr (5 t). J (facing) right with ST line to Viernum. Present line is ST.
105	169.2	LOBBERICH		SER; Wb (32 t). J (trailing) right with ST line from Viernum.
*108	174.7	GRUPPETH	Bridge over river.	SER; Wb (35 t).
109	176.4	MULHAUSEN OEDT		Hak.
*113	181.5	KEMPEN	Bridge over ST Kempen- Süchteln line.	ES RH type (cap. 2, 20-30 locos). SER; Wb (35 t); Cr (10 t). J (trailing) right with ST line from Viernum. J (facing) left with DT line to Wesel (Route 17). J (facing) right with ST line to Mora. Present line becomes DT.
*116	187.9	BENRAD ST. TONN	Bridge over ST line Such- teln to Krefeld-Nord.	Wb (35 t).
			Bridge over light railway or tramway.	J (trailing) right with DT lines from Viernum and M. Gladbach. J (trailing) right with DT from Viernum.
*121	194.8	KREFELD Hbf.		SER; Wb (50 t); LS; DES; ES (cap. 20-30 locos). Factory sid- ings. MY (cap. 2,000 wagons per day). J (facing) right with DT line to Duiseldorf.
		KREFELD (Goods Station)	Bridge over river.	Small ES; SER; Wb (40 t); Cr (20 t). J (facing) right with DT line to Duisberg.
*122	197.3	KREFELD OBERM	Line crossed by overbridge carrying DT Krefeld-Duis- berg. 2 bridges over river. Line crossed by overbridge carrying road. 2 bridges over river.	Rps (passenger and goods wagons) 1 mile East of station. Present line passes under DT Krefeld-Duisberg line (Route 11). J (trailing) left with DT from Duisberg (Route 11).
123	201.1	CHERVEN	Line crossed by overbridge carrying road. Line crossed by overbridge carrying road. 2 bridges over river. Bridge over quadruple track Duiseldorf-Nord line.	SER; Wb (40 t). J (facing) left with DT line to Duiseldorf. J (facing) left with DT line from Duiseldorf. J (trailing) right with ST line from M. Gladbach. J (facing) right with DT line to M. Gladbach.

RAILWAYS

Distance from
Rotterdam
Miles - Km.

Stations

Engineering works

Details and facilities

*133 215.3 NAUW

Bridge over Noord Kanal.

LS; DES; SER; Wb (50 t); Cr
(25 t); ES RH type (cap. over 30
loco.).
MY (cap. 2,000 wagons daily).

J (facing) right with DT line to
M. Gladbach (Route 7).
J (facing) right with DT line to
Düren (Route 8).

Bridge over DT Neuss-
Düren line.
2 bridges over river.

138 222.4 NORF

SER; Wb (40 t).

141 227.3 NIEVENHEIM

143 230.8 DORMAGEN

SER; Wb (35 t).
J (facing) left with private lines.

HACKENBROICH

Halt.

147 236.7 KÖLN-WORRMINGEN

SER; Wb (40 t).

Bridge over road.

151 243.3 KÖLN-LONGEBACH

SER; Wb (40 t).

Bridge over ST Mülheim-
Mödrath.

*153 247.5 KÖLN-NIPPEL

Line crossed by overbridge
carrying ST from Düren to
Köln-Kalk.

PL; SER; Wb (35 t); Wb (40 t).
MY (cap. 3,500 wagons per day);
ES (rect.) (over 30 locos.). RPS
(large) passenger and goods
wagons, 1,600 m. North-North-
West of main station.
J (facing) right with DT line to
Düren (Route 3).
J (facing) left with ST line to
Köln Hbf.

Line crossed by overbridge
carrying DT line Köln-
Ehrenfeld to Köln Hbf.
Line crossed by overbridge
carrying DT line Köln Hbf
to Köln West.

J (trailing) right with DT line from
Köln West.
J (trailing) left with ST line from
Neuss (other track rejoins present
route).

Bridge over Hansa Ring
(plate girder type) bridge
over Gereons Wall.
4 bridges over streets.

*156 251.3 KÖLN Hbf.

PL—9 tracks running through sta-
tion served by similar number of
platforms under single arched roof
span. ES.

ROUTE No. 11

KREFELD-DUISBURG

General details

1. Gauge: 1,435 m. (standard).
2. Length: 21.3 km. (13 miles).
3. Track: Double.
4. Maximum permissible axle load: 20 metric tons.
5. Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
6. Curves: No information available.
7. Traction: Steam throughout.
8. Maximum speed: 100 km. (62 miles) per hour.

9. *Marshalling yards (MY):*

Division	Location	Max. capacity per 24 hours
Köln	Krefeld	2,500 wagons

10. *Engine sheds (ES):*

Division	Location	Type	Stabling capacity
Essen	Duisburg Hbf	RH	Over 30 locos.
Köln	Hohenbudberg	Rect.	Over 30 "
	Krefeld Hbf	RH	c. 20-30 "
	Krefeld Gbf	RH	Up to c. 20 "

11. *Watering facilities (W):* No information available, but adequate water supply assumed to exist, especially at all important stations.12. *Vulnerable points (marked by asterisks in Detailed Description of line):*(a) *Marshalling yards and locomotive depots:* Described in paras. 9 and 10.(b) *Junctions at:* Krefeld, Uerdingen, Hohenbudberg, Duisburg.13. *Capacity:* 72/96 trains per day each way, of 500 tons net train load each.**Detailed description of line**

Distance from Krefeld		Stations	Engineering works	Details and facilities
Miles	Km.			
*0	0	KREFELD Hbf	..	SER; Wb (50 t); LS; DES; ES (cap. 20-30 engines) round-house; factory sidings; MY (cap. 2,000 wagons per 24 hours). J (facing) right with DT from Düsseldorf.
•		KREFELD (Goods Station)	..	SER; Wb (40 t); Cr (20 t); small ES; RpS. J (facing) left with DT to Neuss (Route 10).
1½	2.5	KREFELD OPPUM	Line crossed by overbridge carrying DT Krefeld-Neuss line.	RpS (passenger and goods wagons). J (trailing) right with DT line from Neuss. J (facing) left with ST line to factory.
2½	4.5	KREFELD LINN	..	SER; Wb (30 t). J (facing) right with ST line to Krefeld-Rheinhafen.
*4½	7.1	UERDINGEN	..	SER; Wb (50 t); Cr (10 t). J (facing) left with ST line to Ruhrort.
•		HOHENBUDBERG	..	Halt.
*5½	8.9	HOHENBUDBERG (Goods Station)	..	Wb (31 t); Cr (20 t); MY (cap. 6,700 wagons per 24 hours); ES rectangular type (cap. over 30 locos.). J (facing) left with DT line to Mörs.
			Bridge over (?) lake.	J (trailing) left with DT line from Mörs.
8½	14.1	RHEINHAUSEN	..	SER; Wb (40 t).
9½	15.7	RHEINHAUSEN OTT	..	..
10½	17.2		Bridge over R. Rhine (length 934 m.). (No. 54 of Bridge Schedule.)	..
*11½	18.1	DUISBURG HOCHFELD SdP	..	Wb (45 t); Cr (12.5 t); SR. J (facing) right with DT line to Essen. J (facing) right with DT line to Düsseldorf (Route 13). J (trailing) right with DT line from Düsseldorf (Route 18).
*13	21.3	DUISBURG Hbf	..	SER; Wb (40 t); Cr (25 t); MY (cap. 1,000 wagons per 24 hours); ES rectangular type (cap. over 100 locos.); Ross wagons.

ROUTE No. 12

ROTTERDAM-OSNABRÜCK via UTRECHT, AMERSFOORT,
ALMELO and SALZBERG.

General details

1. Gauge: 1'437 m. (standard).
2. Length: 276½ km. (173 miles).
3. Track: Double.
4. Maximum permissible axle load:
HOLLAND: Rotterdam to Bentheim—16 metric tons.
GERMANY: Bentheim to Salzbergen—20 metric tons.
Salzbergen to Osnabrück-Eversberg—18 metric tons.
Osnabrück-Eversberg to Osnabrück Hbf—20 metric tons.
5. Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
6. Curvature: No information available.
7. Traction: Steam throughout.
Electric—Rotterdam to Amersfoort (Holland).
8. Maximum distance between stations:
HOLLAND: 16.8 km. (10½ miles), Amersfoort to Barneveld-Forthuizen.
GERMANY: 7.9 km. (5 miles), Salzbergen to Rheine.

9. Marshalling yards (MY):

HOLLAND		GERMANY	
Location	Max. capacity per 24 hours	Location	Max. capacity per 24 hours
Utrecht	1,200 wagons	Rheine Osnabrück	2,100 "

10. Engine sheds (ES):

HOLLAND		GERMANY	
Location	Division	Location	Type
Gouda	Münster	Osnabrück Hbf	RH
Utrecht		Osnabrück Gbf	
Amersfoort		Rheine (passenger sta.)	RH
Apeldoorn		Rheine MY	RH
Almelo			

Stabling capacity
c. 40-45 locos

Up to c. 20 "
Up to c. 20 "

11. Watering facilities (W):

HOLLAND		GERMANY
Rotterdam Maas	Barneveld-Voorthuizen	No information available, but adequate water supply is assumed to exist, especially at all important stations.
Gouda	Apeldoorn	
Woerden	Deventer	
Utrecht	Rijssen	
Amersfoort	Almelo	

12. Vulnerable points (marked by asterisks in Detailed Description of line):

- (a) Marshalling yards and locomotive depots: Described in paras. 9 and 10.
- (b) Junctions at: Rotterdam, Moordrecht, Gouda, Harmalen Junction, Utrecht, Amersfoort, Km. 74. Apeldoorn, Deventer, Wierden, Almelo, Hengelo, Bentheim, Salzbergen, Rheine and Osnabrück.
- (c) Bridges (see Bridge Schedule): 0.5, 11.7, 17.0, 18.1, 48.4 and 127.2 km.

13. Capacity: 60-72 trains per day each way, of 500 tons net train load each.

Detailed description of line

Distance from Rotterdam	Miles	Km.	Station	Engineering works	Details and facilities
0.0	0		ROTTERDAM MAAS (for full description see p. 12.0)		Terminus in City area. Facilities crowded alongside R. Maas. DES (short) for carriages, left and right; 2 LS; W left; 12 LS, quay sidings; Cr right. Goods rolling stock stabled.
				Bridge DT (swing) over canal. No. 55 (Bridge Schedule.)	
1	1.3				Facing left with DT line to Hengelo.
11	2.5				Facing left with DT line from Hengelo.
17	2.5				DES, SR right.
17.0	10.7				DES, SR left; PL right.
18.1	11.2			Bridge DT (swing) over canal. No. 55 (Bridge Schedule.)	

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Distance from Rotterdam		Stations	Engineering works	Details and facilities
Miles	Km.			
*9½	14.9	MONTERENHUT	..	Halt. SSt.
10½	16.8			J (trailing) left with ST line from The Hague.
*10½	17.0	..	Bridge (DT swing) over Ringvaart Canal. (No. 37 of Bridge Schedule.)	..
*11½	18.1		Bridge (DT, rolling lift) over R. Gouwe Aar. (No. 38 of Bridge Schedule.)	
*12½	19.8	GOUDA	..	J (trailing) left, ST line from Alphen enters yard. SSt, 3 LS; DES (short) left; ES (small); 2 LS; DES; Tbl; SR right; W; 2 DES 1,800 m. long back to R. Gouwe.
13½	21.8	..	Bridge (DT) over branch Hollandische IJssel Canal.	J (facing) right with ST line to Schonehoven.
18½	30.0	OUDEWATER	..	2 PL; SR left; DES right.
21½	35.1	WOERDEN	..	J (trailing) left with ST line from Leiden. 24 DES; SR left; 2 PL; SSt right; W; 3 through platforms 270 yd. long.
*24	38.8	HARNELDEN (Junction)	..	J (facing) left with DT electrified line to Amsterdam. J (facing) right with short private siding.
27½	43.9	VLEETUEN	Bridge DT lattice girder span, over Merwede Canal. (No. 39 of Bridge Schedule, length 200 ft.)	DES (short) right.
*30	48.4			..
*31½	50.9	UTRECHT	..	EA, NS, Rps carriages and permanent way, 4 DES left. MY (cap. 1,200 wagons per day). Quay siding, 2 DES right. J (trailing) left with DT line from Amsterdam. J (trailing) left with DT line from Hilversum. J (facing) left with DT line to Arnhem (Route 14). Line continues towards Eindhoven (Route 10). Trains to Amersfoort would have to reverse at Utrecht.
34	54.9	PUTHOVEN	..	J (facing) left with DT line to Hilversum.
37	59.7	DOUWELAND	..	4 PL; DES. J (facing) right with DT light railway to Zoort.
40	64.5	SCHIEDAM	..	PL, DES. J (facing) left with light ST line to Pijn. J (facing) right with ST line to Schiedam and airport.
43	69.3	..	..	PL, DES. J (facing) left with DT line from Amsterdam.
46	74.1	..	..	J (facing) right with DT line to Rotterdam.

<i>Distance from Rotterdam Miles Km.</i>	<i>Stations</i>	<i>Engineering works</i>	<i>Details and facilities</i>
*44 71.0	AMERSFOORT	..	Amersfoort MY—50 sidings, many train length and longer (cap. 2,400 wagons per 24 hours). On extreme left large R, S (way.), ES, Tbl, W. Passenger Station, 2 island platforms, 720 yd. long, 3 through tracks, 1 dead end platform track. Outside right, carriage sidings. J (facing) left with DT line to Zwolle. 2 PLs left. 3 DES right. SR right. W. J (facing) right with ST light railway to Utrecht-Emmerich line.
46 74.0	BARNVELD-VOORTWIJZEN	..	DES left. J (facing) right with ST line to Radio station.
54 87.8	KOOTWIJK	..	2 LS right. 2 DES left. SR. Low gradient in cutting, 1 in 200 down to Apeldoorn. J (facing) left with ST loop to ST line Apeldoorn-Zwolle.
59 94.7	ANIEL	..	J (trailing) left with ST line from Zwolle. 4 through tracks through station. Short carriage sidings, goods sidings, SR, Cr on left. 6 marshalling sidings train-length, shorter sidings on right. ES; Tbl; W. Island platforms 3 ft. high and 300 yd. long, and 3 low platforms 100 yd. long. J (facing) right with ST line to Dieren-Doornburg.
*71 114.8	APeldoorn	Swing bridge, DT, 40 ft. span over Apeldoornsche Canal.	J (facing) right with ST line to Zutphen.
71 113.6	DE TRUOE	Bridges, short spans, over small streams.	Halt. DES left.
73 120.9			PL; 2 DES; SR right.
75 121.5			J (trailing) left with ST line from Zwolle.
76 123.3	TWELLO	Bridge, ST, lattice girder spans over R. IJssel (length 1,700 ft.). (No. 60 of Bridge Schedule.)	Island platform, 3 ft. high, 400 yd. long, 4 through tracks. MY and DES on right 13 tracks, 8 full length. Large goods shed; SR 100 yd; Cr; Tbl; W. J (facing) right with DT line to Zutphen.
77 124.2			
*79 124.7			
*79 127.2			
*80 129.6	DEVENTER	Swing bridge, DT, over Overijsselse Canal.	PL left; DES right.
81 131.1			DES.
86 138.4	RATHMEN		PL left; 2 DES right; SR.
89 144.4	DIJKERHOF		3 PLs left; 1 DES; SR right; W. J (facing) right with short ST line to Enter.
92 148.5	HOUTEN		J (trailing) left with ST line from Zwolle.
96 155.0	RUDEN		PL left; 2 DES; SR right.
*100 161.4	W. RUDEN		

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Distance from Rotterdam Miles Km.		Stations	Engineering works	Details and facilities
*104½	164.8	ALMELD	..	J (trailing) left with ST line from Creerden. Island platform, 3 ft. high, 400 yd. long—one bay 100 yd. Western end—4 through tracks. 6 DES train length, several shorter sidings; quay siding; Cr; goods sheds; SR; all on left. ES; Tbl; W. Goods rolling stock stored.
104½	168.8		Bridge, short span, DT, over R. Aa.	
110½	177.5	BORNE	..	PL right; 3 DES; SR left.
*113½	182.6	HENGLO	..	J (trailing) right with ST alternative route from Apeldoorn. Island platform 3 ft. high, 400 yd. long. 2 track bay Eastern end 100 yd. 4 through tracks. 6 sidings full train length right. DES; SR; sheds; Cr on extreme right. J (facing) right with DT line to Enschede, thence German frontier. J (facing) right with ST light railway to Boekelo.
			Bridge over Twente Canal.	
120½	193.6	OLDENZAAL	..	8 marshalling sidings, train length; 6 DES; sheds; SR; Cr left. ST line to Gronau (over German frontier) bears to right. Light ST line from DES on left to Denekamp.
125½	202.4		GERMAN FRONTIER	
129	207.5	GILDENHAUS	Line crossed by overbridge carrying (?) DT Bentheim-Gronau line.	SR; Wb (25 t); Cr (3 t).
*130½	210.5	BENTHEIM	..	J (trailing) left with ST line from Gronau. SER; Wb (60 t); Cr (3 t).
133½	214.9	SCHÜTTORF	..	SER; Cr (3 t). J (trailing) left with DT line from Leer (Route 13).
*138	222.2	SALZBERGEN	Line crossed by (?) overbridge carrying DT Quakenbrück-Rheine line.	SER; Wb (35 t).
*143	230.1	RHEINE (Passagierbahnhof)	Bridge over road.	J (trailing) right with DT lines from Quakenbrück and Neuenkirchen. MY (cap. 2,000 wagons per 24 hours). SER; Wb (35 t); Cr (15 t); ES (up to 20 locos.); 1 roundhouse at Rheine North with 8-10 tracks, 1 ditto at Rheine South with 15-20 tracks. J (facing) right with DT line to Münster.
		RHEINE M.Y.	Bridge over road. Bridge over R. Hemetten.	
147	236.8	RODDE	Line crossed by overbridge carrying road. Bridge over road.	Halt.
150	241.7	HORSTEL	..	SER; Wb (35 t).
151	246.2	ESCH	..	Wb (35 t).
152	249.2	LOHNSBURG	..	SER; Cr; Wb (30 t). J (trailing) right with ST line to Paderborn.

Distance from Rotterdam		Stations	Engineering works	Details and facilities
Miles	Km.			
159½	257.7	LAAGHUSEN	..	..
163½	267.9	VIJVER	Bridge over road. Bridge over stream. Bridge over road.	SER.
166½	267.9	LETTEN	..	SR.
169½	273.4	OSNABRÜCK-EVERSBURG	..	SR; Wb (33 t). J (trailing) left with DT line from Bremen and Quakenbrück (Route 18).
			Bridge over Herrenreichwall.	
172	277.0	OSNABRÜCK-HAIRSTON	..	Halt. LS; DES. J (facing) left to Bremen avoiding Osnabrück Hbf.
173	278.4	OSNABRÜCK Hbf	..	SER; Wb (40 t). ES (cap. 40-45 engines) RH with Tbl; also radial tracks (partly covered) with Tbl. MY (cap. 2,100 wagons per 24 hours). RPS (goods wagons), 500 m. North Main Station.
		OSNABRÜCK Gbf		

ROUTE No. 13 SALZBERGEN-LEER

General details

1. Gauge: 1,435 m. (standard gauge).
2. Length: 105.8 km. (65½ miles).
3. Track: Double.
4. Maximum permissible axle load: 18 metric tons.
5. Gradients: No information is available, but it is estimated that no heavy gradients will be encountered.
6. Curvature: No information available.
7. Traction: Steam throughout.
8. Maximum distance between stations: 10.6 km. (6½ miles), Geeste to Meppen.
9. Marshalling yards (MY): None.
10. Engine sheds (ES): None.
11. Watering facilities: No information available, but adequate water supply assumed to exist, especially at all important stations.
12. Vulnerable points (marked by asterisks in Detailed Description of line):
 - (a) Marshalling yards and locomotive depots: None.
 - (b) Junctions at: Salzbergen, Meppen, Ithroe, Leer.
 - (c) Bridges: Between Km. 13.3 and 23.1, Km. 32.2 and 42.8, Km. 68.2 and 105.8.
13. Capacity: 61-72 trains per day each way, of 300 tons net train load each.

Detailed description of line

Distance from Salzbergen		Stations	Engineering works	Details and facilities
Miles	Km.			
0	0	SALZBERGEN	..	SER; Wb (33 t). J (facing) left with DT line to Bentheim and Dutch frontier (Apeldoorn) (Route 12).
			Bridge over road.	
11	13.3	LEWITZ	..	SER.
16	19.1	LEHME	..	Halt.
			Bridge over Dümme and Fries Canal.	
21	24.0	LEHME	..	SER; Wb (40 t), G.
			Line crossed by Leine, bridge, canal, 2 S.E. from Quakenbrück.	

<i>Distance from Salzbergen</i>	<i>Miles</i>	<i>Km.</i>	<i>Stations</i>	<i>Engineering works</i>	<i>Details and facilities</i>
20	32.2		GERREN		SER.
				Bridge over R. Havel.	J (facing) right with ST line to Quakenbrück.
*26½	42.8		MIPPEN	..	J (facing) right with ST line to factory.
29½	47.7		HARMEN	..	Halt.
33	53		HAREN		..
				Bridge over road.	
42½	61.7		LATHEN	..	SER; Wb (35 t).
43½	69.8		KLUSE	..	SER.
46	74.2		DÖRSEN		..
				Bridge over Canal.	
51½	83.5		ASCHENDORF	..	SER; Wb (35 t).
55½	88.8		PAPENBURG	Bridge over Canal.	SER; Wb (35 t); Cr (2.5 t).
59	95.0		STENFELDE	..	Halt.
*61	98.2		IRHMOVE	..	SER.
					J (trailing) left with DT line from Weener and Holland.
				Bridge over R. Leda.	
*65½	105.8		LEER	..	SER; Wb (40 t). Line continues north to Emden and east to Bremen (Route 26).

ROUTE No. 24

ROTTERDAM-KASSEL (via UTRECHT, ARNHEM, ZEVENAAR, EMMERICH, WESEL, OBERHAUSEN, MÜLHEIM, ESSEN, BOCHUM, DORTMUNDERFELD and HÖRDE) —

General details

1. Gauge: 1.435 m. (standard).
2. Length: 438.8 km. (272½ miles).
3. Track: HOLLAND: Rotterdam-Elten—Double.
GERMANY: Elten-Mülheim Styrum—Double.
Mülheim Styrum-Essen Hbf—Multiple.
Essen Hbf-Bochum Süd—Double.
Bochum Süd-Dortmunderfeld—Multiple.
Dortmunderfeld-Kassel—Double.
4. Maximum permissible axle load:
HOLLAND: Rotterdam-Elten—16 metric tons.
GERMANY: Elten-Hörde—20 metric tons.
Hörde-Böck Heide (Schwerte)—18 metric tons.
Böck Heide (Schwerte)-Fröndenberg—20 metric tons.
Fröndenberg-Bestwig—18 metric tons.
Bestwig-Warburg—19 metric tons.
Warburg-Kassel—20 metric tons.
5. Gradients: No information available, but between Meschede (416.3 km.) and Beringhausen (352.7 km.) line rises to an average of 0.300 m.
6. Curvature: No information available.
7. Traction: Steam throughout.
Electric—Rotterdam-Arnhem, Holland.
8. Maximum passenger speed:
HOLLAND: Maastricht to De Klomp, 114 km.—140 km.
GERMANY: Bielefeld to Hamm, 114 km.—140 km.

9. *Marshalling yards (MY):*

HOLLAND			GERMANY		
Location	Max. capacity per 24 hours	Division	Location		Max. capacity per 24 hours
Utrecht	1,200 wagons	Ennen	Nijmegen Stnd		5,000 wagons
Arnhem	1,000 "	Kavel	Langendreeer		3,000 "
			Mülheim-Kuhr-Speldorf		2,300 "

10. *Engine sheds (ES):*

HOLLAND			GERMANY		
Location	Division	Location	Type		Stabling capacity
Rotterdam Maas	Ennen	Essen Hbf	RH		Over 30 locos.
Gouda		Mülheim Styrum	RH		Over 30 "
Utrecht		Emmerich	Rect.		Up to 2. 30 "
Arnhem		Oberhausen	RH		c. 20-30 "
		Weesl	Rect.		Up to 2. 30 "
		Langendreeer	RH		c. 20-30 "
		Merthoog			" "
	Wuppertal	Arnsberg	Rect.		c. 20-30 "
		Fronenberg			" "
	Kassel	Kassel	RH		c. 30-40 "
		Scherfede			c. 20-25 "
		Warburg	RH		c. 20-25 "

11. *Watering facilities:*

HOLLAND: Rotterdam Maas, Gouda, Woerden, Utrecht, Arnhem, Zvenaar.

GERMANY: No information available, but adequate water supply assumed to exist, especially at all important stations.

12. *Valuable points (marked by asterisks in Detailed Description of line):*

- (a) *Marshalling yards and locomotive depots:* Described in paras. 9 and 10.
- (b) *Junctions at:* Rotterdam, Moordrecht, Gouda, Harmelen J., Utrecht, 78.9 km., Arnhem, Zvenaar, Emmerich, Esapel Ross, Weesl, Sterkrade, Oberhausen, Mülheim-Kuhr, Essen, Bochum, Langendreeer, Hörde, Schwerte (Aplerbeck Süd), Frondenberg, Freisenhl, Naster, Bitten-Wald, Scherfede, Warburg, Hümme, Oberwellmar, Kassel (Camel).
- (c) *Bridge (see Bridge Schedule):* 0.5, 11.4, 17.0, 18.1, 48.4 km., between 30.9 and 30.3 km., 100.9, 170.0, 173.0, 194.4, 196.0, 246.0 km., between 288.5 and 297.5 km. and 296.5 and 300.3 km., 300.3 and 320.6 km., 333.2 and 400.5 km.
- (d) *Tunnels (see Tunnel Schedule):* 232.9 km., between 302.3 and 307.5 km., 326.6 and 331.5 km., 339.0 and 339.5 km.

13. *Capacity:* Rotterdam-Oberhausen 60/72 trains per day each way
 Oberhausen-Dortmunderfeld 96 " " " "
 Dortmunderfeld-Kassel 60/72 " " " " of 500 tons net train load each.

Detailed description of line

Distance from Rotterdam Miles Km.	Stations	Engineering works	Details and facilities
0 0	ROTTERDAM MAAS	..	Terminus in City area. Facilities crowded alongside R. Maas. DES (Short) for carriages, left and right. ES, 2 LS, W left. 12 LS, quay sidings, sheds, Cr. right. Goods rolling stock stabled.
0 1/2 0.5		Bridge, DT, swing, over canal lies between station and shunting yard (length c. 47 m.). (No. 55 of Bridge Schedule.)	
1 1.8		..	J (facing) with BT line to Hillegersberg to left.
1 1/2 2.6		..	J (trailing) with DT line from Hillegersberg from left.
4 6.3	CAPELLE	..	DES; SR right.
6 10.6	NIEUWERKERK	..	DES; SR left; PL right.
7 11.4		Bridge, DT, swing, over Ringvaart Canal. (No. 56 of Bridge Schedule.)	
9 14.9	MOORDRECHT	..	Halt. SSU.
10 16.8		..	J (trailing) with line DT from the Hague, left.
10 1/2 17.0		Bridge, DT, swing, over Ringvaart Canal. (No. 57 of Bridge Schedule.)	
11 18.1		Bridge, DT, siding left, over R. Gouwe-Aar. (No. 58 of Bridge Schedule.)	

Distance from Holland Miles Km.		Stations	Engineering works	Details and facilities
12½	19½	GRUBBA	..	J (trailing), ST line from Alphen enters yard, left. SSt; 3 LS; DES (short) left. ES (small); 2 LS; DES; Tbl; SR right. W. 2 DES 1,600 m. long back to R. Gouwe. J (facing) with ST line to Schoonhoven, right.
13½	21½		Bridge, DT, over branch of Hollandsche-IJssel Canal.	
18½	30-0	OUDEWATER	..	2 PL; SR left; DES right.
21½	35-1	WOERDEN	..	J (trailing) with ST line from Leiden, left. 2 DES; SR left; 2 PL; SSt right. W. 3 through platforms, 250 yd. long.
23½	38-5		Bridge DT over canal.	
24	38-8	HARMELN (junction)	..	J (facing) with DT electrified line to Amsterdam, left. Short siding (private) right.
27½	43-9	VLEUTEN	..	DES (short), right.
29	46-4		Bridge, DT, lattice girder span (length 200 ft.). (No. 59 of Bridge Schedule.)	
31½	50-9	UTRECHT	..	ES; SSt; Rps (wagons and permanent way); W. 4 DES (4,800 wagons); Railway Head Offices left. MY (cap. 1,200 wagons per 24 hours) and DES; 1 Quay siding; 2 DES right. Large stocks passenger and goods rolling stock stabled.
			..	J (trailing) with DT electrified line from Amsterdam, left.
			Bridge. 3 DT rolling lift bridges over Vaartsche Canal. (No. 66 of Bridge Schedule.)	
			..	J (trailing) with DT electrified line from Hilversum and Amersfoort (Route 12).
			..	J (facing) with DT electrified line to Goudersloot, leaves through South end of MY.
34½	55-5	LEUVEN	Level crossing; ST line from Hilversum to 't Har- genbosch crosses main line from left.	
36½	58-9	BAAREN	..	Halt. DES (short) left.
36½	59-0		..	
37	59-9		Bridges, short spans, over streams.	
38½	62-5	DRILDBOEN	..	Passenger station left. 2 DES; SR right.
42½	68-8	MAAREN	..	6 DES and LS right. Permanent way material stored. Gravel and sand pits.
43	72-5	MAARSBROEN	..	DES; SSt; SR left; PL right.
47½	76-9		..	J (facing) right with DT spur to Amersfoort-Kesteren line.
48	77-1		Overbridge carrying ST line from Amersfoort to Kesteren.	
51½	84-3	DE KROON	..	DES; SR left; PL right.

Distance from Rotterdam		Stations	Engineering works	Details and facilities
Miles	Km.			
56½	91.3	ELDE-WAGeningen	..	J (trailing) left with ST s.o. line from Barneveld-Venst. J (facing) right with ST s.o. line to Wageningen from PL. 2 DES; SS; left; 4 LS right. Halt.
60½	97.0		..	
62	99.9	WOLFJEEZEN	..	PL left; DES; SR right.
64½	103.5	OOSTERBEEK	..	Halt.
*67	107.9	ARNHEM	End of electrified section from Rotterdam. West end of yard in cutting. East end on bank. Line continues on embankment; several under-bridges over wide streets in town area. High embankment to Westervoort bridge (112.9 km.) Bridges, short spans over narrow roads. Bridge, lattice girders, DT and road (1,500 ft. long). Reported damaged 1940, but restricted service restored by May, 1941. Over R. IJssel. (No. 62 of Bridge Schedule.)	J (trailing) with DT electrified line from Nijmegen, right (Route 17) Goods shed; SR (long); ES; Tbl; 12 DES and LS (cap. 1,000 wagons per 24 hours); SS; W; left. 3 platforms 300 yd. long.
68	109.6			Velperbroek J (facing) with DT s.o. line to Zutphen.
68½	110.0			
68½	110.0			
*70	112.9			
70½	113.7	WESTERVOORT	..	2 DES; SR left; PL right.
72½	116.9	DUTVEN	..	DES; SR left; PL right.
*75½	121.9	ZEVENAAR	..	2 DES left; 3 LS right; Tbl; W. J (facing) with ST s.o. line to Doetinchem left. 2 DES and LS at junction on left of Doetinchem line with SR.
78½	126.9			
80	129.0	ELTEN	..	SER; Wb (30 t). J (facing) right with ST line to Cleve.
82½	133.2		2 bridges over road.	
84½	135.8		2 bridges over road.	
85½	137.1		Bridge over road.	
*85½	137.8	EMMERICH	..	Wb (40 t); Cr (12 t); SER; LS; ES, rectangular type (cap. up to 20 locos.).
			Bridge over road. 2 bridges over road.	
89½	144.0	PRANST	..	Halt.
*92	147.9	EMPEL REES	Bridge over road.	SER; Wb (40 t). J (facing) left with ST line to Muelburg.
			Bridge over road.	
94½	151.9	HOLDERN	Bridge over road.	
95½	153.6		Bridge over road.	
96	154.6		Bridge over road.	
97½	157.5	MERIKUM	Bridge over road. Several bridges over secondary roads.	SER; Wb (30 t).
100½	162.2	DIERFORDT	Bridge over road.	Halt.
104½	168.1		Bridge over road.	J (trailing) left with ST line from Westervoort.
*105½	170.0	WISSE	Bridge over IJssel Canal	Wb (40 t); Cr (12 t); SER; LS; ES, rectangular type (cap. up to 20 locos.). J (facing) right with ST line to Westervoort.

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Distance from Hilversum		Stations	Engineering work	Details and facilities
Miles	Km.			
105 1/2	171.4		Bridges over R. Lippe; Bridges over road.	
*107 1/2	173.9		Bridge over Lippe-Seiten Canal at Wesel-Datteln.	J (facing) right carrying alternative DT line to Oberhausen (Route 14).
107 1/2	173.3	FRIDRICHVELD	2 bridges over road.	Halt.
110 1/2	177.8	VÖRDE		
111 1/2	179.9		Bridge over Friedr. Strasse.	
113 1/2	182.6	DINMAREN	Bridge over road.	Wb (30 t); Cr (3 t); SER; ES; DES; siding to cattle-yard.
114 1/2	184.2		Line crossed by overbridge carrying ST line from (?) Lohberg factory to alter- native line Wesel-Ober- hausen.	
115 1/2	186.3		Bridge over road.	
117 1/2	188.9	HOLTEN		
117 1/2	189.3		Bridge over road.	
117 1/2	189.6		Bridge over road.	
117 1/2	189.7		Line crossed by overbridge carrying Hanover-Düssel- dorf autobahn.	
118 1/2	190.6		Line crossed by overbridge carrying road.	
*120	193.1	STERKRODE		J (facing) right with ST line to Hamborn Neumühl. J (facing) left with DT line to Osterfeld Süd.
120 1/2	194.4		Line crossed by overbridge carrying DT line from Os- terfeld Süd to Hamborn Neumühl. Bridge over canal (Emscher- verlegung). Bridge over canal (Rhein- Herne Kanal).	
*121 1/2	196.0		Line crossed by overbridge carrying multiple tracks Os- terfeld Süd to Duisberg.	J (trailing) left with ST line from Osterfeld Süd. J (trailing) right with ST line from Wesel.
				J (facing) left with multiple track line to Essen-Frintop.
*122 1/2	197.2	OBERHAUSEN		SER; Wb (40 t); Cr (20 t); ES roundhouse (cap. 20-30 locos). J (facing) right with DT line to Duisberg-Ruhrort RpS (carriages and wagons). J (trailing) left with DT line from Essen-Frintop. J (facing) right with DT line to Duisberg (Route 13).
*124 1/2	199.9	MÜLHEIM-STEIN		SER; Wb (150 t); ES round- house type (cap. over 30 locos). J (facing) right with DT line to Mülheim Saarn.
*125	201.2	MÜLHEIM-RUHR		Wb (40 t); SER; Cr (45 t); Loco. RPS West of Mülheim Speldorf; MV at Mülheim Speldorf (cap. 1000 wagons per 24 hours).
127 1/2	204.2	MÜLHEIM-FRINTROP		SER; Wb (40 t); Cr (45 t); Loco. RPS West of Mülheim Speldorf; MV at Mülheim Speldorf (cap. 1000 wagons per 24 hours).

RAILWAYS

Distance from Rotterdam		Stations	Engineering works	Details and facilities
Miles	Km.			
*131½	211.9	EMMEN WAAZ	..	SER; Wb (40 t).
134	214.1	EMMEN HILF	..	Wb (30 t); ES, roundhouse type (cap. over 30 locos.). J (facing) right with DT line to Ratingen (Route 20). J (trailing) right with DT line from Ratingen (Route 20). J (facing) left with multiple track line to Alten-Essen and Bochum Präsident. J (facing) right with alternative DT line to Bochum via Steele North. Wb (30 t).
T35	217.5	KRAY-SÜD	..	SER; Wb (30 t). J (trailing) right with DT line from Steele North (alternative line re-joins).
137	222.1	WATTENBÜHLE	..	MY. J (facing) left with DT line to Münster (Route 21). J (trailing) left with DT line from Bochum-Präsident. J (facing) left with DT main line Witten.
*141	227.1	BOCHUM-SÜD	..	SER; Wb (33 t); Cr (20 t); ES, roundhouse type (cap. 20-30 locos.) MY (cap. 3,000 wagons per 24 hours). J (facing) with DT line to Witten.
*145½	234.6	LANGENDELER	..	SER; Wb (30 t). J (trailing) left with DT line from Huckarde. J (facing) left with DT line to Dortmund (Route 21). J (facing), with multiple track line to Dortmund. J (trailing) left with DT line from Dortmund. Present line crosses over lines Dortmund-Witten.
148	238.1	LUGENDORTMUND	..	J (trailing) right with ST line from Hagen.
150½	242.6		..	SER; Wb (30 t). J (facing) left with line to Aplerbeck.
*152½	246.0		Bridge over Neue-Emacher Canal. (?) Bridge over ST line Dortmund Süd-Hagen.	Line passes under multiple track line Unna to Schwerte. Present line avoids Schwerte. J (trailing) right with DT line from Schwerte.
*154	247.8	HÖRDE	..	Halt.
*156	251.3	APLERBECK SÜD	..	SER; Wb (30 t); Cr.
*157	252.9		Tunnel (c. 796 m. long).	J (trailing) left with ST line from Unna.
160½	257.9	GEISCKE	..	SER; ES. J (facing) right with ST line to Menden.
164½	264.5	LANGSCHEDE	..	Halt.
*167	268.6	FRONZENBURG	..	SER; Wb (30 t); Cr.
169½	274.3	WARMEN	..	
171½	278.5	WICKMÖR	Bridge over road.	

RAILWAYS

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<i>Distance from Rotterdam Miles Km.</i>	<i>Stations</i>	<i>Engineering works</i>	<i>Details and facilities</i>
175½ 282.5	NÄHRIM-HUTTEN	..	Wb (35 t); Cr; SER; factory sidings.
		Bridge over R. Ruhr. Line crossed by overbridge carrying road. Bridge over road. Bridge over R. Ruhr.	
*184½ 296.5	ARNBERG	..	SER; Cr; Wb (40 t); ES rectangular (cap. 20-30 engines); Tbl.
		Bridge over R. Ruhr. Bridge over road. Bridge over road.	
187½ 302.5	OEVENTROP	..	SER; Wb (35 t); Cr.
		Scheide Kopf tunnel (length c. 600 m.). Tunnel (length c. 500 m.). Bridge over R. Ruhr.	
*191 307.5	FREIENOHLE	..	SR; Cr; Wb (40 t). J (trailing) right with ST line from Weselhausen.
194½ 309.7	WENNEMEN	..	SER; Wb (40 t).
196½ 316.3	MESCHDE	Bridge over road. Bridge over Ruhr.	SER; Wb (40 t); Cr (5 t).
199½ 320.8	EVERBERG	..	Wb (35 t).
201½ 324.7	BESTWIG	..	SER; Wb (35 t).
*203 326.8	NUTTLAR	Bridge over road.	Cr (1.8 t). J (facing) right with DT line to Allendorf.
		Tunnel (c. 250 m. long).	
206 331.5	OLBERG	..	SER; Wb (40 t).
209½ 337.0	ELLERENHAGEN	Tunnel.	Halt. J (trailing) right with DT line to Korbach.
210½ 339.3	BILLO WALT	..	SER; Wb (40 t).
214½ 345.4	HOPPECKE	2 bridges over road.	
216½ 348.7	MEISINGHAUSEN	..	SR; Wb (35 t).
219 352.7	BERINGHAUSEN	..	Halt.
219½ 352.7	BREDELAR	Bridge over R. Diemel.	SER; Wb (40 t).
224½ 361.5	MANBERG	Bridge over R. Diemel.	SER; Wb (45 t).
228 366.8	WESTHEIM	..	SR; Wb (40 t); Cr (4.8 t).
232½ 373.7	WREXEN	..	SER; Wb (40 t).
*234½ 377.0	SCHERFFDE	..	SER; Wb (35 t); Cr (4 t); ES (cap. 20-25 engines). J (facing) left with DT line to Nörde. J (trailing) left with DT line from Nörde. J (facing) right with ST line to Volkmarsen.
*240½ 386.6	WACKERD	..	SER; Wb (35 t); Cr (0.75 t); ES roundhouse type (cap. 10-25 locomotives).
		Bridge over road. Bridge over R. Diemel.	

RAILWAYS

Distance from Rotterdam		Stations	Engineering works	Details and facilities
Miles	Km.			
244	392.6	HAUDDA	Bridge over road.	Halt.
245	394.9	LEBENAU	Bridge over R. Warne.	SR; Wb (32 T).
*248	400.5	LAMERDEN	..	SER.
250	403.3	EBERHÜTZ	2 bridges over roads.	Halt.
*252	406.7	HÖHNE	..	SER; Wb (40 t). J (trailing) left with ST line from Carlshafen.
			Bridge over road.	
256	412.2	HOPFENMAR	Bridge over road.	SER; Wb (40 t).
259	418.2	GREENSTEN	Line crossed by overbridge carrying road.	SER; Wb (40 t).
262	422.8	IMMENHAUSEN	..	SER; Wb (40 t).
264	427.1	MONCHENOF	Bridge over road.	SER; DES; Wb (40 t).
*268	431.3	OBERVELLMAR	..	J (trailing) right with ST from Volkmarren.
			Bridge over road.	SER; Wb (30 t). J (facing) left, with DT line to Camel MY and ES.
270	435.1	KAMEL HARLESBAUSEN	..	Halt.
			Bridge over road.	
			Line crossed by overbridge carrying road.	Lines from MY cross present line from left to right towards Wald- kappel and Gunterhausen and Kamel Wilhelmhöhe. J (trailing) right with ST line from Kamel Wilhelmhöhe.
				J (trailing) left from MY.
*272	43.88	KAMEL Hbf	..	SER; Cr (3 T); Wb (40 t); ES roundhouse type (cap. 30-40 locom.); Tbl; MY (cap. 2,300 wagons per 24 hours); RPS-locom., carriages and wagons.

ROUTE No. 13
UTRECHT-BONTEL

General details

1. Gauge: 1,433 m. (standard gauge).
2. Length: 62.3 km. (38½ miles).
3. Track: Double track throughout with exception of ST stretch between Hedel (43.1 km.) and south of R. Maas, total length 2.12 km.
4. Maximum permissible axle load: 16 metric tons.
5. Gradient: No information available, but it is estimated that no heavy gradients will be encountered.
6. Curvature: No information available.
7. Traction: Steam and electric throughout.
8. Main line distance between stations: 7.3 km. (4.5 miles), Culmburg to Gledermolen.
9. Main line (MY):

Locom.
Locom.
Locom.
Locom.

Locom.
Locom.
Locom.
Locom.

10. Engine sheds (V's):

Location
 Utrecht
 'Hertogenbosch
 Geldermalsen
 Breda

11. Weighing facilities:

Location
 Utrecht
 Geldermalsen
 'Hertogenbosch

12. Vulnerable points: (Marked by asterisks in detailed descriptions of line).

- (a) *Marshalling yards and locomotive depots:* Described in paras. 9 and 10.
 (b) *Junctions at:* Utrecht, Geldermalsen, 'Hertogenbosch, Vught, Bontel.
 (c) *Bridges (see Bridge Schedule):* Km. 0, 17-0, 25-5, 35-5, 44-1, 49-5.

13. Capacity: 48.60 trains per day each way, of 570 tons net train load each.

Detailed description of line.

Distance from

Utrecht

Miles Km.

0

0

UTRECHT

Stations

Engineering works

Details and facilities

Rolling lift bridge, 6 tracks
 over Vaartsche Canal.
 (No. 61 of Bridge Schedule.)

4 tracks, main lines to Arnheim and
 'Hertogenbosch. DT goods lines
 on right.
 MY right, 17 tracks, train length,
 cap. 1,200 wagons per day, goods
 sidings, quays sidings, goods sheds.
 SR; Cr. Goods lines leave main
 lines before passenger station.
 Between MY and passenger sta-
 tion. RPS (wagons and permanent
 way); Tbl; SSr.
 Passenger Station—6 through lines,
 3 through platforms, 3 ft. high
 300 yd. long, 6 bay platforms
 150 yd. Triangle between Amers-
 foort and Amsterdam lines; large
 RPS, ES, Tbl.
 J (facing) left with DT electrified
 line to Arnheim (Route 14).

1 1/2 9-7 LUNETTEN

Island platform 3 ft. high, 200 yd.
 long. 2 LS, DES on left.
 ST bypassing Utrecht, branches in
 sharp curve to the left, crossing,
 on the level, main line from
 Arnheim.

3 8-4 HOUTEN

PL left. DES; SR right. Low plat-
 forms.

7 1/2 12-3 SCHALKWIJK

PL left. DES; SR right. Low
 platforms.

*10 1/2 17-0

Bridge, DT (length 2,300
 ft.), over R. Lek (Rhine).
 (No. 63 of Bridge Schedule.)

11 1/2 18-2 CULEMBORG

3 PLs; DES; SR right. Platforms
 2 ft. 4 in. high, 200 yd. long.
 J (trailing) right with DT s.o. line
 from Dordrecht.
 Goods sidings (10 w) right.

*15 23-0

Bridge DT (length 600 ft.)
 over R. Lange.
 (No. 64 of Bridge Schedule.)

*18 1/2 26-0 GELDERMALSEN

J (facing) left with DT lines from
 Keizeren. Island platform 3 ft. high,
 300 yd. long, with wide road ap-
 proach from outside across the
 tracks.
 2 PLs, 1. 6 PLs, 2 or more DES,
 SR right. LS, Tbl, SSr.

19 1/2 28-1 WAGeningen

PL right. DES, SR left. Low
 platforms.

Rolling lift bridge, 6 tracks
 over R. Waal.
 (No. 65 of Bridge Schedule.)

RAILWAYS

<i>Distance from Utrecht</i> Miles Km.	<i>Stations</i>	<i>Engineering works</i>	<i>Details and facilities</i>
25½ 37.3	ZALT-BOMMEL	..	PL left. 2 or more DES, SR right. Platforms 2 ft. 4 in. high, 150 yd. long.
26½ 43.4	HENDRIK	..	Main line to South becomes ST. PL left; DES right.
*27½ 44.1		Bridge ST (length 2,400 ft.) over R. Maas. (No. 66 of Bridge Schedule.)	Main line to South becomes DT again.
31 49.5		..	J (trailing) left with DT a.o. line from Nijmegen.
*31 46.5		Swing bridge DT over Zuid-Willms Canal. (No. 67 of Bridge Schedule.)	
*31½ 50.1	S'HERTOGENBOSCH	..	4 through lines, 7 DES train length and several shorter sidings right (cap. 800 wagons per day). 12 DES; SR; Cr; shed left. Island platform 3 ft. high, 500 yd. long, and one platform 500 yd. long, with bay 200 yd. long, southern end left. ES; Tbl; W; SST.
*33½ 53.6		..	J (facing) right with ST a.o. line to Lage Zwaluwe.
33½ 54.1	VUURT	..	J (facing) right DT a.o. line to Tilburg.
36½ 58.8	EACH	..	PL right. DES, SR left. Platform 2 ft. 4 in. high, 100 yd. long.
*38½ 62.3	BOXTEL	..	PL left. DES right. Low platforms.
			J (trailing) right DT a.o. line from Tilburg.
			J (facing) left DT a.o. line to Goch at end of station (Route 9). 4 through lines, 2 PL, shorter goods sidings left. PL right. Goods shed, SR left—3 low platforms. ES; Tbl. Small MV.

ROUTE No. 16
EINDHOVEN-ROERMOND

General details

- Gauge: 1,435 m. (standard).
- Length: 53.1 km. (33 miles).
- Track: Double.
- Maximum permissible axle load: 16 metric tons.
- Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
- Curvature: No information available.
- Traction: Steam throughout.
- Maximum distance between stations: Maarheeze-Weert, 10.1 km. (6½ miles).
- Marshalling yards (MV): Eindhoven (1,000 wagons per 24 hours).
- Engine sheds (ES): Roermond, Eindhoven.
- Watering facilities (W): Weert, Eindhoven, Roermond.
- Telephone points: Marked by asterisks in detailed description of line.
- Marshalling yards and locomotive depots: Detailed in paras. 9 and 10.
- Locomotive depots: Eindhoven, Weert and Roermond.
- Bridge and trestle schedule: At 27½ and 46½ km.
- Passenger service: 100 passenger cars per day each way, of 1000 net ton capacity each.

RAILWAYS

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Detailed description of line

Distance from Eindhoven		Stations	Engineering works	Details and facilities
Miles	Km.			
*0	0	EINDHOVEN	..	See Route 17 MY (cap. 1,000 wagons per 24 hours).
1½	3.0	TONGERLARE	..	Halt.
2½	4.4		Bridge, DT, over Kind- hoven Canal.	
3½	6.1	GELDEROP	..	DES (short); SR left; PL (a) right.
7½	11.6	HEERLEENDEN	..	DES (short); SR left; PL right.
9	14.5	STERREEL	..	DES (short) right.
11½	18.9	MAARHEZE	..	DES (short) left; PL right.
16½	27.0		..	DT line from Neerpelt approaches from right.
*17	27.4		Bridge, a DT, parallel lat- tice girder spans over Zuid- Willems Canal. (No. 37 of Bridge Schedule.)	
*18	29.0	WEERT	..	J (trailing) right with DT line from Neerpelt. PL left; DES; PL right; W; SR.
21½	35.0		Bridge DT over Wemern- Nederweert Canal.	
23½	37.4	KELFEN	..	DES (short); SR left; PL right.
25½	41.4	BARKEN-HEIJTWOZEN	..	DES; SR left; PL right.
28½	46.2	HARLEN	..	DES (short); SR left; PL right.
*30	48.3		Bridge, DT, lattice girder spans over R. Maas (length 264 m.). (No. 38 of Bridge Schedule.)	
*33	53.1	ROERMOND	..	J (trailing) left with ST line from Venlo. ES; a DES; SR; Cr; goods shed; Tb; left DES; 10 LS right; W; passenger and goods rolling stock stabled. J (facing) right with DT line to Maastricht.

ROUTE No. 17

ARNHEM-KENIPEN (via NIJMEGEN, KLEVE, GOCH and GELDERN)

General details

- Gauge: 1.433 m. (standard gauge).
- Length: 99.9 km. (62 miles).
- Track: Double.
- Maximum permissible axle load: 16 metric tons.
- Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
- Curvature: No information available.
- Traction: Steam.
Electric—Arnhem to Nijmegen.
- Maximum distance between stations:
HOLLAND: 10.8 km. (6½ miles), Nijmegen to Groesbeek.
GERMANY: 7.2 km. (4½ miles), Geldern to Nieukerk.
- Marshalling yards (MY):

HOLLAND

Location
Arnhem
Eindhoven
Nijmegen

Max. capacity per 24 hours
Passenger
Goods

RAILWAYS

10. Engine sheds (ES):

HOLLAND
Location
Arnhem
Nijmegen

Division
Köln

GERMANY
Location
Kempen

Type
RH.

Stabling capacity
c. 20-30 *locomotives*.

11. Watering facilities:

HOLLAND
Location
Arnhem
Elst
Nijmegen

GERMANY

No information available, but adequate water supply assumed to exist, especially at all important stations.

12. Valuable points: (Marked by asterisks in detailed description of line)

- (a) *Marshalling yards and locomotive depots:* Described in paras. 9 and 10.
- (b) *Junctions at:* Arnhem, between Km. 10-7 and 12-7, Nijmegen, Kieve (Cleve), Goch, Geldern, Kempen.
- (c) *Bridges (see Bridge Schedule):* Km. 4-0, 17-2, between Km. 39-2 and 66-3, Km. 76-2 and 81-2.

13. Capacity: 60/72 trains per day each way, of 500 tons net train load each.

Detailed description of line

Distance from Arnhem		Stations	Engineering works	Details and facilities
Miles	Km.			
0-0	0	ARNHEM	..	4 through tracks (line Amsterdam-Zurphen passes through station). 12 LS and DES, train length and longer, right. At East end of station yard, passenger station, 3 platforms 3 ft. high, 300 yd. long, large goods shed; SR 100 yd. right; ES; Tbl; W; ES. (MY, cap. 1,000 wagons per day.) J (facing) right with DT electrified line to Utrecht (Route 14).
2-2	3-2	OOSTERBEEK	..	PL right; DES; SR left.
2-2	4-0		Bridge, DT, lattice girder spans (length 1,200 ft.) over R. Rhine. (No. 68 of Bridge Schedule.)	
6-6	10-7	ELST	..	PL left. Large MY with two groups of over 10 LS, each train length, each with shunting neck both ends, and seven all shunting sidings. SR 200 yd.; W; low platforms. J (facing) right with DT line to Keiteren.
8	12-7	REMEN-BEMMEL	..	J (trailing) right with DT line from Keiteren.
10-10	17-2		Bridge, DT, lattice girder span (length 1,500 ft.), over R. Waal. (No. 69 of Bridge Schedule.)	
11	17-8	NIJMEGEN	..	4 through tracks, 3 platforms 3 ft. high, 500 yd. long, one bay, far end left 200 yd.; 8 DES train length and longer, right. Several shorter sidings right and left. Sheds, SR, Cr left. ES; Tbl; W; MY (cap. 1,000 wagons per day). DT main line to 'Hertogenbosch leaves station in curve to right. Main DT line to Venlo and present line continue side by side. Main line to Venlo diverges to right, to junction.
15-15	23-6	GROENBEEK	..	PL left; DES; SR left. Low platforms.
16-16	31-0	GERMAN FRONTIER		
22	35-6	KEITEN	Bridge over road Bridge over canal	SR, W, etc.
24	39-2	NEEDS		PL

RAILWAYS

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Distance from Arnhem		Stations	Engineering works	Details and facilities
Miles	Km.			
26½	42.5	LOVENHAGEN	..	Halt. J (trailing) left with ST line from Elten.
			Bridge over road.	
29	47.5	KLEVE (Cleve)	..	SER. Wb (75 t), Cr (10 t). J (facing) left with ST line to Menschen West.
			Bridge over road. Bridge over road.	
32½	52.3	BESBURG-HAU	..	SER.
34½	55.3	PVALSDORF	..	SER. J (facing) right with ST line to Winnenthal. J (trailing) left with DT line from Hausum and Gennep (Route 9).
*36½	59.2	GOCH	..	J (trailing) right with ST line from Boxtel (Route 9).
			Bridge over R. Niers. Line crossed by overbridge carrying ST line to Win- nenthal. Bridge over road.	
*41½	66.3	WEEZ	Bridge over road. 2 bridges over river.	SER; Wb (30 t).
45	72.4	KEVELAER	Bridge over road.	SER; Cr (5 t); Wb (30 t).
*47½	76.2	WETTEN	Bridge over road. Bridge over Niers Kanal.	..
*50½	81.2	GELDEREN	Bridge over road. Bridge over river. Line crossed by overbridge carrying ST Venlo-Wesel line.	SER; Cr (5 t); Wb (30 t). J (facing) left with ST loop to ST line Venlo-Wesel.
55	88.5	NEUKERK	Bridge over road.	SER; Cr (3-75 t); Wb (26 t).
57½	92.2	ALDERKOP	Bridge over road. Bridge over R. Landwehr. Bridge over stream (Vinn- brück). Bridge over road.	SER; Cr (4 t).
60	96.5	ST HUBERT-VÖSCH	(?) Bridge over river. (?) Bridge over river.	Halt. ES RH (cap. 20-30 locos.); Tbl.
*62	99.9	KEMPEN	Bridge over ST Kempen- Sicheteln line.	SER; Wb (35 t); Cr (10 t). J (trailing) left with ST line from Huls and Wesel (Route 10). J (facing) right with ST line to Kaldenkirchen (Route 10).

ROUTE No. 18

KÖLN BREMEN via DÜSSELDORF, DUISBURG, OBERHAUSEN, GELSENKIRCHEN,
RECKLINGHAUSEN, HALTERN, MÜNSTER and OSNABRÜCK

General details

1. Gauge: 1433 mm. standard gauge.

2. Length: 1107 km. (688 miles).

3. For C. K. to Oberhausen—Double.
Oberhausen to Essen—Altenessen—Mülheim
Altenessen to Gelsenkirchen—Duisburg
Gelsenkirchen to South of Recklinghausen—Haltern—Münster
South of Recklinghausen to Bremen—Duisburg

4. For S. R. to Bremen—Duisburg—Münster—Haltern—Recklinghausen—Gelsenkirchen—Duisburg

RAILWAYS

5. *Gradients*: No information available, but it is estimated that no heavy gradients will be encountered.
6. *Curvature*: No information available.
7. *Traction*: Steam throughout.
8. *Maximum distance between stations*: 13.5 km. (8½ miles), *Bolmer to Lernfeld*.
9. *Marshalling yards (MY)*:

Division	Location	Max. capacity per 24 hours
Essen	Essen-Frintrop	3,400 wagons
	Wanne-Eickel	3,200 "
	Duisburg Hbf	3,600 "
	Gelsenkirchen Hbf	2,000 "
	Düsseldorf Derendorf	2,100 "
Wuppertal	Osnabrück	2,100 "
Münster	Münster	2,000 "
	Kirchweyhe	3,000 "
Köln	Köln-Deutz	
Hanover	Bremen Rangierbahnhof	4,100 "

10. Engine sheds (ES):

Division	Location	Type	Stabling capacity
Essen	Essen-Frintrop	RH	Up to 20 locos.
	Gelsenkirchen	RH	6. 20-30 "
	Wanne-Eickel	RH	Over 30 "
	Recklinghausen	RH	6. 20-30 "
	Duisburg Hbf	RH	Over 30 "
Wuppertal	Oberhausen	RH	6. 20-30 "
	Düsseldorf Derendorf	RH	Over 30 "
Köln	Köln Hbf	..	..
	Köln-Deutz	Rect.	Over 30 "
Münster	Münster	Rect.	6. 20-30 "
	Haltern	RH	Up to 20 "
	Osnabrück Hbf	RH	6. 40-45 "
	Osnabrück Gbf	..	..
Hanover	Bremen Hbf	RH	..
	Bremen Rangierbahnhof	RH	..
	Bremen Walle	RH	..

11. *Watering facilities*: No information available, but adequate water supply assumed to exist, especially at all important stations.

12. *Vulnerable points*: (Marked by asterisks in detailed description of line)

- (a) *Marshalling yards and locomotive depots*: Described in paras. 9 and 10.
- (b) *Junctions at*: Köln (Cologne), Mülheim, Langenfeld, Düsseldorf, Duisburg, Oberhausen, Essen, Gelsenkirchen, Wanne-Eickel, Recklinghausen, Haltern, Münster, Osnabrück, Km. 322.3, Bremen.
- (c) *Bridges (see Bridge Schedule)*: Km. 0.3, between km. 16.3 and 23.2, between km. 41.3 and 44.5, km. 54.9 and 62.1, km. 62.1 and 69.8, km. 73.0 and 78.9, km. 81.1 and 84.1, km. 93.3 and 97.7, km. 97.7 and 105.8, km. 203.9 and 210.0, km. 321.5.

13. <i>Capacity</i> :	Köln-Oberhausen	72 trains per day each way	} of 300 tons net train load each.
	Oberhausen-Recklinghausen	96 " " "	
	Recklinghausen-Bremen	72 " " "	

Detailed description of line

Distance from Köln		Stations	Engineering works	Details and facilities
Miles	Km.			
0.0	0	KÖLN Hbf	..	PL. 9 tracks running through station served by similar number of platforms under single arched roof span. ES.
0.1	0.3		Bridge over Frankgasse. Bridge (Hohenzollernbrücke) over R. Rhine (4 tracks). (No. 39 of Bridge Schedule.)	
0.7	1.2	KÖLN-DEUTZ	..	ES (rectangular type) with 2 Tbl (cap. over 30 locos.). MY. [(trailing) left from LS. [(facing) right DT to Köln-Kalk. Line passes alongside Deutzer Feld MY. [(facing) right to Köln-Hohenberg MY. [(trailing) left from Deutzer Feld MY.
0.31	5.0	MÜLHEIM	..	[(facing) right with DT line to Opladen. [(facing) right with DT line to Mülheim-Rosenthal line
			Bridge over DT Mülheim & station	

RAILWAYS

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Distance from Köln		Station	Engineering works	Details and facilities
Miles	Km.			
		MÜLHEIM (contd.)		J (facing) right with ST line to Opeladen. J (trailing) left with DT line from goods station. J (facing) left with ST line to Leverkuen.
8½	13.5	LEVERKUEHN-WIESBOHN	Bridge over R. Dhänn.	
10	16.3	KUPPERTHO	Bridge over R. Wuppe.	SER; Cr; Wb (33 t).
*14½	23.2	LANGENFELD	..	J (facing) left with ST line to Hildorf. SER; Wb (33 t).
			Bridge over Alten Rhein. Bridge over road. Bridge over road.	
19½	31.5	DÜSSELDORF-BENRATH	..	Halt.
20½	32.6	DÜSSELDORF-BENMOLE	..	..
21	33.9	DÜSSELDORF-BENMOLE (Goods Station)	..	SER; Wb (40 t); Cr (10 t). J (trailing) right with DT from Opeladen. J (facing) right to Lierenfeld Goods Station.
			Bridge over R. Ick.	
*25½	41.3	DÜSSELDORF Hbf	..	Junction with DT line from Neum. SER; Wb (40 t); FS.
			Line crossed by overbridge carrying DT Düsseldorf- Vohwinkel line.	J (trailing) right with DT line from Lierenfeld Goods Station.
			Line crossed by 3 over- bridges carrying roads.	
*27½	44.5	DÜSSELDORF-DEKENSDORF	..	SER; Wb (40 t); Cr (2.5 t). MY (cap. 2,100 wagons per day). ES, roundhouse type (cap. over 30 locos.).
			Line crossed by 3 over- bridges carrying roads. Bridge over Kittel-Brücke.	J (facing) right with DT line to Ratingen and Mülheim on Ruhr. (Route 20). J (facing) left with ST line to Zeppelin Hangars. J (trailing) left with ST line from Zeppelin Hangars.
29½	47.8	DÜSSELDORF-UNTERRATH	Bridge over Schwarz Bach. Bridge over road.	Halt.
31½	51.0	KALKUM	..	SER.
			Bridge over road. Bridge over Rahme Bach. Line crossed by overbridge carrying road.	
34	54.9	GROSSENBAUM	..	SER.
			Line crossed by overbridge carrying DT line Krefeld and Neum. to Mülheim (Rhine).	Lanes from Mülheim and Krefeld Neum. run parallel with present line (Route 11).
*34½	62.1	DÜSSELDORF Hbf		SER; Cr (250); Wb (40 t); FS. roundhouse type (cap. over 30 locomotives). MY (cap. 1,600 wagons per day).

RAILWAYS

Distance from Köln Miles Km.		Stations	Engineering works	Details and facilities
			Line crossed by overbridge carrying multiple track Oberhausen West to Ratingen.	J (facing) right with DT line to Oberhausen West (KpS wayruns).
			Bridges over DT Duisburg Meiderich to Mülheim-Stryum.	J (facing) right with DT line to Mülheim (Ruhr)-Stryum.
43 1/2	69.8	OBERHAUSEN Hbf		Passenger station, c. 14 platforms of which 7 are island. ES (RH type) c. 20-30 locos. KpS—carriage and wagons. SER; Wb (40 t); Cr (20 t). Oberhausen W; MY (cap. 3,100 wagons per day). ES. J (trailing) left with DT line from Duisburg-Meiderich. J (facing) left with multiple track line to Sterkrade. J (facing) right with ST line to Osterfeld Nord. J (trailing) left with multiple tracks from Sterkrade and Duisburg Hbf.
			Line crossed by overbridge carrying ST line Oberhausen Hbf to Osterfeld Nord.	
46	74.3	EMEN FREITROP		Cr (20 t); ES (RH, cap. up to 20 locos). MY (cap. 5,400 wagons per day).
46 1/2	75.0	EMEN DELLWIG	Line crossed by overbridge DT line Oberhausen West to Emen Hbf.	Halt.
				J (facing) left with DT line to Bottrop Süd.
49	78.9	EMEN BERG-BORBECK		Wb (32 t). J (trailing) left with ST line from Bottrop Süd. J (facing) right with ST line to Emen Nord.
			Line crossed by overbridge carrying ST line from Horst MY to Emen Nord.	
50 1/2	81.1	EMEN ALTEN-ESEN	Bridge over Verle Berne stream.	Wb (30 t); SER; Cr (20 t). J (trailing) left with DT line from Emen Nord. J (trailing) right with ST line to Emen.
			Line crossed by overbridge carrying DT line from Katernberg Nord to Emen.	
52	84.1	KATERNBERG SÜD	Bridge over DT line Gelsenkirchen-Schalke Süd to Emen.	Wb (40 t).
			Bridge over stream.	J (trailing) left with DT line from Gelsenkirchen-Schalke Süd. J (trailing) right with ST line from Emen (Route 20).
54 1/2	88.2	GELSENKIRCHEN Hbf	Line crossed by overbridge carrying 1 track along main line to Wanne and 1 track by an overbridge to Wanne.	Wb (40 t); Cr (20 t); SER; MY (cap. 2,000 wagons per day); ES; RH (cap. 20 to 30 locos). J (facing) right with ST line to Gelsenkirchen-Wattenscheid.

RAILWAYS

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Distance from
Kala
Miles Km.

Stations

Engineering works

Details and facilities

Bridge over IYT line Gelsen-
kirchen-Schalke and
Wanne-Unser-Fritz to
Wanne.

J (trailing) right with IYT line from
Bochum-Klemke.
J (trailing) left with DT line from
Gelsenkirchen-Schalke.
J (trailing) left with ST line from
Wanne-Unser-Fritz.
J (trailing) right with DT alterna-
tive route from Gelsenkirchen and
ST from Gelsenkirchen-Watten-
scheid.

*28 93.5 WANNE-EICKEL

ES, RH (cap. over 30 locos); Wb
(40 t); SER.
MY (cap. 5,000 wagons per day).
J (facing) left with six track line to
Herne (Route 22).

Two tracks of line crossed
by flyover bridge carrying
three tracks from Wanne-
Eickel to Herne.
Line crossed by overbridge
carrying DT line Wanne-
Unser-Fritz to Herne.
Bridge over stream.

J (trailing) left with short ST spur
joining DT from Wanne-Unser-
Fritz.
J (trailing) right with short ST
spur joining DT line from Bochum-
Klemke and ST from Herne.

2 consecutive bridges over
Rheine-Herne Canal and
Neue Emacher river.

60 97.7 RECKLINGHAUSEN SÜD

Bridge over stream.

SER; Wb (40 t).

Bridge over DT line from
Recklinghausen Ost.

J (facing) right with short ST spur
to Recklinghausen Ost.
RpS for goods wagons adjoining
Reck. Ost Stn. Staff c. 3,000.
J (trailing) right with DT line from
Herten and Recklinghausen Ost.

*65 103.8 RECKLINGHAUSEN Hbf.

Bridge over stream.

SER; Wb (50 t); Tbl (20 m.
diam.). Main RpS (coaches and
wagons); ES, roundhouse (c. 20-30
locos.).

J (trailing) left with DT line from
Dortm. (Route 9).

*70 112.7 HALTERN

SER; Wb (33 t); ES (up to 20
locos.).

STATION

Halt.

Bridge over Mühlen Brücke.
Line crossed by overbridge
carrying road.

77 124.9 DUESSEN

SER; Wb (40 t); Cr (20 t).
J (trailing) left with DT line
from Coersfeld.

Line crossed by 2 over-
bridges carrying roads.

82 131.9 BOCHUM

SR

Line crossed by 2 over-
bridges carrying roads.
J (facing) left with DT line from
Coersfeld.

83 138.0 BOCHUM

SER

Line crossed by 2 over-
bridges carrying roads.
J (facing) left with DT line from
Coersfeld.

Distance from Köln		Stations	Engineering works	Details and facilities
Miles	Km.			
88	141.5	BORANNOFF	Line crossed by overbridge carrying road. Bridge over stream.	SR.
89	144.4	ALBACHTEN	Line crossed by overbridge carrying road.	SR.
91	147.7	MECKLENBURG	..	J (facing) right DT to Osnabrück by-passing Münster.
93	150.9	GERT	..	Halt. J (trailing) left with ST line from Werne. J (trailing) right with DT line from Hamm (Route 21). J (trailing) right with loop line from Hamm-Münster main line. Line separates and runs on either side of Münster Goods Station.
*95	154.2	MÜNSTER Hbf	..	SER; Wb (40 t); Cr (15 t). ES, rectangular shed (cap. 20-30 locom.); Tbl; MY. J (facing) left with DT line to Rheine. J (facing) right with DT line to Warendorf. J (trailing) right with DT alter- native line from Oberhausen.
99	160.3	SODMÜLLER	..	SER.
102	165.4	WESTERVEN	Line crossed by overbridge carrying road. Bridge over stream.	..
106	171.7	BROCK-OSTERVEN	2 bridges over stream.	..
110	177.7	KATTENVENNE	..	..
111	179.2	..	Bridge over R. Buller.	J (trailing) right with ST line from Iburg.
113	185.4	LENGERICH	..	SER. (?) J (facing) left with ST line to Rheine.
118	190.8	NATRUP-HAGEN	..	..
119	192.3	..	2 bridges over stream.	..
121	195.2	HAASBERGEN	..	J (trailing) left with ST line from Rheine. J (trailing) right with ST line from Paderborn. J (facing) right with DT line to Berlin and Minden. J (trailing) right with ST line from Berlin and Minden.
*126	203.9	OSNABRÜCK Hbf	1) Bridge over DT Amster- dam-Berlin line.	SER; Wb (40 t). ES, roundhouse with Tbl; also radial tracks (partly covered) with Tbl (cap. 40-45 engines); MY (cap. 2,100 wagons per day); RPS (goods wagons) 500 m. north of main station on line to Bremen. J (trailing) right with DT line from Berlin. J (facing) right with ST line to MY. J (trailing) left with line from Am- sterdam (Route 12) and Oldenburg.

OSNABRÜCK HAGEN
Exact location
unknown

Wb (40 t); Cr (15 t)

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Distance from Köln Miles	Km.	Stations	Engineering works	Details and facilities
		COLOGNE-HAVEN (cont.)	Bridge over Bremer Str. Bridge over Haaster Weg. Bridge over Gartlager Weg. 2 small bridges over roads.	
130½	210.0			
131	211.0	BAUM	..	Halt.
133½	214.5	VENHRT	Bridge over road.	SER.
137	220.4	OSTERKAPPELN		
140	225.2		Bridge over autobahn to Hanover.	
141½	226.2	BOHME	..	SER; Wb (35 t). J (trailing) right with ST line from Minden and Hannover. J (facing) left with ST line to Hildorf.
142	229.9		Bridge over road.	
149	240.0		Bridge over road to Oms- brück.	
150	241.7	LEMPFORD		SER.
151½	244.0		Bridge over road.	
153½	247.4		Bridge over road.	
154½	248.8	LEMBRUCH	Bridge over road.	SER.
160½	258.1	DIEPHOLZ	Bridge over road.	SER; Wb (30 t). J (facing) right with (?) ST line to Sulingen.
161½	260.3		2 bridges over roads.	
166½	267.9	DRESEER	2 bridges over roads.	SER.
170½	274.8	BARNSTORF	Bridge over road.	SER.
174½	280.7	DRENTWEDER	..	SR.
178½	287.9	TWENTINGEN	Bridge over road.	SER; Wb (35 t).
179½	288.9		Bridge over road.	
184	296.1		2 bridges over road.	J (trailing) right with ST line from Sulingen.
184½	296.8	BAUM	..	SER; Wb (35 t).
187	300.9	BRAMSTEDT	..	Halt.
190½	306.3	SYKE	2 bridges over road.	SER; Wb (35 t).
192	309.3		Bridge over road.	
192½	310.2	BARNEN	Bridge over road.	
*105½	314.6	KIRCHWEYER	Bridge over road.	SER; Wb (40 t). MY (cap. 5,000 wagons per day). J (facing) left with ST line to Huchting.
			Bridge over ST Dreding- hausen-Huchting line.	
199	320.5	DRAYE	Bridge over road.	Halt.
*199½	321.5		Bridge, DT, over R. Weser (length c. 604 m.). (No. 74 of Bridge Schedule.)	
*200½	322.3		..	J (facing) right with DT line Bremen-Hamburg (No. 23).
202	325.2	HENSELINGEN-BREMEN	Bridge over road.	J (trailing) right with DT line from Hannover.
*206	330.7	BREMEN HM	..	Wb (60 t); Cr (20 t). 2 FS (half RH joined by 1 RPS right). 2 TBL. MY at Bremen Rangierbahnhof cap. 4,100 wag- ons.

RAILWAYS

ROUTE No. 19

DUSSELDORF-HAMM

(via WUPPERTAL, HAGEN, SCHWERTZ and UNNA)

General details

1. Gauge: 1,435 m. (standard gauge).
2. Length: 102.4 km. (62½ miles).
3. Trunk: Düsseldorf Hbf to Düsseldorf-Gerresheim—Multiple.
Düsseldorf-Gerresheim to Erkrath—Double.
Erkrath to Hochdahl—Multiple.
Hochdahl to Gruiten—Double.
Gruiten to Schwelm—Multiple.
Schwelm to Hagen—Double.
Hagen to North of Schwerte—Multiple.
North of Schwerte to Holzwickede—Double.
Holzwickede to Unna—Multiple.
Unna to Hamm—Double.
4. Maximum permissible axle load: 20 metric tons.
5. Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
6. Curvature: No information available.
7. Traction: Steam throughout.
8. Maximum distance between stations: 9.1 km. (5½ miles), Schwerte to Holzwickede.
9. Marshalling yards (MY):

Division	Location	Max. capacity per 24 hours
Essen	Hamm	10,000 wagons
Wuppertal	Vohwinkel	2,800 "
	Hengstey (Hagen)	2,330 "
	Schwerte	2,200 "
	Langerfeld	" "

10. Engine sheds (ES):

Division	Location	Type	Stabling capacity
Essen	Hamm	Rect.	Over 30 locos.
Wuppertal	Düsseldorf Hbf	"	"
	Elberfeld-Steinbeck	Rect.	Over 30 "
	Wuppertal-Langerfeld	RH	Over 30 "
	Wuppertal-Vohwinkel	RH	Over 30 "
	Holzwickede	RH	Up to 6. 20 "
	Schwerte	RH	Over 30 "
	Hagen-Eckesey	RH	Over 30 "

11. Watering facilities (W): No information available, but adequate water supply assumed to exist, especially at all important stations.

12. Vulnerable points: (Marked by asterisks in detailed description of line)

- (a) Marshalling yards and locomotive depots: Described in paras. 9 and 10.
- (b) Junctions at: Düsseldorf, Gruiten, Wuppertal-Vohwinkel, between km. 33.3 and 35.3, Schwelm, Hagen, Hagen (Hengstey), Schwerte, Holzwickede, Unna, Hamm.
- (c) Bridges (see Bridge Schedule): Between km. 0 and 6.0, kil. 21.4, 24.0, between km 33.3 and 35.3, kil. 59.4, 87.5, between km. 97.5 and 102.4.
- (d) Tunnels (see Tunnel Schedule): Km. 71.8.

13. Capacity: 96 trains per day each way, of 500 tons net train load each.

Detailed description of line

Distance from Düsseldorf Miles Km.	Stations	Engineering works	Details and facilities
0.0 0	DUSSELDORF Hbf		SER; Wb (40 t); ES. Parallel lines leave station to Duis- burg (Route 18).
0.4 0.7		Bridge over DT Benrath- Duisburg line.	J (trailing) left with ST line from Duisburg. J (leading) left with ST line to Mulheim-am-Ruhr.
0.4 2.1		Bridge over ST line from Mulheim-am-Ruhr to main line Duisburg-Benrath.	J (leading) left with DT to Mul- heim-Opladen line
2.1 4.3		Line crossed by overbridge carrying DT to Mulheim- Opladen	J (leading) left with ST line to Mulheim-Opladen line

<i>Distance from Duisburg Miles</i>	<i>Km.</i>	<i>Stations</i>	<i>Engineering works</i>	<i>Details and facilities</i>
31	5.4	DÜSSELDORF GERRAHRIM	..	SER; Wb (33 t). J (facing) left with DT line to Ellerfeld.
31	6		Bridge over Düssel Bach.	
4	6.4		Bridge over stream.	
5	8.1	ERKRATH	..	SER; Wb (40 t). 3 parallel lines from Erkrath to Hochdahl.
51	9.4		Line crossed by overbridge carrying road.	
61	10.9	HOCHDAHL	..	SER; Wb (40 t).
91	15.7	GRUTTEN	..	SER; Wb (35 t). J (trailing) right with DT line from Opladen. 4 lines run parallel from Grutten to Vohwinkel. J (trailing) right with ST line from Solingen.
111	18.4	VONWINKEL MY	..	(Cap. 2,800 wagons per day). J (facing) left with DT line to Kupferdreh.
121	20.7	WUPPERTAL-VONWINKEL	..	SER; Wb (40 t); Cr; ES, round-house type (cap. over 30 locos). J (facing) right with DT line to Ellerfeld.
131	21.4		Line crossed by overbridge carrying DT line Vohwinkel to Ellerfeld.	
141	23.3	WUPPERTAL-SONNBOHN	..	Halt.
141	23.7		Line crossed by overbridge carrying road.	
15	24.0		Bridge over R. Wupper (length c. 100 m.). (No. 70 of Bridge Schedule.)	
15	24.1	WUPPERTAL ZOOLOGICAL GARDENS	..	Halt. J (trailing) right with DT line from Cronenberg.
161	26.8	STEINBECK	..	SER; Wb (40 t); Cr (15 t).
17	27.6	WUPPERTAL ELBERFELD	..	Halt.
18	29.2	UNTER BARMEN	..	SER; Wb (40 t); Cr (7.5 t).
191	31.1	WUPPERTAL BARMEN	..	SER; Wb (34 t); Cr.
201	33.3	BARMEN RITTERSHAUS	..	SER; Wb (40 t); Cr (25 t). J (facing) right with DT line to Lennep.
			Bridge over R. Wupper.	J (facing) right with DT line to Lennep and to Langerfeld MY. J (trailing) right with ST line from Lennep.
			Line crossed by overbridge carrying DT line to Langerfeld MY.	
24	40.5	WUPPERTAL LANGERFELD	..	Wb (35 t); Cr (30 t); MY; 2 ES (semi-roundhouse type). J (trailing) left from MY. J (facing) left with ST line to Hagen.
241	42.2	SCHWALM	..	SER; Wb (40 t); Cr (25 t). J (facing) left with ST line to Hagen.
261	44.4	ALSTADT	..	SER; Cr (25 t). J (facing) left with ST line to Albstadt.

RAILWAYS

Distance from Duisburg Miles	Distance from Duisburg Kms.	Stations	Engineering works	Details and facilities
27½	44.3	GRVELANBERG	Bridge over stream. Bridge over stream. Bridge over stream.	Halt.
28½	45			
28½	45.9			
29½	47.4			
30½	49.7	HAGEN	Bridge over road.	SER; Wb (40 t); Cr (10 t). J (trailing) left with DT loop from Barmen-Eckesey line.
33	53.4	HAGEN	Bridge over river.	SER; Wb (50 t); Cr (25 t). J (facing) left with line to Hagen- Eckesey Station (ES). 4 tracks run parallel until Schwerte.
34½	55.9		Line crossed by overbridge carrying road.	J (facing) left with DT line to Huttingen. J (trailing) left with DT line from Huttingen. J (trailing) left with ST line from Horde.
*36	58.0	HENSTEDT-MY		MY (cap. 2,350 wagons per day). J (facing) left with DT line to Altena. J (facing) right with DT line to Altena.
36½	58.9		Line crossed by overbridge carrying DT line to Altena. Line crossed by overbridge carrying ST to join present line.	J (trailing) left and right from Altena.
*36½	59.4		Bridge over confluence of R. Lenne and R. Ruhr.	
38½	62.5	WESTROFEN		Wb (40 t).
39½	64		Line crossed by overbridge carrying road.	
*42½	68.1	SCHWERTE		ES, roundhouse (cap. over 30 locoa.); SER; Wb (40 t); Cr 10 t); MY (2,200 wagons daily); RPS (locoa.) 2,000 m. North-East of main station. J (facing) right DT to Scherfede and Kassel (Route 14).
43½	69.7		Bridge over loop line linking Scherfede line to present line.	J (trailing) left with DT line from Scherfede. J (facing) left with DT line to Dortmund.
44	70.9			
*44½	71.8		Tunnel (c. 800 m. long).	
*48	77.2	HOLZWICKEDT		ES, roundhouse (up to c. 20 locoa.). SER; Wb (40 t); Cr (10 t). J (trailing) left with DT line from Horde.
48½	78.7		Bridge over road.	
49½	80.0		Line crossed by overbridge carrying road.	
49½	80.1		Line crossed by overbridge carrying autobahn.	
51	84	USSA		SER; Wb (40 t); Cr (25 t). J (facing) right with ST line to Freudenberg. J (facing) right with DT line to Sest.
*51½	85.5		Line crossed by overbridge carrying DT line from Nott- mund to Sest-Hamm and Line crossed by overbridge carrying road.	
51½	85.9			

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Distance from Düsseldorf Miles Km.	Stations	Engineering works	Details and facilities
56 1 57 9	ESSEN	Line crossed by overbridge carrying autobahn.	
60 1 97 5	WUCHENHEDDORF	Line crossed by overbridge carrying tracks from float line to Hamm MY.	Mkt. J (trailing) left to Hamm MY. J (trailing) right with DT line from Essen. Line runs parallel with Hamm MY.
100 1 100 4	HAMM		SER; Wb (60 t); Cr (15 t); MY (cap. 10,000 wagons per day); ES (rectangular, cap. over 30-locos.).

ROUTE No. 20

DÜSSELDORF-GELSENKIRCHEN (via RATINGEN and ESSEN)

General details

- Gauge: 1'435 m. (standard gauge).
- Length: 44.9 km. (27 1/2 miles).
- Track: Düsseldorf to Essen—Double.
Essen to Kray-Nord—Multiple.
Kray-Nord to Gelsenkirchen Hbf—Double.
- Maximum permissible axle load: Düsseldorf to Essen-Werden—20 metric tons.
Essen-Werden to Essen-Süd—18 metric tons.
Essen-Süd to Gelsenkirchen—20 metric tons.
- Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
- Curvature: No information available.
- Traction: Steam throughout.
- Maximum distance between stations: 5.8 km. (3 1/2 miles), Essen Süd—Kray Nord.
- Marshalling yards (MY):

Division	Location	Max. capacity per 24 hours
Wuppertal	Düsseldorf-Derendorf	2,100 wagons
Essen	Gelsenkirchen Hbf	2,000 "

Division	Location	Type	Stabling capacity
Essen	Gelsenkirchen Hbf	RH	c. 20-30 locos.
	Katzenberg	RH	Up to c. 20 "
Wuppertal	Düsseldorf Hbf		
	Düsseldorf-Derendorf	RH	Over 30 "

- Watering facilities: No information available, but adequate water supply assumed to exist, especially at all important stations.
- Vulnerable points: (Marked by asterisks in detailed description of line)
 - Marshalling yards and locomotive depots: Described in paras. 9 and 10.
 - Junctions at: Düsseldorf, between Km. 17.6 and 21.1, Essen, Kray Nord, Rothhausen, Gelsenkirchen.
 - Bridges (see Bridge Schedule): Km. 21.1, between km. 32.2 and 34.2.
 - Tunnels (see Tunnel Schedule): Km. 18.3.
- Capacity: 72 trains per day each way, of 500 tons net train load each.

Detailed description of line

Distance from Düsseldorf Miles Km.	Stations	Engineering works	Details and facilities
0 0 0 0	DÜSSELDORF Hbf	Line crossed by flyover bridge carrying 4 tracks from Neuss to Wuppertal.	SER; Wb (40 t); ES. J (trailing) left with 4-track line from Wuppertal (Route 19); 4 tracks of present line pass under 4-track Neuss-Wuppertal line towards Düsseldorf-Derendorf. 2 additional tracks from Düsseldorf Hbf run direct to Düsseldorf-Derendorf. J (trailing) right with DT line from Köln-Denz. J (trailing) right with DT line from Wuppertal.

RAILWAYS

Distance from Düsseldorf		Stations	Engineering works	Details and facilities
Miles	Km.			
0.2	3.3	DÜSSELDORF-LIERSFELD	..	SER; Wb (40 t); Cr (25 t); MY (cap. 2,100 wagons per 24 hrs.); HS, roundhouse type (cap. over 30 locos.).
3.1	5.2		Bridge over Düssel stream. Line crossed by overbridge carrying road.	J (facing) left with DT line to Duisberg.
4	6.4		Bridge over Kiesel stream.	J (trailing) right with DT line from Düsseldorf-Liersfeld.
4.4	7.2	DÜSSELDORF-RATH	..	SER; Wb (40 t); Cr (15 t). J (facing) right with ST line to Essenwig. J (facing) left with DT line to Mülheim.
5.1	8.3		Bridge over Schwartz stream.	J (facing) left with ST line to Rath-Mülheim line.
7.1	12.0	RATINGEN OST	..	SER; Wb (40 t); Cr (10 t).
8.1	13.3		Bridge over Jäger Bach. Bridge over ST line Ras- ingen West to Wülfrath.	
8.1	14.0		Bridge over stream.	
9	14.8		Bridge over stream.	
9.1	15.3		Bridge over stream.	
11	17.6	HOMER	Bridge over stream.	SER; Wb (31 t). Length c. 450 m.
11.1	18.3		Tunnel	J (trailing) left with DT line from Duisberg.
11.1	19.0		Bridge over stream.	J (trailing) right with ST line from Wülfrath.
13	21.1		Bridge over R. Ruhr (length 190-2 m.). (No. 71 of Bridge Schedule.)	
14.1	22.9	KETTWIG	..	SER; Cr (75 t); ES, roundhouse (cap. up to c. 30 locos.).
16.1	27.1	EMEN-WERDEN	..	SER; Wb (40 t); Cr (5 t). J (facing) right with DT line to Hettingen.
18.1	29.9	EMEN HÜDEL	..	Hak. PL.
20	32.2	EMEN STADTWALD	..	PL.
			Bridge over DT line from Emen-Ruttenchied to Emen Rellinghausen. Bridge over stream. Bridge over ST line from Mülheim to (?) factory.	
21.1	34.2	EMEN SÜD	..	PL.
22	35.3		..	J (facing) left with DT spur line to Emen Hbf.
			Line crossed by overbridge carrying DT line Emen Hbf to Kray Süd.	J (trailing) left with c. 6 track line from Emen Hbf. J (facing) right with c. 6 track line converging to 1 to 2 tracks east to Kray Süd and 2 tracks South-East to Steele. J (facing) left with DT line to Stoppenberg. J (trailing) left with DT line from Mülheim.
24.1	40.0	KRAY NORD	..	Wb (40 t). J (facing) right with DT line to Eschum.

Distance from Dortmunderfeld Miles Km.	Stations	Engineering works	Rolling stock and facilities
*26 12.8	KORTHAUSEN	..	Wb (90 t); J (trailing) with DT line to Gelsen- kirchen Schalke.
*27 44.9	GELSENKIRCHEN Hbf	..	MY (cap. 2,700 wagons per 24 hours); SPK; Wb (40 t); Cr (20 t); ES, roundhouse type (cap. 20-30 locos); J (trailing left with DT line from Oberhausen (Route 18)). J (trailing) left with DT line from Gelsenkirchen Schalke.

ROUTE No. 22

DORTMUNDERFELD-MÜNSTER (via HAMM)

General details

- Gauge: 1,435 m. (standard).
- Length: 79.2 km. (44.8 miles).
- Track: Dortmundfeld-Dortmund Hbf—Multiple.
Dortmund to Scharnhorst—Double.
Scharnhorst to Hamm—Multiple.
Hamm to Münster—Double.
- Maximum permissible axle load: 20 metric tons.
- Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
- Curvature: No information available.
- Traction: Steam throughout.
- Maximum distance between stations: Kamen to Nordbögge Hbf, 10 km. (6½ miles).

9. Marshalling yards (MY):

Division	Location	Max. capacity per 24 hours
Rhein	Hamm	10,000 wagons
	Dortmunderfeld	3,000 "
Münster	Münster	2,000 "

10. Engine sheds (ES):

Division	Location	Type	Stabling capacity
Rhein	Dortmund Hbf	Rect.	Over 30 locos.
	Dortmunderfeld	"	" "
	Hamm	"	" "

- Watering facilities: No information available, but adequate water supply is assumed to exist, especially at all important stations.

- Vulnerable points: (Marked by asterisks in detailed description of line).

(a) Marshalling yards and locomotive depots: Described in paras 9 and 10.

(b) Junctions at: Dortmundfeld, Dortmund, between 28-2 and 38-9 km., Hamm, Hilstrup, Münster.

- Capacity: Dortmundfeld-Hamm 96 trains per day each way | of 300 tons net train load
Hamm-Münster 72 " " " " each.

Detailed description of line

Distance from Dortmunderfeld Miles Km.	
0 0	DORTMUNDERFELD

ES, rectangular (cap. over 30
locos); Wb (32 t); MY (cap.
3,000 wagons per 24 hours).
DT lines from Schwerte (Route 14)
and Witten Ost run parallel
through station.
4 tracks run parallel towards Dort-
mund.

Line crossed by overbridge
carrying multiple track from
Bochum to Weller.

Junction for with DT line from
Bochum, 2 tracks run parallel
to Dortmund.

*Distances from
Dortmunderfeld*
Miles Km.

0 1 1/2 2-1 DORTMUND Hbf

Line crossed by overbridge
carrying DT line Lunen to
Dortmund Sbd.

Wb (32 t); Cr (7-5 t); ES, rect-
angular (cap. over 30 locos.).
J (trailing) left with multiple track
from Gelsenkirchen (Route 22).
J (facing) left to Lunen.

5 8-0 DORTMUND FLUGHAFEN

Halt.

J (trailing) left with DT line from
Gelsenkirchen.
(7) line to Hamm, quadruple
track, running parallel.
Line runs parallel to Scharnhorst
MY.

7 1/2 10-0 KURL

Bridge over stream.

Wb (30 t).

10 1/2 16-6

11 1/2 18-2 KAMEN

Line crossed by overbridge
carrying autobahn.
Line crossed by overbridge
carrying autobahn.

SER; Wb (32 t).

13 1/2 21-7

17 1/2 28-2 NONNESTERN

Halt.

J (facing) left to join line Lunen-
Hamm.
Main lines from Unna (Route 19)
and Lunen run parallel with
present line through MY.

23 36-9 HAMM

ES, rectangular (cap. over 30
locos.); SER; Wb (60 t); Cr
(15 t); MY (cap. 10,000 wagons
per 24 hours).
J (facing) right with DT line to
Ahlen.

23 1/2 38-4

25 40-2

Bridge over stream.

25 1/2 40-9 ECKELDORF

SER.

30 48-4 MÜNCHEN

Bridge over road.

Cr (7-5 t).

32 1/2 52-6 DRAHTESBURG

2 bridges over road.
Line crossed by overbridge
carrying road.
Bridge over stream.

SER; Wb (35 t).

34 54-6

36 1/2 58-6 REINERDORF

Line crossed by overbridge
carrying road.
Bridge over Kemmer stream.
Bridge over stream.

SER.

40 1/2 63-1

40 1/2 63-4

40 1/2 63-7 HILTRUP

Line crossed by (?) over-
bridge carrying loop line
from Haltern, avoiding Mün-
ster.

J (facing) right with alternative
line to Münster.

J (trailing) left with DT main line
from Recklinghausen and Haltern
(Route 18).
J (trailing) right DT from Hamm,
alternate line rejoining.
Lines separate and run on either
side of Münster goods yard.

44 1/2 72-2 MÜNSTER Hbf

SER; Wb (40 t); Cr (15 t); ES
rectangular (cap. 20-30 locos.);
MY

ROUTE No. 28
GELSENKIRCHEN-DORTMUND

General details

1. *Gauge*: 1,435 m. (standard).
2. *Length*: 30.6 km. (19 miles).
3. *Track*: Gelsenkirchen to North of Herne—Multiple.
North of Herne to Dortmund Hbf—Double.
4. *Maximum permissible axle load*: 20 metric tons.
5. *Gradients*: No information available, but it is estimated that no heavy gradients will be encountered.
6. *Curvature*: No information available.
7. *Traction*: Steam throughout.
8. *Maximum distance between stations*: Herne to Rauzel, 7.9 km. (4½ miles).
9. *Marshalling yards (MY)*:

<i>Division</i>	<i>Location</i>	<i>Max. capacity per 24 hours</i>
Esen	Gelsenkirchen	2,000 wagons
	Wanne-Eickel	5,200 "
	Dortmund Vbf	4,800 "
	Herne	2,400 "

10. *Engine sheds (ES)*:

<i>Division</i>	<i>Location</i>	<i>Type</i>	<i>Stabling capacity</i>
Esen	Gelsenkirchen	RH	c. 20-30 locos.
	Herne	RH	" "
	Wanne-Eickel	RH	over 30 locos.
	Dortmund Hbf	Rect.	" "
	Dortmund MY (Vbf)	Rect.	" "

11. *Watering facilities*: No information available, but adequate water supply assumed to exist, especially at all important stations.
12. *Valuable points*: (Marked by asterisks in detailed description of line.)
 - (a) *Marshalling yards and locomotive depots*: Described in paras. 9 and 10.
 - (b) *Stations at*: Gelsenkirchen, Wanne-Eickel, Herne, Mengede and Dortmund.
 - (c) *Bridges between* 0-0 and 5.3 km., 24.3 and 27.9 km.
13. *Capacity*: 96 trains per day each way, of 500 tons net train load each.

Detailed description of line

<i>Distance from Gelsenkirchen</i>	<i>Stations</i>	<i>Engineering works</i>	<i>Details and facilities</i>
<i>Miles</i>	<i>Km.</i>		
0	0	GELSENKIRCHEN Hbf	SER; Wb (40 t); Cr (20 t); MY (cap. 2,000 wagons per 24 hours); ES, roundhouse type (cap. 20-30 locos.); J (facing) right with ST to Gelsenkirchen-Wattenscheid.
		Line crossed by flyover bridge carrying one track along main route to Wanne and one track by an alternative route to Wanne. Bridges over DT lines Gelsenkirchen-Schalke and Wanne-Unser-Fritz to Wanne.	J (trailing) right with ST line from Bochum-Riembe. J (trailing) left with DT line from Gelsenkirchen-Schalke. J (trailing) left with ST line from Wanne-Unser-Fritz. J (trailing) right with DT alternative route from Gelsenkirchen and ST from Gelsenkirchen-Wattenscheid.
0.1	5.3	WANNE-EICKEL	SER; Wb (40 t); ES, roundhouse type (cap. over 30 locos.); MY (cap. 5,200 wagons per 24 hours); J (facing) left with quadruple track line to Recklinghausen. (2 tracks passing under present route) (R/W 10).
		Bridge over DT line to Recklinghausen.	

RAILWAYS

Distance from Cottbus/Hirschow Miles Km.		Stations	Engineering works	Details and facilities
		WANNE-EICKEL (contd.)		J (facing) right with short ST spur connecting with DT line Reckling- hausen to Bochum-Riemke.
5	8.1		Line crossed by overbridge carrying DT line Reckling- hausen and Wanne-Unser- Fritz to Bochum-Riemke.	
36	54		Line crossed by flyover bridge carrying ST line from Recklinghausen and Wanne-Unser-Fritz to Herna.	J (trailing) left with ST line from Recklinghausen and Wanne- Unser-Fritz.
*51	92	HERNA	Line crossed by flyover bridge carrying 2 of 4 tracks to Bönning.	SER; Wb (30 t); Cr (15 t); MY (cap. 2,400 wagons per 24 hours); ES, roundhouse type (cap. 20-30 wagons).
			Bridge over stream. Bridge over stream.	J (facing) right with quadruple track to Bönning (2 tracks on fly- over).
104	171	RAUXEL	..	SER; Wb (32 t).
*134	213	MENHARD	..	SER; Wb (30 t). J (facing) right with ST line to Niederschwingen. J (facing) left with DT line to Dortmund-Obervinge (one track on flyover).
			Line crossed by flyover bridge carrying ST to Dort- mund-Obervinge.	J (trailing) left with DT line from Dortmund-Obervinge. J (trailing) right with quadruple track from Hueslarde.
			Bridge over Neue Escher River.	Dortmund-Ems Canal docks to left of line with rail connections. J (trailing) right with 6 track line from Dortmundfeld Barop and Hörde-Hacheney.
*164	279	DORTMUND MY (Vbf)	..	Wb (30 t); Tbl; MY (cap. 4,800 wagons per 24 hours); ES, rect- angular (cap. over 30 locos.).
*19	306	DORTMUND Hbf	..	SER; Wb (32 t); PL; Tbl; Cr (7.5 t); ES, rectangular (cap. over 30 locos.).

ROUTE No. 29
BREMEN-HAMBURG Hbf

General details

1. Gauge: 1,435 m. (standard).
2. Length: 116.1 km. (72 miles).
3. Track: Bremen to Hamburg-Harburg—Double.
Hamburg-Harburg to Hamburg Hbf—Quadruple.
4. Maximum permissible axle load: 20 metric tons.
5. Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
6. Curves: No information available.
7. Traction: Steam throughout.
8. Maximum distance between stations: Bremen Hbf to Oberneuland, 11.4 km. (7 miles).

9. *Marshalling yards (MY):*

<i>Division</i>	<i>Location</i>	<i>Max. capacity per 24 hours</i>
Hamburg	Hamburg-Wilhelmsburg	4,200 waggons
"	Hamburg-Harburg	"
Hannover	Bremen-Rangerbahnhof	4,100 "

10. *Engine sheds (ES):*

<i>Division</i>	<i>Location</i>	<i>Type</i>	<i>Stabling capacity</i>
Hannover	Bremen Hbf	RH	"
"	Bremen-Rangerbahnhof	RH	"
"	Bremen-Walle	RH	"
Hamburg	Hamburg-Harburg	(?) RH	"
"	Hamburg-Wilhelmsburg	"	"
"	Hamburg Hbf	RH	"

11. *Watering facilities:* No information available, but adequate water supply assumed to exist, especially at all important stations.

12. *Vulnerable points:* (Marked by asterisks in detailed description of line).

(a) *Marshalling yards and locomotive depots:* Described in paras. 9 and 10.

(b) *Junctions at:* Bremen, between 12.3 and 18.4 km., Rotenburg, Sprötze, Hamburg-Harburg, Hamburg.

(c) *Bridges (see Bridge Schedule):* 43.3, 67.0 km., between 95.3 and 104.1 km., 106.0, 115.1 km., between 115.0 and 116.1 km.

13. *Capacity:* 70 trains per day each way, of 500 tons net train load each.

Detailed description of line

<i>Distance from Bremen</i>	<i>Stations</i>	<i>Engineering works</i>	<i>Details and facilities</i>
<i>Miles</i>	<i>Km.</i>		
0	0	BREMEN Hbf	Passenger Station; SR; 2 ES (half RH) joined by (?) RPS; 2 Tbl. J (facing) left with DT line to Bremen-Weserbahnhof and Oldenburg (Route 26).
1	0.9	BREMEN Gbf (Goods station)	SER; DES; Wb (60 t); Cr (30 t). J (trailing) left with DT line from Bremen-Weserbahnhof and Oldenburg (Route 26). J (facing) left with multiple track to Bremen-Walle and Bremen-Rangerbahnhof MY (Route 24). J (trailing) left with DT line from Rangerbahnhof MY.
		(?) overbridge carrying ST line from Bremen to Zaven. Line crossed by overbridge carrying autobahn. Line crosses 4 culverts or bridges over irrigation canal.	
7 1/2	12.3	OSERNEULAND	SER. J (trailing) right with DT line from Osnabrück (Route 18).
		Line crosses 2 bridges or culverts over irrigation canals.	
11 1/2	18.4	SAGEHORN	SER. Line crosses 10 bridges or culverts over irrigation canals. 2 bridges over roads.
15 1/2	23.4		
16	26.0	OTTERBERG	SER. Line crosses 4 culverts or bridges over irrigation canals.
18 1/2	29.8		
20 1/2	33.0		
21	33.8	SOTTAUM	SR. Line crosses 4 irrigation culverts or bridges. (?) bridge over ST line from Bremerhaven. J (trailing) right with ST line from Bremerhaven. J (trailing) right with ST line from Verden. J (facing) right with ST line to Vöhrsevede.

Distance from Bremen		Stations	Engineering works.	Details and facilities
Miles	Km.			
*27	43.3	RIJTBURG	Bridge over Wümm stream 2 bridges or culverts over irrigation canals.	SER; Wb (35 t).
32½	52.7	SCHNARL	4 bridges or culverts over irrigation canals.	SER; Wb (40 t).
36½	58.4	LAUBENBUCH	3 bridges or culverts over irrigation canals.	SER.
41	65.9	KÖNIGSDORF	Bridge over Wümm stream.	..
*41½	67.0		Bridge over stream.	..
43½	69.8			
45	75.5	TORSDT	Bridge over Eise stream.	..
47	75.5			
*49½	79.3	SPRÖTZ	(?) bridge over ST line from Bremervörde.	J (trailing) right with ST line from Saltan. J (trailing) right with ST line from Bremervörde.
52	84.0	BUCHOLD	..	SER; Wb (33 t).
55½	89.9	KLECKEN	Bridge over autobahn.	SER.
58½	91.1			
*59½	95.3	HITTFELD	Bridge over DT line Lüne- burg to Hamburg.	SER.
*64½	104.1	HAMBURG-HAMBURG	..	MY; SER; Wb (40 t); Cr (15 t); ES. J (trailing) right with DT line from Lüneburg. J (facing) left with DT line to Cuxhaven. Line continued as quadruple track to Hamburg Hbf.
*66	106.0		Bridge carrying quadruple track over southern branch of R. Elbe (length c. 618 m.) (No. 72 of Bridge Schedule.)	
*68	109.6	HAMBURG-WILHELMSTRADE	..	SER; Wb (30 t); Cr (5 t); ES (?) RH; MY (cap. 4,800 wagons per 24 hours). Sidings to shipyards and wharves on left and right of line.
			Bridge over Vedel Canal.	J (trailing) left with DT line from Freihafen (dockyards).
69½	111.9	VEDDEL	2 parallel DT bridges over northern branch of R. Elbe (length c. 300 m.) (No. 73 of Bridge Schedule.)	Halt.
*70½	113.1			
70½	113.4	ELB-BRÜCKE	..	Halt. J (trailing) right with ST loop from main line Berlin-Hamburg. J (facing) left to Hamburg Hbf.
71½	115.0	CUXHAVEN	Line crossed by (?) over- bridge carrying ST line to Sandtorhafen. Bridge over Oberhafen canal (length c. 160 m.) (?) Bridge over S F line from Hanover Hbf to main line Berlin-Hamburg.	Halt. J (trailing) right with DT line from Berlin.

Distance from
Bremen
Miles Km.
9.72 15.61

Stations

Engineering works

Details and facilities

Hamburg Hbf

Covered passenger station with
6, 2 island and 6, 2 single-faced
platforms served by 6, 6 through
tracks. ES (RH) with Tbl situated
South-East of station on the North
side of Oberhafen.

ROUTE No. 24

BREMEN-WESERMUNDE-BREMERHAVEN-SPECKENBÜTTEL

General details:

1. Gauge: 1,435 m. (standard gauge).
2. Length: 64.6 km. (40 miles).
3. Track: Double.
4. Maximum permissible axle load: 20 metric tons.
5. Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
6. Curvature: No information available.
7. Traction: Steam throughout.
8. Maximum distance between stations: 7.1 k.m. (4.4 miles), Lübberstedt to Stubben.
9. Marshalling yards (MY):

Division	Location	Max. capacity per 24 hours
Hanover	Bremen Rangier Bhf Speckenbüttel	4,100 wagons

10. Engine sheds (ES):

Division	Location	Type	Stabling capacity
Hanover	Bremen Hbf	RH	..
	Bremen Rangier Bhf	RH	..
	Bremen Wallc	RH	..
	Speckenbüttel	RH	..

11. Watering facilities: No information available, but adequate water supply assumed to exist, especially at all important stations.

12. Variable points: (Marked by asterisks in detailed description of line).

- (a) Marshalling yards and locomotive depots: Described in paras. 9 and 10.
- (b) Junctions at: Bremen, Burg-Lesum, Osterholz, Wesermünde-Wulsdorf, Speckenbüttel.
- (c) Bridges: Between Km. 7.3 and 11.1, Km. 32.2, 50.2, 57.3.

13. Capacity: 60 trains per day each way, of 500 tons net train load each.

Detailed description of line

0	BREMEN Hbf	..	Passenger station; SR; 2 ES (half roundhouse, joined by (?) RpS); 2 Tbl. J (trailing) right ST from Park.
1	0.9 BREMEN Gbf (Goods Station)	..	SER; DES; Wb (60 t); Cr (20 t) J (facing) left with DT line to Weser Bhf and Oldenburg. J (trailing) left with DT line from Weser Bhf and Oldenburg. J (facing) right with DT line to Hamburg.
*11	2.9 BREMEN WALLC	..	ES with (?) RpS; Tbl. J (trailing) right with DT line from Hamburg.
*3	5.1 BREMEN RANGIER Bhf (MY)	..	MY (cap. 4,100 wagons per day). 1 ES (roundhouse type) with (?) RpS; Tbl.
41	7.3 BREMEN OLFENHAUSEN	..	J (facing) left with ST line to Bremen-Inlandshafen and western port zone.

Bridge over Grambker See.
Bridge over R. Hamme.

Distance from Bremen		Stations	Engineering works	Details and facilities
Miles	Km.			
*7	11.1	BURG LESUM	Line crossed by overbridge carrying autobahn. Bridge over stream.	SER; W6 (30 t); Cr (5 t). J (trailing) left with DT line to Lesum, St. Magnus and Bremerhafen (alternative route).
10	16	RITTERHUDE	3 bridges over streams or irrigation canals.	SER.
*13	21.2	OTTERHOLE SCHARMBECK		SER. J (facing) right with DT line to Bremerförde.
17½ 20	28 32.2	OLDENBURG	Bridge over Giehler stream.	
21½	34.9	LÜBBESTEDT	3 bridges over streams.	SR; Cr (7.5 t).
26 27½	42 44.2	STUBBEN	Bridge over stream.	
29½ 31½	47.3 50.2	FRECHLUNDEBERG	Bridge over Grosse Becke stream.	SR.
33½	54	LOHSTEDT	2 bridges over streams.	SER.
33½	57.3		Bridge over Rohr stream.	J (trailing) left with ST alternative route from Bremen. J (trailing) right with ST line from Bremerförde and Hamburg.
*36½	58.7	WESERMÜNDE-WULFSDORF		SER. J (facing) left with DT line to Fischerhafen (docks). J (facing) left with DT line to Wesermünde West. J (trailing) left with DT line from Wesermünde West.
38½	61.9	WESERMÜNDE-BREMERHAFFEN		Wb (30 t). J (trailing) left with (?) DT (?) factory siding.
		WESERMÜNDE-LEHNE		
*40	64.6	SPECKENBÜTTEL		ES. Tbl. J (facing) left to Speckenbüttel MY, Bremerhafen docks and ST to Cuxhafen (Route 23). J (facing) right ST to Bederkesa.

ROUTE No. 25

SPECKENBÜTTEL-CUXHAVEN

General details

1. Gauge: 1:435 m. (standard).
2. Length: 37.5 km. (23½ miles).
3. Track: Speckenbüttel to 33.7 km.—Single.
33.7 km. to Cuxhaven—Double.
4. Maximum permissible axle load: 17 metric tons.
5. Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
6. Curvature: No information available.
7. Traction: Steam throughout.
8. Maximum distance between stations: Nordholz to Alsterwalde, 6.4 km. (4 miles).

9. *Marshalling yards (MY):*

<i>Division</i>	<i>Location</i>	<i>Max. capacity per 24 hours</i>
Münster	Emden	2,000 wagons
Oldenburg	Oldenburg	2,100 "
Hanover	Bremen Rangierbahnhof	

10. *Engine sheds (ES):*

<i>Division</i>	<i>Location</i>	<i>Type</i>	<i>Stabling capacity</i>
Münster	Emden		
Hanover	Bremen Hbf	RH	
	Bremen Rangierbahnhof	RH	
	Bremen Wallf.	RH	
Oldenburg	Oldenburg Hbf	RH	c. 20 locos.
	Oldenburg MY		

11. *Watering facilities:* No information available, but adequate water supply assumed to exist, especially at all important stations.

12. *Vulnerable points:* (Marked by asterisks in detailed description of line).

(a) *Marshalling yards and locomotive depots:* Described in paras. 9 and 10.

(b) *Junctions at:* Bremen, Delmenhorst, Hude, Neuenwege, Oldenburg, Ocholt, Km. 108.2, Emden.

(c) *Bridges:* Between Km. 0.9 and 3.6, Km. 86.0, between Km. 129.8 and 134.1.

13. *Capacity:* Bremen-Oldenburg 60-72 trains per day each way } of 400-500 tons net train
Oldenburg-Km. 108.2 20 " " " } load each.
Km. 108.2-Emden 60-72 " " " }

Detailed description of line

<i>Distance from Bremen</i>		<i>Stations</i>	<i>Engineering works</i>	<i>Details and facilities</i>
<i>Miles</i>	<i>Km.</i>			
0	0	BREMEN Hbf		Passenger Station. ER; 2 ES (half RH's joined by (?) RPS); 2 Tbl. J (trailing) right with ST line from (?) municipal slaughter house.
0½	0.9	BREMEN Gbf (Goods Station)		SER; DES; Wb (60 t); Cr (20 t). J (facing) right to Hamburg, Bremerhaven and Bremen Wallf. J (facing) right DT to Bremen eastern port zone. J (facing) right to Weser Bbf port goods station.
			Bridge over R. Weser (length c. 200 m.).	
2½	3.6	BREMEN NEUSTADT		SER; Wb (33 t); Cr (9 t). J (trailing) right from north side of Hohentors Haven (southern port zone). J (trailing) right from south side of Hohentors Hafen (southern port zone). J (facing) right to large Gas Works and sidings.
4½	7.4	HUCHTING		SR. J (facing) left with ST line to Hannover and Osnabrück.
			Bridge over road. 3 bridges over streams.	
7	11.2	HAIDERUO		
9	14.6	DELMEHORST		SER. J (trailing) right with ST line from Wesermünde. J (trailing) left with ST line from Harpat. J (facing) left with ST line to Vechta.
12½	19.9	SCHIEDEBROK		
14½	23.3	ROCKHOLZBERG		SER; Wb (110).
17½	26.6	HUDE		SER; Wb (110). J (facing) right with ST line to Neukirchen.
20½	31.7		Line crossed by overbridge curving road.	

9. *Marshalling yards (MY):*

Division	Location	Max. capacity per 24 hours
Hannover	Speckenbüttel	..

10. *Engine sheds (ES):*

Division	Location	Type	Stabling capacity
Hannover	Speckenbüttel	RH	..
	Cuxhaven	RH	..

11. *Watering facilities (W):* No information available, but adequate water supply assumed to exist, especially at all important stations.

12. *Vulnerable points:* (Marked by asterisks in detailed description of line).

(a) *Marshalling yards and locomotive depots:* Described in paras. 9 and 10.

(b) *Junctions at:* Speckenbüttel, 1.8 km., Cuxhaven Stadt.

13. *Capacity:* 20-25 trains per day each way, of 400-500 tons net train load each.

Detailed description of line

Distance from Speckenbüttel Miles	Km.	Stations	Engineering works	Details and facilities
0.0	0	SPECKENBÜTTEL	..	ES; Tbl; MY. DT line runs through MY until J at 1.8 km. when it becomes ST to Cuxhaven. J (facing) left DT to Bremerhafen dock.
0.1	1.8		..	
3	4.7	INSUM	2 bridges over streams.	SER.
5 1/2	8.6	WRESEN	Bridge over stream.	SER.
6 1/2	10.8		Bridge over stream.	
7 1/2	11.7	MULSUM	2 bridges over streams.	Halt.
9	14.5	DORUM	Bridge over road.	SER.
9 1/2	15.5		Bridge over road.	
11 1/2	18.9	CAFFEL-MIDLETH	Bridge over road. 2 bridges over streams.	SER.
14	22.4	SPIEKA	Bridge over road.	SR.
15 1/2	25.3	NORDNOLE	..	Wb (50 t).
19 1/2	31.3	ALTENWALDE	..	SER. J (trailing) right DT from Ham- burg.
23 1/2	37.5	CUXHAVEN STADT	..	SER; Wb (40 t). c. 16 LS. ES (RH). Branches continue, to serve (1) barracks, (2) port. c. 9 LS on quay side. Large sheds and cus- toms house.

ROUTE No. 26**BREMEN-EMDEN****General details**

1. *Gauge:* 1,435 m. (standard gauge).
2. *Length:* 134.1 km. (83 1/2 miles).
3. *Track:* Bremen to Oldenburg—Double.
Oldenburg to Kayhauersfeld—Single.
Kayhauersfeld to Bad Zwischenahn—Double.
Bad Zwischenahn to km. 102.2 (Junction with DT Emden to Salzbergen)—Single.
Km. 102.2 to Emden—Double.
Reversing necessary at Leer.
4. *Maximum permissible axle load:* Bremen to J., km. 102.2—20 metric tons.
J., km. 102.2 to Emden—18 metric tons.
5. *Gradients:* No information available, but it is estimated that no heavy gradients will be encountered.
6. *Curves:* No information available.
7. *Traffic:* a. Steam throughout.
8. *Distance between stations:* 136 km. (84 miles), 1.1 m to Nienburg.

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Distances from Bremen		Stations	Engineering works	Details and facilities
Miles	Km.			
23	37.1	WUSTING	2 bridges over streams.	SR.
25½	40.8	NEURNWESE	..	J (facing) left with DT short spur to ST Osnabrück-Oldenburg line. J (trailing) left with DT from ST Osnabrück-Oldenburg line. J (trailing) with ST line from Brake.
28	45.3	OLDENBURG	..	2 ES (at Hbf and MY) (1 RH, esp. no locos.), Tbl. SER; Wb (33 t); Cr (5 t); MY (esp. 2,000 wagons per day). Rps goods wagons adjoining main station. J (facing) right with DT line to Wilhelmshaven (Route 27). Line becomes ST until Kayhauersfeld.
30½	48.6		Bridge over road. Bridge over stream.	
31½	51.3	BLON	Bridge over stream.	SR
34½	56.1	KAYHAUERSFELD	6 3 bridges over streams.	Line becomes DT until Bad Zwischmann.
37½	60.5	BAD ZWISCHMANN	..	J (trailing) left ST branch line from Edewechterdamm.
42½	68.8	OSCHOLT	..	SER; Wb (33 t). Line becomes ST until Leer. J (facing) right with ST line to Emsdörfer (short branch line).
45½	73.8		Bridge over stream. 2 bridges over roads.	SER; Wb (33 t). J (trailing) left with ST line from Cloppenburg.
46½	74.8	APEN	Bridge over stream.	SR.
48 51½	77.5 83.1	AUGUSTFERN	Bridge over road. Bridge over stream.	SER; Wb (33 t).
52½ 53½	84.9 86	STICKHAUSEN VELDE	Bridge over R. Lumme.	SR.
54½ 55½ 56½	88.2 89.2 91.2	FILSUM	Bridge over road. Bridge over road.	
59½ 61½ 63½	96.1 98.8 102.2	NORTHMOOR	Bridge over road. Bridge over road.	SR.
64½	103.3	LEER	..	Line joins main DT line Emden-Saltbergen and proceeds south to Leer, where trains for Emden would have to reverse.
64½	104.4		..	SER; Wb (40 t). Trains from Bremen to Emden reverse at Leer. J (facing) right with ST line to Bremen (km. 102.2 of present route).
67½	108.6		Bridge over road. 7 bridges over streams or irrigation canals.	
72½	116.9	NEERMoor	Bridge over road. 7 bridges over streams or irrigation canals.	SR.
77	124.1		Bridge over road.	
77½	124.9	OLDERSUM	Bridge over road.	SER.

Distance from Bremen		Stations	Engineering works	Details and facilities
Miles	Km.			
0	0	BRUNNEN	Bridge over canal (c. 80 m. long).	SR.
0.5	0.8	BRUNNEN SOUTH		SER; Cr (7.5 t); Wh (40 t). J (facing) left to small MY and ST to Norden. ES (half roundhouse); Tbl.

ROUTE No. 27

OLDENBURG-WILHELMSHAVEN

General details

1. Gauge: 1'435 m. (standard gauge).
2. Length: 52.5 km. (32½ miles).
3. Track: Double.
4. Maximum permissible axle load: 20 metric tons.
5. Gradients: No information available, but it is estimated that no heavy gradients will be encountered.
6. Curvature: No information available.
7. Traction: Steam throughout.
8. Maximum distance between stations: 7.3 km. (4½ miles), Jaderberg to Varel.
9. Marshalling yards (MY):

Division	Location	Max. capacity per 24 hours
Oldenburg	Oldenburg	2,000 wagons

10. Engine sheds (ES):

Division	Location	Type	Stabling capacity
Oldenburg	Oldenburg Hbf	RH	c. 20 locos.
	Oldenburg MY		

11. Watering facilities: No information available, but adequate water supply assumed to exist, especially at all important stations.

12. Vulnerable points: (Marked by asterisks in detailed description of line).

- (a) Marshalling yards and locomotive depots: Described in parts 9 and 10.
- (b) Junctions at: Oldenburg, Varel, Ellensrieden, Sande.
- (c) Bridges: Between Km. 48.0 and 50.6.

13. Capacity: 60 trains per day each way, of 500 tons net train load each.

Detailed description of line

Distance from Oldenburg		Stations	Engineering works	Details and facilities
Miles	Km.			
0	0	OLDENBURG		SER; Wh (32 t); Cr (5 t). 2 ES (1 at Hbf (cap. c. 20 locos.) and 1 at MY), Tbl. MY (cap. 2,000 wagons per day). Rps (wagons) adjoining main station. J (facing) left with ST line to Leer and Emden (Route 26).
1	1.1			
2½	3.3	BUNGERFELD		
3½	5.5	OFENREDE		SR.
5½	8.5	NEU-SÜDENDE	Bridge over road. 3 bridges over roads.	
7½	12.1	RASTEDE	Bridge over road.	SER.
9	14.5		Bridge over road. Bridge over stream.	
10½	16.9		Bridge over road.	
10½	17.5	HANN	2 bridges over streams.	SER.
14½	23.3	JADERBERG	Bridge over road. 6 bridges over streams.	SR.
19	30.6	VAREL		SER; Wh (32 t); Cr (10 t). J (trailing) right with ST line from Rodenkirchen.

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Distance from
Oldenburg
Miles Km.

Stations

Engineering work

Details and facilities

VAREL
(quail.)

1 (fencing) right with ST line to
Varelshafen.

2 bridges over road.
5 bridges over irrigation
canals.

31 33.7 DAMHART

Bridges over road.
5 bridges over irrigation
canals.

34 38.8 ELLEHARDHAM

..

SR.
1 (trailing) left with ST loop from
Leer-Oldenburg line.

3 bridges over irrigation
canals.

37 44.9 SANDER

..

SR.
1 (fencing) left with ST line to
Norden.

38 48 MANNHOL

Bridge over road.

..
Bridges over canal.

31 50.6 WILHELMHAVERN WEST

..

32 50.3 WILHELMHAVERN EHF

..

SR; Wb (33 4); Cr (30 4).

ANTWERP (See Appendixes 1, 2 and 3)

Antwerp (in French "Anvers" and in Flemish "Antwerpen") is situated about 55 miles from the sea on the east or right bank of the deep and tidal River Scheldt or Escaut. It was the principal port of Belgium, and one of the largest ports in the world.

The city proper, with a peace-time population of c. 284,400 inhabitants (including suburbs it is c. 518,250 inhabitants), covers an area of 21,375 acres and lies about 16 ft. above sea level, the whole zone being exceedingly flat. An extensive electric tramway system (overhead conductor cables) comprising 28 routes, and a motor bus service with 4 routes, served the commercial and port areas of the city. Antwerp serves the drainage basin of the Rivers Meuse and Sambré by about 1,500 miles of canals in Belgium. It was the commercial metropolis and one of the chief industrial cities of the country. An important overseas trade as well as a large trade with the interior of the continent was carried on both by rail and by inland waterways. These served the principal industrial areas of Northern France, Alsace-Lorraine, the Rhineland, Westphalia and Central Europe. There was also connection by canals with the Rivers Meuse, Sambré and Rhine.

The administration and management of the Port of Antwerp was in the hands of the Municipal Council, while the corporation of the Burgomaster and Aldermen formed the Administrative and Executive Board. Certain services such as the River Police, buoyage and beacon, port railway connections and customs, were under direct State control.

Antwerp is probably one of the most important railway centres in Belgium, occupying a central and strategic position adjacent to the southern frontier of Holland. It was the seat of one of the seven Divisional headquarters of the Belgian State Railways, and possessed three important terminal and three main line subsidiary through passenger stations, together with five marshalling yards as well as extensive goods shed and siding accommodation in the town and port areas. Antwerp was also the northern terminal point of the double-track electrified main line from Brussels (Nord) to Antwerp (Centrale), covering a distance of 44 km. (27½ miles). There are also main lines radiating north to the Dutch frontier via Enschede, south to Namur via Brussels, east to the German frontier, west to Ghent and the channel ports of Ostend and Zeebrugge, south-west to the French frontier, and south-east to Liège and the German frontier.

The following port statistics are for the years 1936, 1937 and 1938. The peak year for the activities of the Port of Antwerp was 1937, while in 1938 there was a general reduction in tonnage handled, due in great part to competition from the Dutch port of Rotterdam.

Maritime Statistics

Year	Merchandise	
	Unloaded (tons)	Loaded (tons)
1936	12,426,243 (overall) 4,791,043 (L.W.F.)	14,786,013 (overall) 5,695,762 (L.W.F.)
1937	17,317,005	16,400,005
1938	14,274,286 (overall) 5,626,212 (L.W.F.)	14,515,590 (overall) 5,540,209 (L.W.F.)
1939	13,200,000	13,100,000
1940	11,352,000 (overall) 4,254,000 (L.W.F.)	11,200,000 (overall) 4,100,000 (L.W.F.)
1941	10,000,000	10,000,000

These statistics are for the port of Antwerp, and do not include the statistics for the port of Rotterdam, which is the largest port in the Netherlands.

Railway Statistics (Wagons and Trains)

Year	Wagons		Merchandise (tons)	
	Entering	Leaving	Unloaded	Loaded
1935	136,966	209,476	2,771,771	2,712,771
1936	200,127	315,766	6,726,705	7,004,118
1937	276,005	377,770	7,776,770	8,270,501
1938	207,007	256,513	5,604,576	5,615,504

The following details relate to the rail facilities at Antwerp for both passenger and freight traffic:

Passenger Stations

GARE CENTRALE (Main Station)

The principal passenger station of Antwerp, located in the centre of the city, with platforms and tracks raised on a viaduct above street level. The station buildings and main hall with domed roof face the Place Rates Astrid (Konigin Astridplein), from which leads off the broad Avenue de Keyser (De Keyserlei). From the Gare Centrale, local steam services were operated to Liège, Herenthals and Louvain, electric service to Brussels and Ghent, together with through international services to Germany (via Rotterdam, Tongres and Herenthals), Holland (via Enschede) and France (via Ghent, Mons and Courtrai). It should be noted that the through international express between Holland and France via Belgium did not touch Gare Centrale, but called at Gare de l'Est, c. 2 km. south-east of the former station. Gare Centrale, which is a terminal station, comprises 10 covered platform tracks, 3 of which are electrified for the Antwerp-Brussels service. East of the station are c. 4 L.S. (carriage sidings), and watering facilities are provided by a water column at the south-eastern end of the platform tracks.

GARE DU SUD (Zoo Station)

Situated on the south side of the city, and east of the Antwerp (Sud) goods station and marshalling yard, in close proximity to the southern port zone (Nouveau Quai du Sud). The station buildings, surmounted by a tall clock tower, face the broad Avenue d'Amérique (Amerikalei), which leads to the centre of the city. From the Gare du Sud, steam services are operated to Malines, Boom, Londerzeel, Termonde, Alost and Ghent (St. Pierre). The station is terminal and comprises 9 platform tracks, 3 of which serve platforms covered by separate awnings and four pairs of platform tracks are connected by cross-overs for running-round purposes. South-west of the station is a group of 5 DES (carriage sidings) and south-east a further group of 4 short DES; there is also direct access to Antwerp (Sud) goods station and marshalling yard. Watering facilities comprise a water tower (capacity 200 m.³), water softening plant and pump house situated south-west of Antwerp (Sud) Marshalling Yard.

ANTWERP TÊTE DE FLANDRE OR RIVE GAUCHE (Vlaamse Hoofd)

Situated on the left or west bank of the River Escaut (Scheldt) facing the Anciens Quais de l'Escaut on the right or east bank. Access to this station from the city of Antwerp can be made by river ferry from the Gare du Pays de Waer, or by two separate tunnels under the river for pedestrians and road traffic. From Gare Tête de Flandre, local steam services are operated to Ghent (P. d'Anvers) via St. Nicolas and Lokeren, Termonde and Kieldrecht. The station, which is terminal, comprises 4 platform tracks. South-west of station is a group of 15 carriage sidings and 15 L.S. (carriage sidings), and to the south-east a group of 15 L.S. (carriage sidings) and 15 L.S. (carriage sidings).

Gare de l'Est (Omnibus)

Situated c. 2 km. northwest of Gare Centrale on the main line to Eindhoven and the Dutch frontier. This station, apart from serving local and main line trains, was the stopping point of the through international express between Paris and Amsterdam and Lille and Amsterdam, which bypassed the Gare Centrale terminus via the triangular junction at Borchers. Gare de l'Est comprises 4 through platform tracks connected by crossways at the north end. East of the main line and north of the station, there is access to c. 4 DES (capacity 39 wagons) serving goods shed and 1 long DES for stabling, all with access from the south.

Gare de Brummen

Lies c. 2 km. south of Gare Centrale, on main steam and electrified lines south to Maastricht and Brummen and east to Liège. The station comprises 6 through platform tracks (3 tracks electrified for Antwerp-Brummen service). North of the station is a triangular junction with quadruple tracks leading north to Gare Centrale terminus, and east to Gare de l'Est on the main line to Holland (via Eindhoven).

Antwerp (Dam)

Situated on main line north to Holland (via Eindhoven) c. 6 km. north-east of Gare Centrale and north of the Zurenborg marshalling yard and Stuyvenberg goods station. Antwerp (Dam) is purely a passenger station and served by the local train service operating between Antwerp (Gare Centrale) and Eindhoven (Dutch frontier). There are 4 through platform tracks at the station.

Goods Stations**Bassin de Entrepôts (Place du Nord or Nordplaza)**

Situated in the central port area south of Bassin de la Campine and c. 1 km. east of the Stuyvenberg Goods Station, through which there is access to the main line north to Antwerp (Dam) and south to Zurenborg marshalling yard and goods station and Gare de l'Est. It lies between the Rhine Quay, timber depot and Royal Bonded Warehouse, and is the principal goods station and shunting yard for port traffic. It can be divided into two sections as follows:

(a) **Northern Section.** Composed of 3 groups of LS (250-350 yd.) for reception and sorting, including 6 LS with DE extensions. Remaining LS converge to DT access east to port area (Bassin de la Campine, Bassin Kattendijk and Bassin Guillaume). From the northern group of LS, spur lines lead off to a group of DES and LS between Bassin de la Campine and Bassin Asia with through connection to 10 LS (300-400 yd.) on north side of Bassin au Bois. To east of the group of LS are 2 DES serving SER, and water column.

(b) **Southern Section.** At eastern end, a LS with 3 DE extensions (200-250 yd.) and 1 DES (300 yd.), also a LS with 1 DES (250 yd.) and a LS with 2 DE extensions (250 and 300 yd.). At western end, a group of 10 DES including 4 DES (280-300 yd.) entering large goods and transhipment shed and 6 DES (80-110 yd.) serving goods yard. The goods shed is believed to be equipped with modern installations for handling merchandise, and facilities include a crane (10 tons) and Wb. North-east of yard there is access to ES and loco yard.

STUYVENBERG

East of and adjoining Bassin et Entrepôts (Place du Nord or Nordplaza) goods station, with which it has quadruple track connection. Direct access to main line north to Holland (via Eindhoven) and south to the Zurenborg MY and Gare de l'Est is to the east. The goods station has 10 small sidings for the city of Antwerp and access to the north side of LS (250-350 yd.) and south side of LS (250-350 yd.) and 10 small sidings, 4 DES

(200-300 yd.) serving goods yard, a LS with 3 DE extensions (200-300 yd.) including 4 DE extensions serving large goods shed with high platform, and 1 DE extension serving goods yard north of shed. East of goods shed, a short DES (170 and 180 yd.). All DES have main access from the east, where facilities include a water tower (capacity 565 m.³ each) connected to water column. The goods station is also equipped with crane (10 tons) and Wb, while to the north there is connection to RLS (locomotives).

ZURENBORG

The goods station is situated to the east of the Zurenborg MY with which there is direct connection, and comprises c. 20 DES (250 yd.) serving goods yard (1 DES also serves SR) and 4 DES to north (1 DES serving SR). The storage capacity of the goods sidings is estimated at 400 wagons, and facilities include a crane.

Gare du Sud (Zuidstation)

Lies north-west of Gare du Sud passenger station and north-east of the MY, from which it is separated by a DT through line to the southern port zone between the Nouveaux Quais du Sud, and Anciens Quais de l'Estuaire (Scheldt). This goods station handled local merchandise traffic, principally full wagon loads, and comprises on the north side a group of 7 DES (250-400 yd.) serving goods yard, and 4 DES (100-250 yd.) serving SER. North of this group there is access east to RLS (Permanent Way), and west to private factory siding. On the south side, there is a group of 16 DES, c. 3 of which serve a large goods shed. South of the shed, a further group of 5 DES (c. 300 yd.) and also access to ES, loco and coaling sidings. Facilities include crane (10 tons) and Wb.

Port Area (Railway Facilities)

The port area of Antwerp lies to the east of the city and was, to a large extent, a railway port. In order to promote commercial traffic, technical handling facilities were of a very high degree of efficiency. The port area alone was provided with more than 800 km. of double track and, as ships could be moored directly alongside the quays at any point, merchandise could be delivered direct from ship to wagon and vice versa without the intervention of lighters. At virtually every point in the port there was ample siding accommodation with direct access to conveniently placed marshalling yards, and clearance of the port by rail was prompt and efficient.

The following details give the approximate track facilities in the port area (see Appendices 1, 2 and 3).

Name of dock or quay	Length (feet)	Approx. no. of tracks serving quays, etc.
Nouveaux Quais du Sud (New South River Quay) Quai d'Herbeville (Berths 5 and 6)	4,950	3 tracks on quayside with through running tracks and sidings in rear of sheds.
Anciens Quais de l'Estuaire (Old River Quay) Quai Lefebvre (Berths 11-13)	1,650	3 tracks on quayside with sidings in rear of sheds.
Quai de la Station (Berths 13 and 14)	1,650	3 tracks on quayside with sidings in rear of sheds.
Quai Cockerill (Berths 15 and 16)	1,650	3 tracks on quayside.
Quai St. Michel, Quai Plautin, Quai Van Dyck (Berths 17 to 21)	2,050	4 tracks on quayside.
Quai Jérôme	850	2 tracks on quayside.
Quai Octelius	410	2 tracks on quayside.
Quai Van Meenen (Berths 22-24)	110	2 tracks on quayside with sidings in rear of sheds.
Quai de l'Est (Berths 25-26)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 27-28)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 29-30)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 31-32)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 33-34)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 35-36)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 37-38)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 39-40)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 41-42)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 43-44)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 45-46)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 47-48)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 49-50)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 51-52)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 53-54)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 55-56)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 57-58)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 59-60)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 61-62)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 63-64)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 65-66)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 67-68)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 69-70)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 71-72)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 73-74)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 75-76)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 77-78)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 79-80)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 81-82)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 83-84)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 85-86)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 87-88)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 89-90)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 91-92)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 93-94)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 95-96)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 97-98)	1,650	3 tracks on quayside.
Quai de l'Est (Berths 99-100)	1,650	3 tracks on quayside.

AUTRUWEL

Austrwiel MY was used for the reception of loaded and empty wagons from the Northern Port zone, and the formation of freight trains to the interior of Belgium.

Situated east and west of DT main line to the Dutch frontier, and south of Antwerp (Dam) passenger station with access from north and south. For the purpose of description, this yard can be divided into Western and Eastern sections. Although the Western section of the yard was equipped for hump shunting, it is not certain whether this system is actually in operation at the present time, owing to the reported removal of a large number of sidings by the German authorities in 1942.

Facilities include water column at north end of the yard.

Zurenborg MY was used for the reception of loaded and empty wagons from the old docks, the Stuyvenberg, Zurenborg, Basins et Entrepôts goods stations and from Holland, and for the formation of freight trains for the interior of Belgium.

This yard is situated to the west of Antwerp (Sud) passenger and goods stations, and the DF main access line to the Southern Port zone in the neighbourhood of Nouvelle Quai du Sud and Ancienne Quai de l'Escaut (St. Field). It has access to the port on the north side with connections south to Antwerp (Sud) passenger and goods stations. The marshalling yard is owned primarily for the reception of inland traffic from the rest of Belgium, and there is no access to the sea. It is a dead-end empty way, a dead-end for the goods trains, and a dead-end for the passenger trains.

Facilities include water tower (capacity 220 m.³), water softening plant and pump house.

Situated south-west of Antwerp (Sud) passenger and goods stations, and north of DT main line from Hoboken to Antwerp. Access to the yard from the main line is on the south side, while on the north side there is DT connection to the Southern Port zone (Nieuwvanat Quai du Sud and Petroleum depots). The Kiel marshalling yard is mechanically operated on the hump system of shunting, and was used for the reception of loaded and empty wagons from the Southern Port zone, including river quays, petroleum depots and Antwerp (Sud) goods station, also the sorting and marshalling of freight trains from the interior of Belgium. For the purpose of description the yard may be divided into Eastern and Western sections. It should also be noted that the original storage capacity of Antwerp (Kiel) marshalling yard was estimated at c. 3,000 wagons, but it is reported that in 1942 the German authorities removed c. 12,000 sq. m. of track, corresponding to a group of L3 and DRS in the Eastern section, and in consequence the capacity of the yard has been considerably reduced.

(b) *Western Section.* This section of the yard with main access from the south would appear to be used exclusively to serve extensive petroleum and other fuel installations on the banks of the River Escaut (Scheldt). It comprises 4 groups of DES (350-300 ma) serving fuel installations and flanked on the west by a further group of LS (400-350 yd.) with connections to private sidings serving petroleum depots.

According to information available, locomotive depots exist at Antwerp (Dam), Berchem and Antwerp (Sud), although consequent upon the construction of the new large and important marshalling yard at Antwerp (Nord) it had been prepared to transfer the locomotive stock from Antwerp (Dam) to Antwerp (Nord). It is believed that this transfer has not yet been carried out.

This depot, which is situated west of Antwerp (Dain) passenger station and north of the Stuyvenberg and Bassins et Entrepois (Place du Nord or Noordplaats) goods station, was reported to store goods incriminated. It consists of 18 rectangular type sheds served by DLS and storing mainly for 14 locomotives under cover and at least eight without access from the east connecting with goods lines serving the Stuyvenberg and Bassins et Entrepois goods stations. North of DLS shed 16, a DLS mixing siding serves the concrete plant owned by the DLS. The DLS siding is used for storage of cement.

It is reported that a 35-ton breakdown crane was allocated to this depot.

BREKHEM

Situated south of Gare Centrale and north of Borschem passenger station in triangle formed by main lines south to Brussels and east to Antwerp (Dam) and the Dutch frontier (via Eschen). This depot, which was reported to stable passenger locomotives, consists of ES (rectangular type) and stabling capacity for 75 locomotives, served by a group of LS and DES with main access from the north. East of ES is a group of DES, and facilities include Tbl (22 m.) and W.

ANTWERP (Sud)

Situated north-east of Gare du Sud passenger station and adjoining the Sud goods station. The depot consists of ES (rectangular type) and stabling capacity for 70 locomotives served by a group of DES with main access south-east. West of ES is a

group of LS with DH extension for dining-coaling stage. Facilities include Tbl (2. 14.50 m.) and W.

Repair Shops

Apart from the RPS (locomotives) at Antwerp (Dam), the location of other RPS is uncertain. Wagon RPS are believed to exist at the Scherpenberg and Antwerp marshalling yards, but it was proposed to transfer these installations to the new marshalling yard at Antwerp (Nord). No accurate information is available as to whether this transfer of RPS has already taken place. The RPS (locomotives) at Antwerp (Dam) lies west of the passenger station and north of the Stuyvenberg goods station to which there is direct access. It consists of a rectangular shed served by a group of DES, 4 of which enter the shed and 2 of which serve traverser at western end of RPS with access from the east. West of Antwerp (Sud) passenger station, RPS (permanent way) with access west to group of LS and DES.

ROTTERDAM (See Appendix No. 4)

Rotterdam is situated about 18 miles from the sea on the Nieuwe Maas River, connected with the sea by the Nieuwe Waterweg and by rail with Den Haag, Amsterdam, Utrecht and Dordrecht. It was the principal industrial port of Holland and one of the principal ports of north-west Europe, rivalling Hamburg and Antwerp. The city proper, with a peace-time population in 1939 of 619,686 inhabitants, lies on the right bank of the river and is intersected by numerous canals, which lend a characteristic air to the city. Apart from canals, the city was well served by an extensive tramway system operating 16 routes and motor bus services with 6 routes. On the left bank of the river, opposite the city is the industrial and shipbuilding zone of Feyenoord or Feyenoord, and between the city and Feyenoord is an island (Noorder-eiland) separated from the left bank by a navigable cutting (Koninginhaven), about 480 ft. wide, and from the right bank by the river, about 1,100 ft. wide. The river between the city and Noorder-eiland is spanned by two parallel fixed bridges. The down-stream bridge (Willemsbrug) is a road and pedestrian bridge, while the up-stream bridge is a railway bridge carrying the main DT electrified line south to Dordrecht. The Koninginhaven cutting is similarly spanned by two parallel bridges: the down-stream bridge (Koninginnebrug) is a road and pedestrian bridge with two piers in the river, and has a double-leaf bascule bridge electrically operated. The up-stream bridge is a railway bridge also carrying the main DT electrified line south to Dordrecht, and has a lifting bridge operated by a 200 h.p. electric motor, driven by D.C.

The port area of Rotterdam extends about 1½ miles above and 3½ miles below these bridges spanning the Nieuwe Maas. Below the latter point, the left bank for 2½ to 3 miles is owned by the municipality for future extensions; the only development so far has been a petroleum harbour at the down-stream end. On the right bank of this portion of the river are Schiedam and Vlaardingen with various quays and basins; geographically, although not administratively, these belong to the port of Rotterdam and are therefore included as components of the port. In addition to quays along the river bank, a number of basins designated "havens" have been constructed. The port of Rotterdam was primarily a transit port for bulk cargoes; about 80 per cent. was carried by inland waterways, but it also handled a large tonnage of general cargoes. It is also the only seaport on the Rhine estuary that has a route line of locks to the Rhine, Ruhr, Moselle, Meuse and Scheldt rivers. It was the terminus for Rhine navigation, and the group of locks were termed the Schiedamsche Sluis. The main line of the Rhine and Rotterdam Canal, which was opened in 1824, runs from the city to the sea, and is the main artery of the port.

property of the city of Rotterdam and was administered by the Municipal Labour Service (Havenbedrijf), and there was a municipal harbour-master who supervised the port traffic. The river and navigation were administered by the State, which appointed a government harbour-master resident at Rotterdam.

As a railway centre Rotterdam occupies an important and strategic position on the west coast of Holland with main trunk routes radiating north to Amsterdam, south to Dordrecht and the Belgian frontier (via Roosendaal and Eschen) and east and south-east to Utrecht, the interior of Holland and the German frontier. Extensive local passenger services are also operated west to Schiedingen, The Hague and The Hook of Holland, and north to Haarlem. All passenger lines in the Rotterdam area are electrified (overhead conductor cables) and electric local and suburban services were operated as follows:

- (1) Rotterdam (Delfsche Poort)-Amsterdam (via The Hague and Haarlem).
- (2) Rotterdam (Maas)-Utrecht-Arnhem.
- (3) Rotterdam (Delfsche Poort)-Dordrecht.
- (4) Rotterdam (Delfsche Poort and Maas)-Hook of Holland.
- (5) Rotterdam (Delfsche Poort and Hofplein)-The Hague.
- (6) Rotterdam (Delfsche Poort and Hofplein)-Scheveningen.

The electric power for Rotterdam and district railways is supplied from the Schiedaven generating station on the north (right) bank of the Nieuwe Maas which is a steam-operated plant with a capacity of 36,100 h.p. There is a connection between Schiedaven generating station and the modern Galilei generating station, which has a capacity of 84,000 kw. and which takes most of the Rotterdam load.

Diesel trains also operated local services from Rotterdam (Maas) to Utrecht and Amersfoort.

Rotterdam is served by three important passenger stations—Delfsche Poort (Central), Maas and Hofplein, the two latter being terminal stations. Other through subsidiary passenger stations exist at Beurs, IJsselmonde (Zuid), Schiedam and Schiedbroek. There are important marshalling yards at Rechtermaasveer (Schiedaven), IJsselmonde (Zuid) and Feyenoord, as well as several large goods stations in the city and port area.

The following details relate to the rail facilities at Rotterdam for both passenger and freight traffic:

Passenger Stations

DELFSCHE POORT (CENTRAL)

This station is situated on the left bank of the Nieuwe Maas, about 1½ miles from the city, and is the main terminal station for the city and district. It is a large station with a main building of 1,200 ft. by 100 ft. and a platform of 1,200 ft. by 100 ft. It is the main station for the city and district, and is the main station for the city and district.

Kaats Straat. The station comprises a through platform (550 yd.), including a island platform served by 4 through tracks, and 6 bay platforms for local services at the western end and south of the main through lines. All main tracks are electrified; the line from Schiedam, entering the station at the western end is quadruple track converging to 1ST and leading on to a viaduct over the town area at the eastern end. West of the station and south of main lines are 2 DES, which would appear from recent air cover to be utilized as carriage stabling sidings, while facilities include SSt and W at centre and western end of station. From the Delfsche Poort station services are operated to and from The Hook of Holland, Amsterdam, The Hague, Scheveningen, and the Belgian and German frontiers.

ROTTERDAM (MAAS)

Situated alongside the north (right) bank of the Nieuwe Maas, east of the parallel rail and road bridges connecting north and south banks, and south of the Boerengat tidal basin of the town group. The station, which is terminal with access to the east, comprises 3 main platforms (250 yd.) and 1 short bay platform (100 yd.). East of station, lines converge to DT and cross a central pivot swing bridge over canal leading to the tidal basins Boerengat and Buisengat. All main tracks in the station are electrified for local services to and from The Hook of Holland and Utrecht, while main line steam and diesel car services operate to and from Zevenaar and the German frontier. Facilities include W and several short carriage sidings north of passenger station.

ROTTERDAM (HOFFLEIN)

Lies on the north side of the Nieuwe Maas, east of Delfsche Poort station, adjoining the DT main line south on viaduct to Feyenoord and Dordrecht. There is, however, no direct rail connection between the Delfsche Poort and Hofflein stations. Rotterdam (Hofflein) is a terminal station with 3 short DE platforms (100 yd.) served by platform lines which converge to DT north of the station and continue on a viaduct over the town area, crossing the Hook of Holland and Utrecht line by an overbridge west of Hilligersberg station to Schiesbroek. East of the station there are several short carriage sidings. All main tracks are electrified for the suburban services which are operated to and from The Hague and Scheveningen. No information is available regarding watering facilities, and it is probable that there are none.

ROTTERDAM (BLURS)

Situated south-east of the Delfsche Poort station on the DT main electrified line south to Feyenoord and Dordrecht, and just north of the up-stream railway bridge spanning the Nieuwe Maas. The station, which is built at high level on a viaduct over the town area, comprises 2 through platforms (250 yd.) served by DT and is purely a passenger station.

IJSELMONDE OR STATION ZUID

On the south bank of the Nieuwe Maas, on the DT main electrified line from Rotterdam (Delfsche Poort) south to Dordrecht. The passenger station lies to the east of the IJselmonde (Zuid) marshalling yard and close to a large football stadium. It comprises an island platform (400 yd.) served by 2 through platform tracks and 2 through tracks, which converge to DT north and south of the passenger station.

SCHIEDAM

Situated on the north (right) bank of the Nieuwe Maas, west of the Delfsche Poort station and Beukelsdijk Junction on the main electrified line to the Hook of Holland and Amsterdam. The line is quadruple track from Delfsche Poort to Schiedam and west of the latter station the DT line to the Hook of Holland and Amsterdam divides. Schiedam comprises an island platform (550 yd.) served by 4 through tracks, and 6 bay platforms for local services at the western end and south of the main through lines. All main tracks are electrified; the line from Rotterdam, entering the station at the western end is quadruple track converging to 1ST and leading on to a viaduct over the town area at the eastern end. West of the station and south of main lines are 2 DES, which would appear from recent air cover to be utilized as carriage stabling sidings, while facilities include SSt and W at centre and western end of station. From the Delfsche Poort station services are operated to and from The Hook of Holland, Amsterdam, The Hague, Scheveningen, and the Belgian and German frontiers.

(250 yd.) served by 4 through platform tracks and 2 through tracks. Facilities include W and SSt.

SCHIEDAM

On the north (right) bank of the Nieuwe Maas on the DT electrified line from Rotterdam (Hofflein) to The Hague and Scheveningen. South of the passenger station there is a junction with a DT electrified line from Delfsche Poort and Schiedam stations. Comprises 2 short platforms served by 2 through tracks. Facilities include SSt.

Goods Stations

DELFSCH E POORT (Central)

The town goods depot situated on the north (right) bank of the Nieuwe Maas, north and south of the passenger station and main through running lines. On the north side there are c. 12 LS (train length) with DE extensions to the west, serving large goods shed and goods yard, and to the east serving goods yard. West of the passenger station and south of main lines there are c. 10 shorter DES comprising goods and carriage sidings (total length 4,370 yd.) with access from the west. Facilities include SRs, Cranes and Wb (40 tons).

ROTTERDAM (MAAS)

Goods depot situated north and south of the passenger station. On the north side is a group of DES with access from the east, serving goods yard, warehouses and quays on the south side of the tidal basin (Boerengat). On the south side there is a further group of DES with access from the east, serving goods shed, goods yard, large warehouse and quays on the right (north) bank of the Nieuwe Maas. Facilities include Crane and Wb (40 tons).

FEYENOORD OR FEYENOORD

On the left (south) bank of the Nieuwe Maas and west of the DT main electrified line south to Dordrecht, with access north-west of the IJselmonde (Zuid) marshalling yard. The depot comprises c. 3 LS connected at northern and southern ends with several groups of short DES serving goods sheds, goods yard and quay on the east side of Binnenhaven. Facilities are believed to include Crane (40 tons) and Wb.

SCHIEDAM

Situated on the right (north) bank of the Nieuwe Maas and north of the passenger station and main electrified line from Delfsche Poort station. North-west of the station are c. 6 LS (train length) connected at eastern and western end with c. 3 DES with access to west, serving goods shed and goods yard. Facilities include SR (100 yd.), Crane and Wb (35 tons).

Port Area (Railway Facilities)

The port area of Rotterdam, situated on both the north (right) and south (left) bank of the Nieuwe Maas below the parallel railway and road bridges spanning the river and Noorder-eiland, is well served by railway communications. The quays on the right bank, from Parkhaven to Merwehaven, were well equipped for the rapid handling of general merchandise by rail and road, while on the left bank the quays with the best railway connections are Spoorweghaven, Wilhelminkade and 2de Kattendrekschehaven. Motor and electric trucks were provided by the lessees of some of the quays for the transfer of merchandise to transit warehouses.

Serving the port area on the right bank is a ST branch access line, which leaves the DT main line from Delfsche Poort (Central) passenger station west of Beukelsdijk Junction and connects with quays, Rechtermaascever (Schiedam), MY and two important groups of sorting sidings at Huismanstraat and Middenstraat.

Quays on the left bank are connected by access tracks, which leave the DT main line to Dordrecht south of Feyenoord passenger station and north of

main access from the north, where connection is made with a branch (2) and RPS (leading to west, the main line to Dordrecht, and IJsselmonde (Zuid) MY. To the south-west, there is DT connection from Feyenoord goods station and from the IJsselmonde (Zuid) MY converging to (2) quadruple tracks running west to serve southern port zone.

The southern group of sidings has c. 10 LS for reception with additional tracks serving quays on the east side, and a large goods shed on the west side of the MY. The northern group is connected with the northern group, which contains a further group of c. 12 LS and DES with spur lines serving the quay and two large warehouses at the north-western end of Spoorweghaven, and goods yard to the west, behind the warehouses. The average length of the LS is 1,200 yd., while the stabling capacity of the yard is estimated at 800 wagons.

RECHTERMAASOEVER (SCHIEHAVEN)

Situated in the port area on the north (right) bank of the Nieuwe Maas, west of the rail and road bridges spanning the river. The Rechtermasoever (Schiehaven) marshalling yard runs along the north side of Schiehaven and contains c. 10 LS (average length 1,100 yd.) with extensions serving (?) goods sheds on north side, and quay and 4 warehouses on south side facing Schiehaven. To the east, spur lines run out at right angles to serve the quays of St. Jobhaven and Parkhaven. To the west there is a DT connection to an adjacent important group of LS at Hudsonstraat (described under heading "Sorting Sidings") and continuing as ST to join the quadruple track electrified main line between Beukelsdijk Junction and Schiedam. Facilities include Cran- and Wb (40 tons). It has not been possible to ascertain if the MY is provided with a locomotive depot (ES).

Sorting Sidings (Port Area—North Bank)

ROTTERDAM (MAAS)

To the east of Maas passenger station and central-pivot swing railway bridge, and south of the DT electrified main line. Contains c. 12 LS (average length c. 1,100 yd.) with DE extensions to the west and east, serving quays facing the river.

HUDSONSTRAAT (VIERHAVEN)

Adjoining the Rechtermasoever (Schiehaven) MY to the west. Contains c. 16 LS (average length 780 yd.) with spur lines running out at right angles to serve warehouses and quays facing Koushaven, IJsselhaven, Lekhaven and Keijhaven. North-west of the LS additional spur lines serve the Gem Gas Works, Ford Motor Works and Galilei Street generating station. To the west a ST branch line runs north to join the quadruple track electrified main line between Beukelsdijk Junction and Schiedam.

MARCONSTRAAT (MATHENESKER DYK)

Situated north-west of the Hudsonstraat sidings, with which there is a ST connection. Consists of a group of 8 LS and DES (average length 460 yd.) with spur lines running out at right angles to serve quays on the Merwehaven.

Sorting Sidings (Port Area—South Bank)

WAAIHAVEN

Situated south-west of Feyenoord MY and Maas-haven, and adjacent to DT branch line through the southern port area to Petroleumhaven on the west. Comprises two groups of LS facing the east and south sides of Waalhaven. The eastern group consists of c. 5 LS (average length c. 800 yd.) running parallel with the quays on the east side of Waalhaven, and connected with spur lines running down the north

side. The western group also consists of c. 5 LS (average length c. 800 yd.) running parallel with quays on the south side of Waalhaven. West of this group the DT branch line continues to Petroleumhaven, and there is also connection north to serve quays on the west side of Waalhaven.

Locomotive Depots

There is very little information available regarding locomotive and Diesel car depots and repair shops in the Rotterdam area. Owing to the electrification of all main lines and the operation of certain lines by Diesel cars, it is assumed that the use of steam traction is limited.

Recent air cover reveals the existence of locomotive depots at the Delfsche Poort (Central) and Maas passenger stations and at the Feyenoord marshalling yard. It is reported that locomotive depots also exist at the IJsselmonde (Zuid) and Rechtermasoever (Schiehaven) marshalling yards, but these cannot be located on recent air cover. It is probable that some of the ES are also used for stabling Diesel rail cars.

DELFSCHÉ POORT (CENTRAL)

West of passenger station and north of the main electrified lines. Depot comprises Tbl and several locomotive stabling and coaling sidings with access from east and west. Recent air cover does not show an ES. Watering facilities at two points—centre and west end of station. Also SSt not located. It is probable that this locomotive depot is of little importance owing to electrification.

ROTTERDAM (MAAS)

East of the passenger station, north of the main DT electrified line, and adjacent to the central-pivot swing bridge over canal access to tidal basin (Boersengat). Comprises ES (rectangular type) served by c. 3 DES with access from west, with Tbl and W.

FEYENOORD MARSHALLING YARD

South-west of Feyenoord marshalling yard, locomotive depot comprising ES (half-roundhouse) with Tbl, and main access north, with group of LS (locomotive stabling and coaling sidings). To the east is an ES (rectangular type) with access from north and Tbl adjacent. To the west is a rectangular shed served by several DES, probably a RPS (wagons).

IJSSÉLMONDE (ZUID) MARSHALLING YARD

It is reported that a locomotive depot exists at the south end of the MY and west of the sorting sidings, and comprises an ES (rectangular) and Tbl with access from the north. Recent air cover, however, does not show a locomotive depot at the point mentioned.

Repair Shops

No accurate information is available regarding the exact location of RPS in Rotterdam. These are believed to be small and unimportant since information to hand at the end of 1939 gave the principal RPS of the Dutch State Railways as being at the following points: Haarlem (electric, diesel and passenger rolling stock), Tilburg (locomotives), Utrecht (passenger rolling stock), Zwolle (locomotive and passenger rolling stock), Amersfoort and Blerik (wagons). It therefore appears that the main RPS are located outside the Rotterdam area.

As far as can be ascertained it is probable that small RPS (wagons) only, exist at the south-western end of the Feyenoord Marshalling Yard, comprising a rectangular shed served by several DES with access north. At Hillegersberg on the DT electrified north by-pass line from Schiedam to Rotterdam (Maas) and Gouda, there is a private works engaged on the construction of passenger and goods rolling stock for the Dutch State Railways.

INTRODUCTION AND EXPLANATION TO SCHEDULE OF RAILWAY BRIDGES

1. Whilst the line description in the body of the report includes all the known railway bridges along the routes described, this schedule covers only the more important ones on which additional data is available. A cross-reference is made in the line description to the bridges detailed in the schedule.

The bridges described in the schedule are grouped according to the routes along which they lie and the routes in turn are, in general, grouped by countries.

2. The following is a key to the information tabulated in the summary—

Columns Nos. 1, 2, 3, 4, 7, 9, 11, 12, 14, 15, and 18 are self-explanatory.

Column No. 5 gives map references of bridges taken from the following maps:

Belgium:	G.S.G.S. 4040, scale 1 : 50,000.
Netherlands:	G.S.G.S. 4083, scale 1 : 50,000.
Germany:	G.S.G.S. 4081, scale 1 : 100,000.

Column No. 6 indicates number of tracks crossing the gap.

Column No. 8 nominal length of each span. This column is used when the length of a span cannot be more specifically defined.

Column No. 10 clear span between abutments, irrespective of intermediate piers.

Column No. 13 type of construction. DT = Double Track. ST = Single Track.

Column No. 16 reference to attached plans or appendices. L.D. means that a thumbnail sketch will be found on the Line Diagram.

Column No. 17 gives the classification of each bridge according to the following strategic criterion.

"A." A bridge whose destruction would cause a probable stoppage of from one to three weeks. In general this will cover the replacement of a span or spans by one of our equipment bridges, where there would be a reasonable expectation of employing either partly demolished piers or camels' feet foundations, with standard steel truss unit piers or abutments.

"B." A bridge whose destruction would cause a probable stoppage of from three weeks to two months. This implies that restoration may be possible with equipment bridges but that piling may be necessary to provide intermediate piers.

"C." A bridge whose destruction would cause a prolonged stoppage necessitating other arrangements, such as the provision of a specially designed bridge or the inauguration of a ferry service.

3. Metric equivalents of British Units:

One inch	= 2.53993 centimetres
One foot	= 0.30479 metres
One mile	= 1.60931 kilometres
One centimetre	= 0.393708 inches
One metre	= 3.28084 feet
One kilometre	= 0.6213824 miles

Bridge No.	Route No.	Between stations	Alt. average	Map Ref.	No. of tracks	No. of spans	Nominal length of each span	Length C to C of bearings	Clear span between abutments	Clear span between individual piers or abut.	Overall length of span	Type of construction	
1	1	DUPPEL-WAYNE-S. CATHERINE	16-3	34 731813	4	1	..	..	..	20 m.	..	Old bridge was Viereendeel. New bridge probably plate girder	R.
2	1	LIBUS GUELLENH-APOLKUS	116-6	69 475863	4	3 & 10	..	..	..	..	..	..	R.
3	1	VERBUR-GORRUK-KWELMPOH MY	118-7	69 484873	2	6	..	..	..	..	218 m.	Deck, Warren girders	110
4	1	..	116-7	69 460834	2	1	34 m. 40	..	..	35 m.	..	3 pinned concrete arch	DT
5	1	..	..	..	..	..	..	..	..	..	..	3 pinned concrete arches	R.
6	1	APOLKUS-CHORRE	100-9	69 488833	2	1	..	..	..	..	55 m.	Bowling	R.
7	1	VERBUR-CHORRE	103-6	69 518833	2	1	..	..	..	..	30 m.	Steel	R.
8	1	CHORRE-THORRE	106-4	69 528833	2	1	..	..	..	..	30 m.	Stone arches	R.
9	1	THORRE-THORRE	108-3	69 538833	2	1	..	..	..	..	..	Warren girder, through	R.
10	1	THORRE-THORRE	109-3	69 548833	2	1	..	..	..	..	..	Steel	R.
11	1	THORRE-THORRE	110-3	69 558833	2	1	..	..	..	..	..	Steel	R.
12	1	THORRE-THORRE	111-3	69 568833	2	1	..	..	..	..	..	Arches	R.
13	1	THORRE-THORRE	112-3	69 578833	2	1	..	..	..	..	..	Arches	R.
14	1	THORRE-THORRE	113-3	69 588833	2	1	..	..	..	..	..	Arches	R.
15	1	THORRE-THORRE	114-3	69 598833	2	1	..	..	..	..	..	Arches	R.
16	1	THORRE-THORRE	115-3	69 608833	2	1	..	..	..	..	..	Arches	R.
17	1	THORRE-THORRE	116-3	69 618833	2	1	..	..	..	..	..	Arches	R.
18	1	THORRE-THORRE	117-3	69 628833	2	1	..	..	..	..	..	Arches	R.
19	1	THORRE-THORRE	118-3	69 638833	2	1	..	..	..	..	..	Arches	R.
20	1	THORRE-THORRE	119-3	69 648833	2	1	..	..	..	..	..	Arches	R.
21	1	THORRE-THORRE	120-3	69 658833	2	1	..	..	..	..	..	Arches	R.
22	1	THORRE-THORRE	121-3	69 668833	2	1	..	..	..	..	..	Arches	R.
23	1	THORRE-THORRE	122-3	69 678833	2	1	..	..	..	..	..	Arches	R.
24	1	THORRE-THORRE	123-3	69 688833	2	1	..	..	..	..	..	Arches	R.
25	1	THORRE-THORRE	124-3	69 698833	2	1	..	..	..	..	..	Arches	R.
26	1	THORRE-THORRE	125-3	69 708833	2	1	..	..	..	..	..	Arches	R.
27	1	THORRE-THORRE	126-3	69 718833	2	1	..	..	..	..	..	Arches	R.
28	1	THORRE-THORRE	127-3	69 728833	2	1	..	..	..	..	..	Arches	R.
29	1	THORRE-THORRE	128-3	69 738833	2	1	..	..	..	..	..	Arches	R.
30	1	THORRE-THORRE	129-3	69 748833	2	1	..	..	..	..	..	Arches	R.
31	1	THORRE-THORRE	130-3	69 758833	2	1	..	..	..	..	..	Arches	R.
32	1	THORRE-THORRE	131-3	69 768833	2	1	..	..	..	..	..	Arches	R.
33	1	THORRE-THORRE	132-3	69 778833	2	1	..	..	..	..	..	Arches	R.
34	1	THORRE-THORRE	133-3	69 788833	2	1	..	..	..	..	..	Arches	R.
35	1	THORRE-THORRE	134-3	69 798833	2	1	..	..	..	..	..	Arches	R.
36	1	THORRE-THORRE	135-3	69 808833	2	1	..	..	..	..	..	Arches	R.
37	1	THORRE-THORRE	136-3	69 818833	2	1	..	..	..	..	..	Arches	R.
38	1	THORRE-THORRE	137-3	69 828833	2	1	..	..	..	..	..	Arches	R.
39	1	THORRE-THORRE	138-3	69 838833	2	1	..	..	..	..	..	Arches	R.
40	1	THORRE-THORRE	139-3	69 848833	2	1	..	..	..	..	..	Arches	R.
41	1	THORRE-THORRE	140-3	69 858833	2	1	..	..	..	..	..	Arches	R.
42	1	THORRE-THORRE	141-3	69 868833	2	1	..	..	..	..	..	Arches	R.
43	1	THORRE-THORRE	142-3	69 878833	2	1	..	..	..	..	..	Arches	R.
44	1	THORRE-THORRE	143-3	69 888833	2	1	..	..	..	..	..	Arches	R.
45	1	THORRE-THORRE	144-3	69 898833	2	1	..	..	..	..	..	Arches	R.
46	1	THORRE-THORRE	145-3	69 908833	2	1	..	..	..	..	..	Arches	R.
47	1	THORRE-THORRE	146-3	69 918833	2	1	..	..	..	..	..	Arches	R.
48	1	THORRE-THORRE	147-3	69 928833	2	1	..	..	..	..	..	Arches	R.
49	1	THORRE-THORRE	148-3	69 938833	2	1	..	..	..	..	..	Arches	R.
50	1	THORRE-THORRE	149-3	69 948833	2	1	..	..	..	..	..	Arches	R.
51	1	THORRE-THORRE	150-3	69 958833	2	1	..	..	..	..	..	Arches	R.
52	1	THORRE-THORRE	151-3	69 968833	2	1	..	..	..	..	..	Arches	R.
53	1	THORRE-THORRE	152-3	69 978833	2	1	..	..	..	..	..	Arches	R.
54	1	THORRE-THORRE	153-3	69 988833	2	1	..	..	..	..	..	Arches	R.
55	1	THORRE-THORRE	154-3	69 998833	2	1	..	..	..	..	..	Arches	R.
56	1	THORRE-THORRE	155-3	69 1008833	2	1	..	..	..	..	..	Arches	R.
57	1	THORRE-THORRE	156-3	69 1018833	2	1	..	..	..	..	..	Arches	R.
58	1	THORRE-THORRE	157-3	69 1028833	2	1	..	..	..	..	..	Arches	R.
59	1	THORRE-THORRE	158-3	69 1038833	2	1	..	..	..	..	..	Arches	R.
60	1	THORRE-THORRE	159-3	69 1048833	2	1	..	..	..	..	..	Arches	R.
61	1	THORRE-THORRE	160-3	69 1058833	2	1	..	..	..	..	..	Arches	R.
62	1	THORRE-THORRE	161-3	69 1068833	2	1	..	..	..	..	..	Arches	R.
63	1	THORRE-THORRE	162-3	69 1078833	2	1	..	..	..	..	..	Arches	R.
64	1	THORRE-THORRE	163-3	69 1088833	2	1	..	..	..	..	..	Arches	R.
65	1	THORRE-THORRE	164-3	69 1098833	2	1	..	..	..	..	..	Arches	R.
66	1	THORRE-THORRE	165-3	69 1108833	2	1	..	..	..	..	..	Arches	R.
67	1	THORRE-THORRE	166-3	69 1118833	2	1	..	..	..	..	..	Arches	R.
68	1	THORRE-THORRE	167-3	69 1128833	2	1	..	..	..	..	..	Arches	R.
69	1	THORRE-THORRE	168-3	69 1138833	2	1	..	..	..	..	..	Arches	R.
70	1	THORRE-THORRE	169-3	69 1148833	2	1	..	..	..	..	..	Arches	R.
71	1	THORRE-THORRE	170-3	69 1158833	2	1	..	..	..	..	..	Arches	R.
72	1	THORRE-THORRE	171-3	69 1168833	2	1	..	..	..	..	..	Arches	R.
73	1	THORRE-THORRE	172-3	69 1178833	2	1	..	..	..	..	..	Arches	R.
74	1	THORRE-THORRE	173-3	69 1188833	2	1	..	..	..	..	..	Arches	R.
75	1	THORRE-THORRE	174-3	69 1198833	2	1	..	..	..	..	..	Arches	R.
76	1	THORRE-THORRE	175-3	69 1208833	2	1	..	..	..	..	..	Arches	R.
77	1	THORRE-THORRE	176-3	69 1218833	2	1	..	..	..	..	..	Arches	R.
78	1	THORRE-THORRE	177-3	69 1228833	2	1	..	..	..	..	..	Arches	R.
79	1	THORRE-THORRE	178-3	69 1238833	2	1	..	..	..	..	..	Arches	R.
80	1	THORRE-THORRE	179-3	69 1248833	2	1	..	..	..	..	..	Arches	R.
81	1	THORRE-THORRE	180-3	69 1258833	2	1	..	..	..	..	..	Arches	R.
82	1	THORRE-THORRE	181-3	69 1268833	2	1	..	..	..	..	..	Arches	R.
83	1	THORRE-THORRE	182-3	69 1278833	2	1	..	..	..	..	..	Arches	R.
84	1	THORRE-THORRE	183-3	69 1288833	2	1	..	..	..	..	..	Arches	R.
85	1	THORRE-THORRE	184-3	69 1298833	2	1	..	..	..	..	..	Arches	R.
86	1	THORRE-THORRE	185-3	69 1308833	2	1	..	..	..	..	..	Arches	R.
87	1	THORRE-THORRE	186-3	69 1318833	2	1	..	..	..	..	..	Arches	R.
88	1	THORRE-THORRE	187-3	69 1328833	2	1	..	..	..	..	..	Arches	R.
89	1	THORRE-THORRE	188-3	69 1338833	2	1	..	..	..	..	..	Arches	R.
90	1	THORRE-THORRE	189-3	69 1348833	2	1	..	..	..	..	..	Arches	R.
91	1	THORRE-THORRE	190-3	69 1358833	2	1	..	..	..	..	..	Arches	R.
92	1	THORRE-THORRE	191-3	69 1368833	2	1	..	..	..	..	..	Arches	R.
93	1	THORRE-THORRE	192-3	69 1378833	2	1	..	..	..	..	..	Arches	R.
94	1	THORRE-THORRE	193-3	69 1388833	2	1	..	..	..	..	..	Arches	R.
95	1	THORRE-THORRE	194-3	69 1398833	2	1	..	..	..	..	..	Arches	R.
96	1	THORRE-THORRE	195-3	69 1408833	2	1	..	..	..	..	..	Arches	R.
97	1	THORRE-THORRE	196-3	69 1418833	2	1	..	..	..	..	..	Arches	R.
98	1	THORRE-THORRE	197-3	69 1428833	2	1	..	..	..	..	..	Arches	R.
99	1	THORRE-THORRE	198-3	69 1438833	2	1	..	..	..	..	..	Arches	R.
100	1	THORRE-THORRE	199-3	69 1448833	2	1	..	..	..	..	..	Arches	R.
101	1	THORRE-THORRE	200-3	69 1458833	2	1	..	..	..	..	..	Arches	R.
102	1	THORRE-THORRE	201-3	69 1468833	2	1	..	..	..	..	..	Arches	R.
103	1	THORRE-THORRE	202-3	69 1478833	2	1	..	..	..	..	..	Arches	R.
104	1	THORRE-THORRE	203-3	69 1488833	2	1	..	..	..	..	..	Arches	R.
105	1	THORRE-THORRE	204-3	69 1498833	2	1	..	..	..	..	..	Arches	R.
106	1	THORRE-THORRE	205-3	69 1508833	2	1	..	..	..	..	..	Arches	R.
107	1	THORRE-THORRE	206-3	69 1518833	2	1	..	..	..	..	..	Arches	R.
108	1	THORRE-THORRE	207-3	69 1528833	2	1	..	..	..	..	..	Arches	R.
109	1	THORRE-THORRE	208-3	69 1538833	2	1	..	..	..	..	..	Arches	R.
110	1	THORRE-THORRE	209-3	69 1548833	2	1	..	..	..	..	..	Arches	R.
111	1	THORRE-THORRE	210-3	69 1558833	2								

ADDITIONAL INFORMATION ON THE MORE IMPORTANT RAILWAY BRIDGES

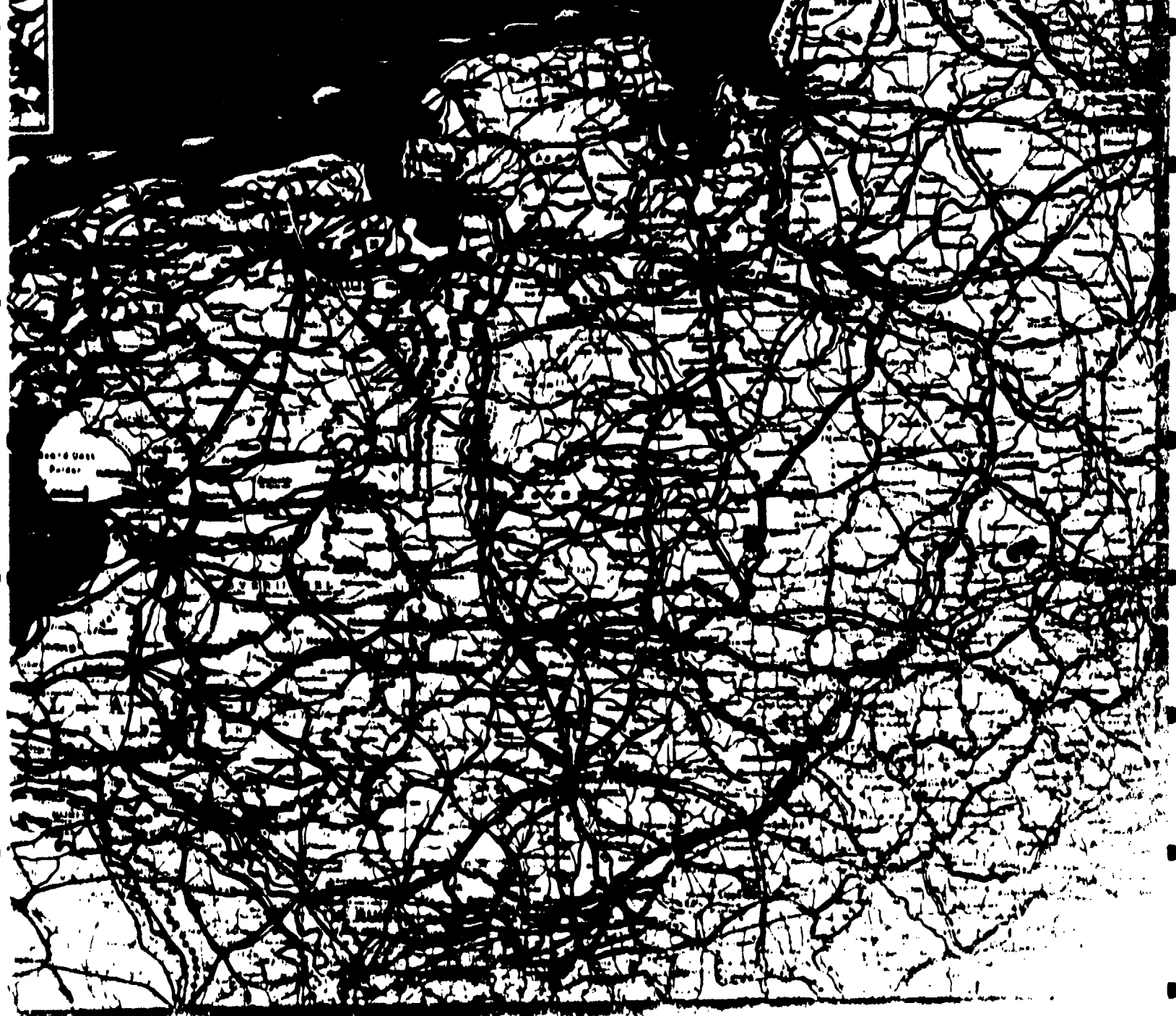
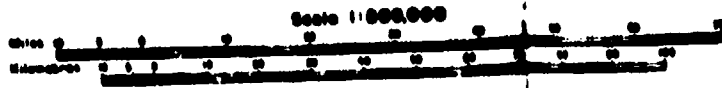
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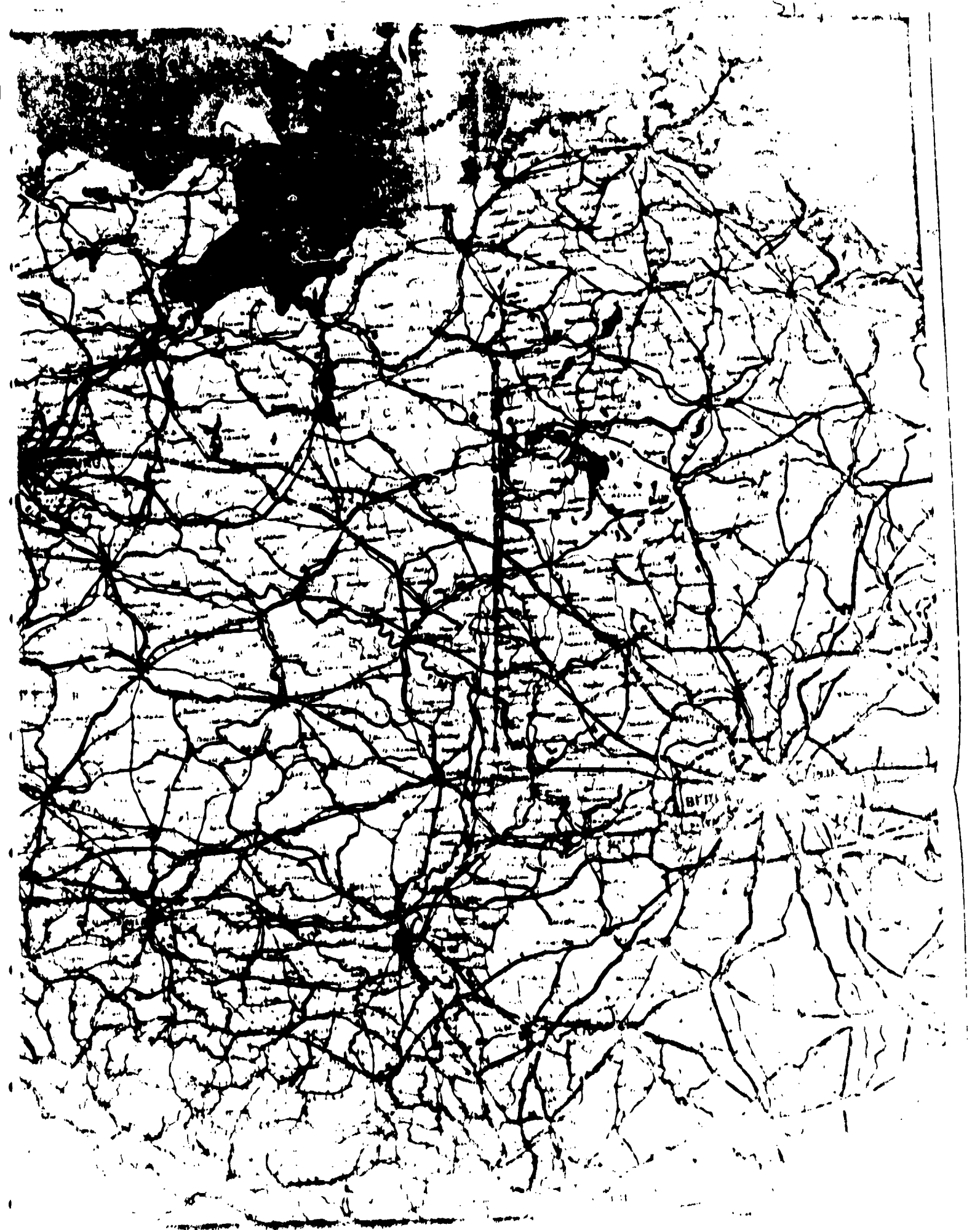
Bridge No.	Route No.	Between stations	Mileage	Map Ref.		No. of tracks	No. of spans	Nominal length of each span	Length C to C of bearings	Clear span between abutments	Clear span between individual piers or abut.	Overall length of span	Type of construction	
				Sheet	Reference									
45	10	BRUNNEN - EVENHOED	2.3	37	769733	2	2	204 ft.	..	85 m.	..	1312 ft.	1 lattice girder through, parallel top chords	R. Loh
46	10	Idaho	2.6	37	773732	2	2	..	..	..	..	..	1 lattice girder through with parallel top chords	R. Loh
47	10	ZWISCHEN - DORNBURG	18.9	44	873614	2	2	87 m. 64	..	77 m. 8	..	1905 ft.	1 lattice girder through, bowstring truss	R. Osh
..	..	..	..	..	..	..	..	64 m. 54	..	50 m. 0	..	..	Idaho	..
..	..	..	..	..	..	..	..	53 m. 64	..	11 x 10 m. 50	..	..	Dark central pivot swing	..
..	..	..	..	..	..	..	..	34 m. 78	..	11 x 10 m. 0	..	..	Dark central pivot swing	..
48	10	WILHELM - LAKE ZUALUWE	31.8	44	883519	1	14	100 m.	..	..	..	1500 ft.	1 lattice girder through with parallel top chords	R. Hal
49	10	LAKE - LAKE	32.8	44	893421	1	1	52 ft.	..	..	..	..	..	..
50	10	Idaho	42.3	44	903549	1	1	..	..	8 x 7 m.	..	..	..	R. Ma
51	10	NEW - HELM	118.3	51	354813	1	1	..	..	..	..	..	..	R. Ma
52	10	DRUM - HELM	134.3	58	707181	1	1	..	..	8 x 7 m.	..	..	..	Zuid-Wi
53	10	BLANK - ENL	157.0	58	904081	1	4	173 ft.	..	..	..	745 ft.	1 lattice girder spans	R. Ma
54	11	RENNEN - Osh - DORNBURG	17.2	86b	383872	2	19	..	..	15 m. 6	..	935 m. 8	1 lattice girder through, cantilever lattice girder	R. Rhi
..	..	..	..	..	..	..	..	104 m.	..	..	..	..	Idaho	..
..	..	..	..	..	..	..	..	186 m.	..	..	..	..	Idaho	..
..	..	..	..	..	..	..	..	189 m.	..	..	..	..	Idaho	..
..	..	..	..	..	..	..	..	51 m. 8	..	..	..	..	Idaho	..
55	12	ROTTEN - MAAS - CAPELLE	0.3	37	770730	2	1	4.47 m.	..	..	..	4.47 m.	1 lattice girder through	Canal
56	12	NEUW - MAAS - MOERBEEK	11.7	38	881789	2	..	..	..	..	..	..	1 lattice girder through	Rings
57	12	MOERBEEK - OUD	17.0	38	901844	2	..	..	..	..	..	..	1 lattice girder through	R. Gou
58	12	Idaho	18.1	38	902845	2	..	..	..	..	..	..	1 lattice girder through	Merwe
59	12	VLEET - TONST	40.4	31	170923	2	1	..	..	..	..	..	1 lattice girder through	R. Uwe
60	12	TYNDEL - DEVENTER	127.8	33	914077	1	..	..	..	..	..	..	1 lattice girder spans	..
61	14	ROTTEN - MAAS - CAPELLE	0.3	37	770730	2	1	4.47 m.	..	..	..	4.47 m.	1 lattice girder through	Canal
62	14	NEUW - MAAS - MOERBEEK	11.4	38	881789	2	..	..	..	..	..	..	1 lattice girder through	Rings
63	14	MOERBEEK - OUD	17.0	38	901844	2	..	..	..	..	..	..	1 lattice girder through	R. Gou
64	14	Idaho	18.1	38	902845	2	..	..	..	..	..	..	1 lattice girder through	Merwe
65	14	VLEET - TONST	40.4	31	170923	2	1	..	..	..	..	..	1 lattice girder through	Vaart
66	14	TYNDEL - DEVENTER	127.8	33	914077	1	..	..	..	..	..	..	1 lattice girder through	R. Uwe
67	15	UTRECHT - VAND	1.0-0	31	180814	3 x 2	3	..	..	..	..	..	1 lattice girder through	Vaart
68	15	SCHEDE - OUD	17.0	39	901787	2	1	..	..	141 m.	..	1.700 m.	1 lattice girder through	R. Loh
..	..	..	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
69	15	OLING - OUD	63.6	39	902845	2	3	..	..	..	..	..	1 lattice girder through	R. Loh
70	15	WALDEN - ZALT	33.5	39	902845	2	7	..	..	8 x 110 m.	..	..	1 lattice girder through	R. Wan
71	15	Idaho	..	..	..	..	..	..	..	1 x 115 m.	..	..	1 lattice girder through	..
72	15	HALL - HERTOGHEM	44.1	45	90319	1	7	..	..	1 x 91 m.	..	..	1 lattice girder through	R. Ma
73	15	Idaho	48.5	45	914473	2	..	..	..	1 x 99 m.	..	..	1 lattice girder through	Zuid-Wi
74	16	MAAS - WINT	0.4	..	..	8 x 2	1	..	..	81 m.	..	..	1 lattice girder through	Zuid-Wi
75	16	HALL - WINT	1.3	..	..	8	4	..	63 m.	262 m.	62 m. 50	4 x 63 m. 907	1 lattice girder through	R. Ma
76	17	OVER - EAST	4.0	40	707764	2	..	..	..	..	..	..	1 lattice girder through	R. Rhi
77	17	RENNEN - Osh - DORNBURG	17.2	40	705633	2	1	..	844 m. 10	..	..	1.370 m.	1 lattice girder through	R. Wan
78	18	KOLN - KOLN	0.3	94	458007	4	8	..	..	..	19 m. 9	..	1 lattice girder through	R. Rhi
79	18	Idaho	..	..	..	..	..	..	..	..	118 m. 9	..	1 lattice girder through	..
80	18	Idaho	..	..	..	..	..	..	..	..	167 m. 8	..	1 lattice girder through	..
81	18	Idaho	..	..	..	..	..	..	..	..	129 m. 6	..	1 lattice girder through	..
82	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
83	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
84	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
85	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
86	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
87	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
88	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
89	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
90	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
91	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
92	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
93	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
94	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
95	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
96	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
97	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
98	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
99	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
100	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
101	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
102	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
103	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
104	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
105	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
106	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
107	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
108	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
109	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
110	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
111	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
112	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
113	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
114	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
115	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
116	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
117	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
118	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
119	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
120	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
121	18	Idaho	..	..	..	..	..	..	..	..	..	..	1 lattice girder through	..
122														

ABLE INFORMATION IN THE MORE IMPORTANT RAILWAY BRIDGES—(contd.)

11	12	13	14	15	16	17	18
Span over total r. chut.	Overall length of span	Type of construction	Over	Type of piers and abutments	Ref. to plans or appendices	Classification	Remarks
	1312 ft.	Lattice girder through, parallel top chords	R. Lek and quayside	Masonry & concrete	App. 34	C	Headroom 7 m. 60 above mean high water level.
		Ditto lattice girder through with parallel top chords	R. Lek and quayside		App. 34	C	Lift span lies between the two fixed spans; lifts to 45 m. above mean high water level.
a. B	c. 1905 ft.	Ditto lattice through bowstring truss	R. Oude Maas			C	Built 1879.
m. 2/		Ditto central pivot swing					
m. 00		Ditto central pivot swing					
m. 0	c. 5000 ft.	Lattice girder through with parallel top chords	R. Hottelach Diep	Masonry	App. 35	C	Swing span on South bank. Called "Marsdijk" Bridge. Headroom 4 m. 90 above mean high water level.
m. 50		Ditto					
7 m.		Ditto	R. Mark	Masonry		B	Repeated Route 9, No. 50.
7 m.		Ditto	R. Mark			B	Clearance at least 7 m. between abutments and central pier.
		Ditto	Zuid-Williams Canal			B	
		Ditto	Heleenwaart Canal			B	
	745 ft.	Ditto	R. Maas	Masonry & concrete		C	Headroom 37 ft. above mean Summer level. Reported damaged May, 1940, but restricted service resumed by May, 1941.
b. 6	933 m. 6	Ditto	R. Rhine	Masonry	App. 36	C	Arches are said to be made of brick composition, probably proven incorrect. Demolition containers attached to tugs. Normal width of river 315 m. Depth of water at low level 3 m. 95; depth at mean water level 4 m. 50.
		Ditto		Masonry			
		Ditto		Masonry			
		Ditto		Masonry			
		Ditto		Masonry			
	c. 47 m.	Ditto	Canal			B	Repeated Route 14, No. 55.
		Ditto	Ringvaart Canal			B	Repeated Route 14, No. 56.
		Ditto	Ringvaart Canal			B	Repeated Route 14, No. 57.
		Ditto	R. Gouwe-Aar			B	Repeated Route 14, No. 58.
		Ditto	Merwede Canal			B	Repeated Route 14, No. 59.
	800 ft.	Ditto	R. IJssel	Masonry & concrete		C	Bridge also used for road traffic. Centre span demolished during hostilities, 1940, but restricted service resumed by May, 1941.
	1700 ft.	Ditto					
	c. 47	Ditto	Canal			B	Repeated Route 19, No. 55.
		Ditto	Ringvaart Canal			B	Repeated Route 19, No. 56.
		Ditto	Ringvaart Canal			B	Repeated Route 19, No. 57.
		Ditto	R. Gouwe-Aar			B	Repeated Route 19, No. 58.
		Ditto	Merwede Canal			B	Repeated Route 19, No. 59.
		Ditto	Vaartse Canal			B	Three parallel DT rolling lift spans. Repeated Route 19, No. 61.
	1500 ft.	Ditto	R. IJssel			C	Headroom 19 ft. above mean Summer level. Reported damaged 1940, but restricted service resumed by May, 1941. Carries a roadway.
		Ditto					
	c. 700 m.	Ditto	Vaartse Canal		App. 37	B	Three parallel DT rolling lift spans. Repeated Route 14, No. 61.
		Ditto	R. Lek			C	Called "Guldenburg" Bridge.
		Ditto					
		Ditto					
	600 ft.	Ditto	R. Linge		App. 33	B	
	5000 ft.	Ditto	R. Waal			C	
	4000 ft.	Ditto	R. Maas			C	
		Ditto	Zuid-Williams Canal			B	
50	4 x 65 m. 907	Ditto	Zuid-Williams Canal	Masonry		B	Two parallel spans. Repeated Route 4, No. 57.
		Ditto	R. Maas			C	Repeated Route 4, No. 58. Two parallel bridges; data given refers to original ST bridge, built 1879. Other bridge may be different. Headroom 8 m. 70 above mean Summer level. Max. height of piers 13 m. 40. Reported damaged in May, 1940, but restricted service resumed by May, 1941.
	c. 370 m.	Ditto	R. Rhine		App. 37	C	Reported damaged in 1940, but restricted service resumed by May, 1941.
	c. 457 m.	Ditto	R. Waal			C	High embankment approaches. Centre span demolished during hostilities, 1940, but bridge reported repaired by October 1940.
a. 9		Ditto	R. Rhine	Masonry	App. 30	C	Called "Hohenbühlern" Bridge. Demolition chambers in both piers; in charge containers. Built 1907-10. Three parallel pairs of girders, a for each double track and 2 for road.
a. 9		Ditto		Masonry			
a. 6	1014 m. 4	Ditto	R. Weser	Masonry	App. 39	C	Built in 1907.
		Ditto					The 15 single track approach spans lie parallel to a similar set of ST spans.
	911 m.	Ditto	R. Wupper		App. 37	B	Built in 1915.
		Ditto					
	100 m. 2	Ditto	R. Ruhr	Masonry	App. 38	C	Built in 1926.
	107 m. 2	Ditto	R. Elbe (N)	Masonry	App. 38	C	Two parallel DT bridges each on 4 main spans; piers and abutments common to both bridges; deck under approach spans. Built 1927.
		Ditto	R. Elbe (N)	Masonry & concrete	App. 38	C	Two parallel DT bridges each of 3 main spans. Each bridge has individual piers. Built 1927-27.
		Ditto					
		Ditto	R. Rhine	Masonry	App. 39	C	Two parallel ST bridges. Normal width of river 400 m.
		Ditto		Masonry			Prepared for demolition.
		Ditto	R. Main	Masonry	App. 40	B	Two parallel ST bridges. Built 1927.

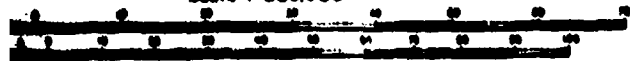
HOLLAND, BELGIUM AND CENTRAL GERMANY

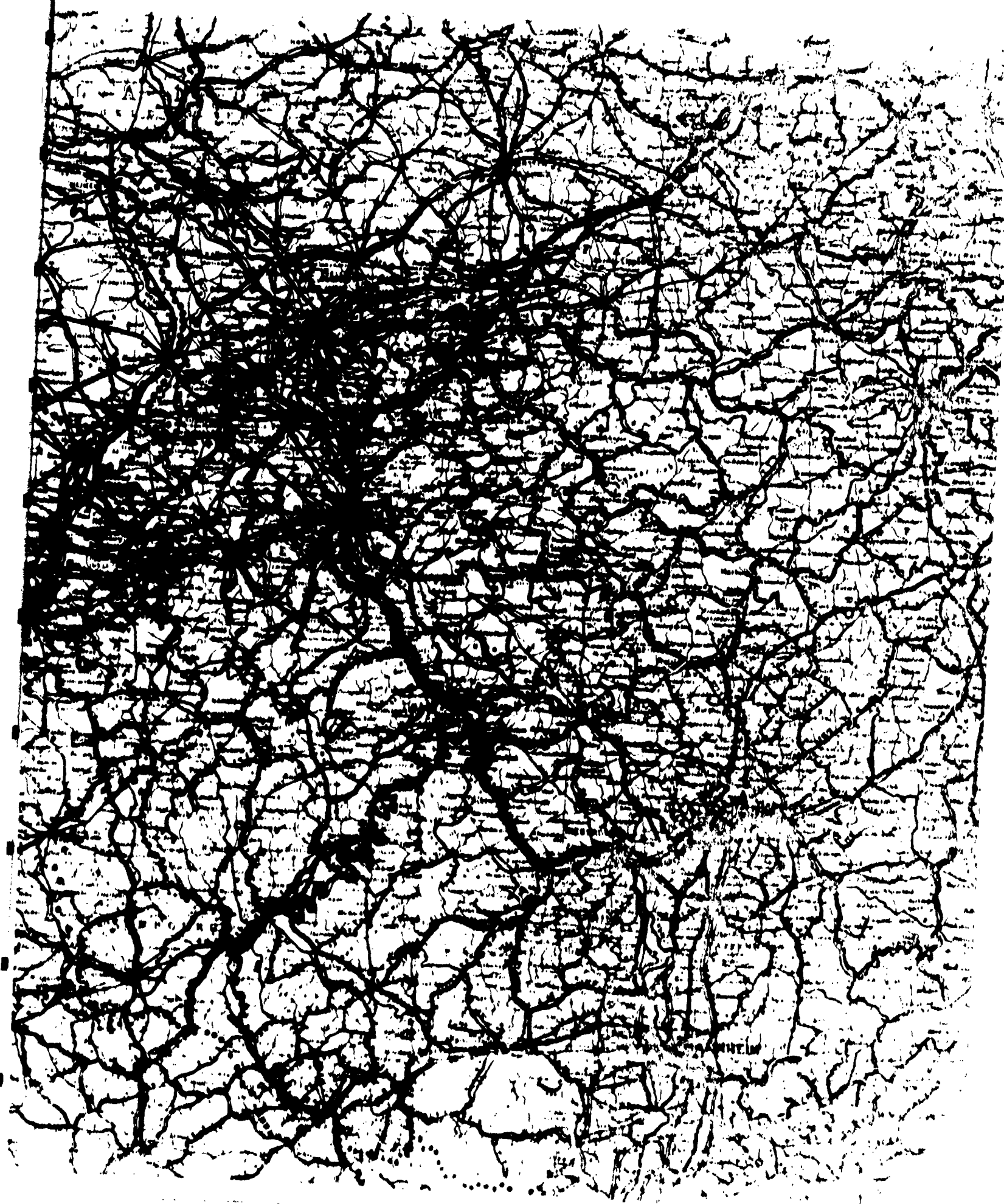




LAND, BELGIUM AND CENTRAL GERMANY

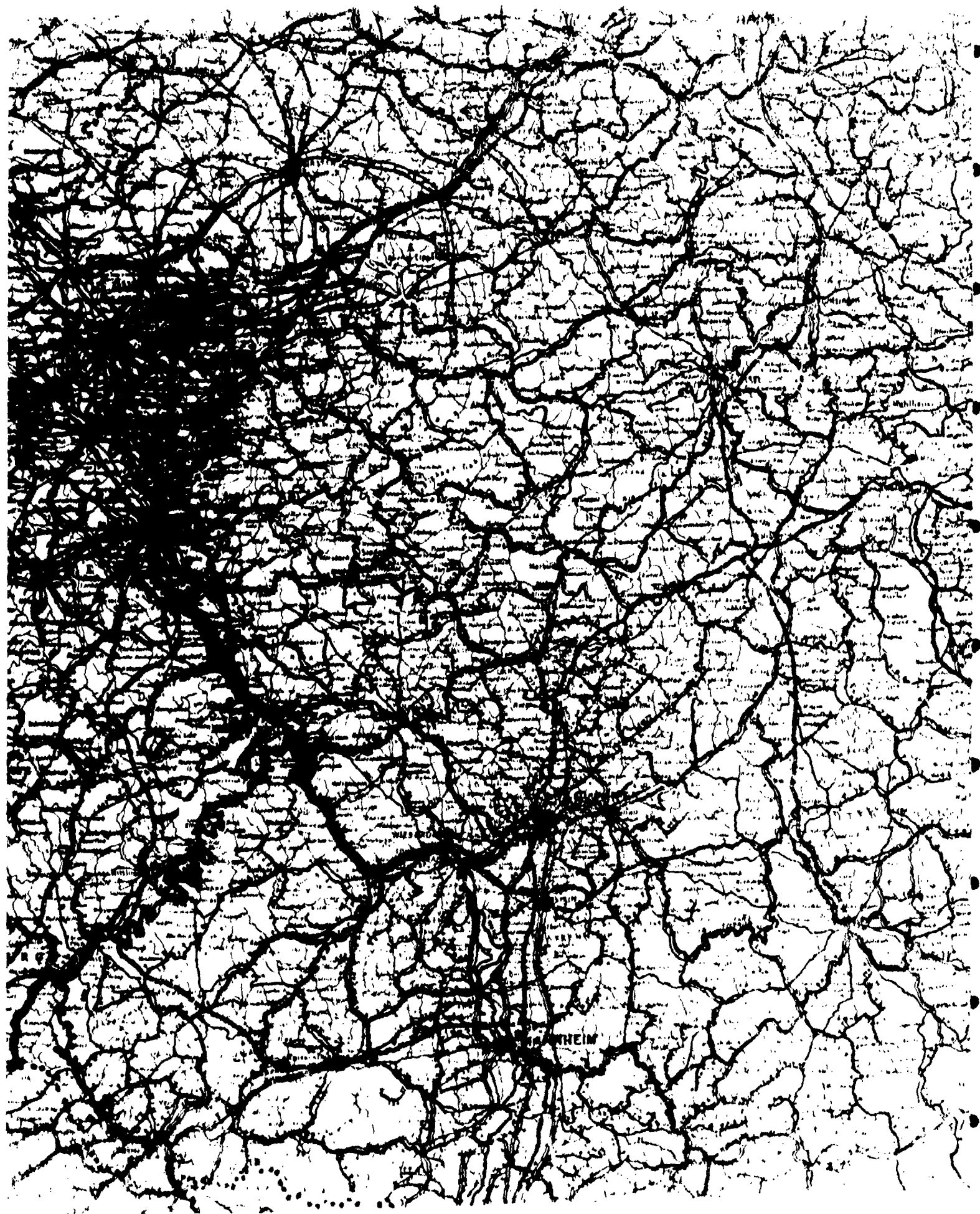
Scale 1:500,000

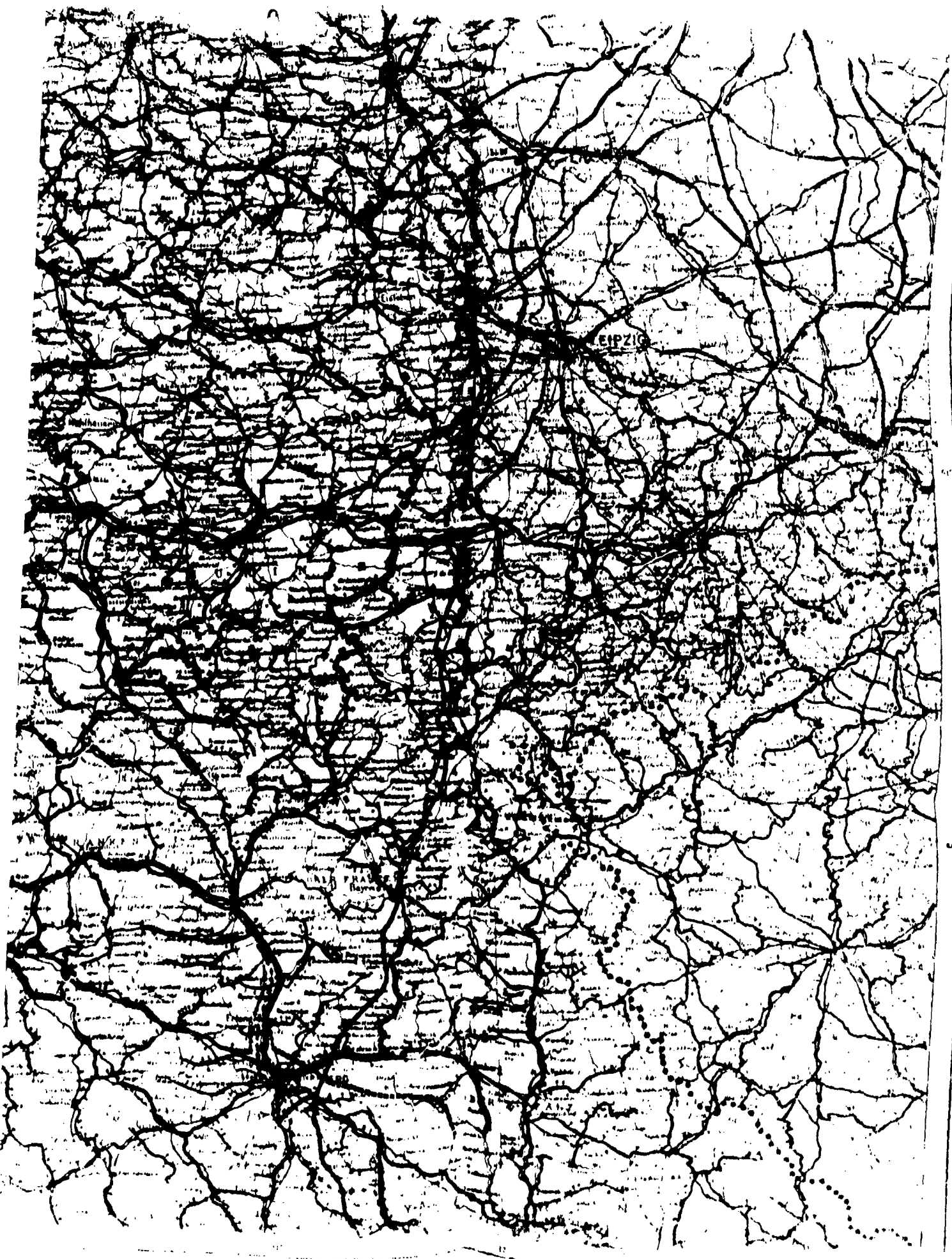




Water usage non-liable for runoff of about 100 tons or over 1000-1000
" " " " 500 to 1000 tons and less water
" " " " 100 to 500 tons and less water
" " " " less than 100 tons and less water









Large rectangular structure, possibly a bunker or a large box, with a small, light-colored object on top.



Border of lamp yard cabin, Waver-Nicht, showing deck frame and rail.



Level crossing barrier and machine's box, showing large signal post.



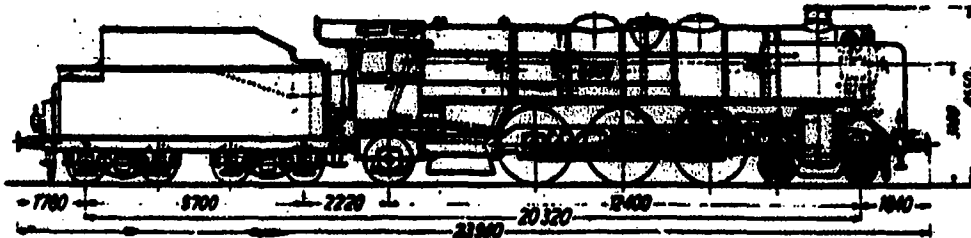
Barrier of power signal box at Diermond, showing "multiple ray" looking frame.

Typical German signalling installations in the Ruhr area.

Anhang 15

**Die Einheits-Lokomotiven der Deutschen Reichsbahn-Gesellschaft
soweit die Henschel & Sohn AG bisher
an ihren Lieferungen beteiligt gewesen ist**

Die im Betrieb befindlichen Lokomotiven der Reihen 44 (Mitteldruck),
45 (s. Bild auf Seite 255), 62 und 85 stammen ausschließlich aus den Henschel-Werken

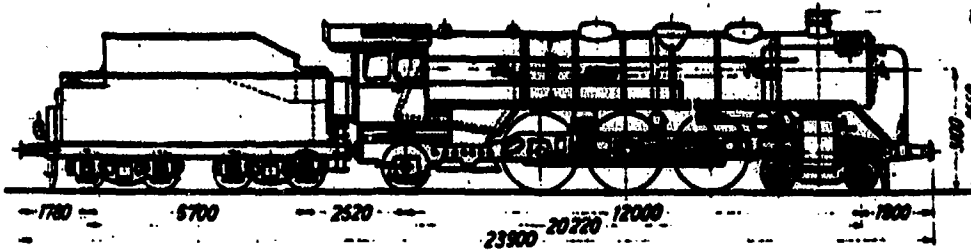


Reihe 01 Zwillings-Schnellzug-Lokomotive

Gattung S 36.20

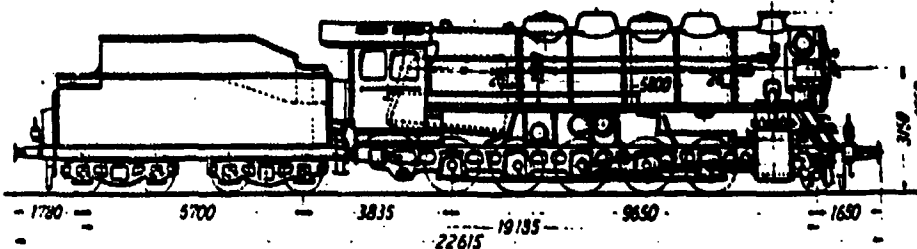
Reihe 02 Viersylinder-Verbund-Schnellzug-Lokomotive

Gattung S 36.20



Reihe 03 Zwillings-Schnellzug-Lokomotive

Gattung S 36.18

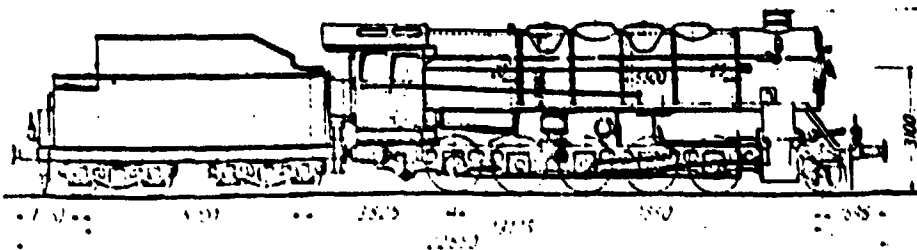


Reihe 43 Zwillings-Gütersug-Lokomotive

Gattung G 36.20

Reihe 44 Drilling-Gütersug-Lokomotive

Gattung G 36.20

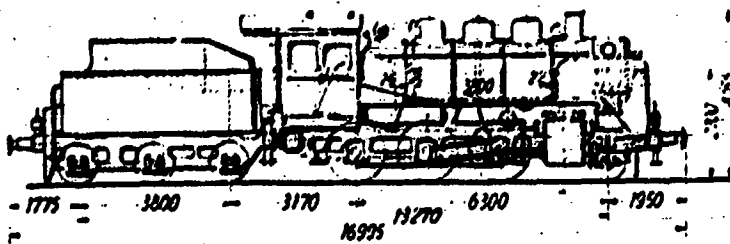


Reihe 45 Viersylinder-Verbund-Mitteldruck-Gütersug-Lokomotive

Gattung G 36.20

(Produktion der Lokomotiven der Reihe 45)

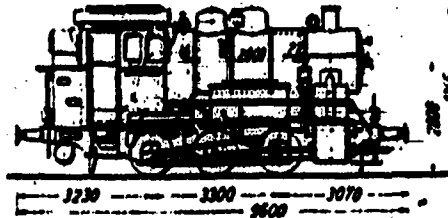
Reihe 16



Reihe 24

Zwillings-Personenzug-
Lokomotive

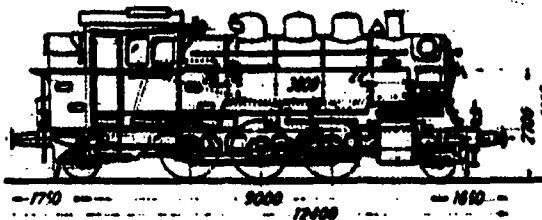
Gattung P 31.15



Reihe 89

Zwillings-Verschiebe-
Tender-Lokomotive

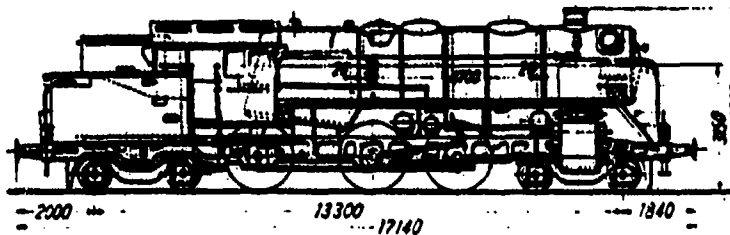
Gattung Gt 33.15



Reihe 64

Zwillings-Personenzug-
Tender-Lokomotive

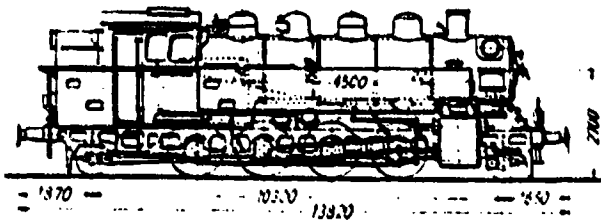
Gattung Pt 35.15



Reihe 62

Zwillings-Personenzug-
Tender-Lokomotive

Gattung Pt 37.20



Reihe 86

Zwillings-Güterzug-
Tender-Lokomotive

Gattung Gt 16.15



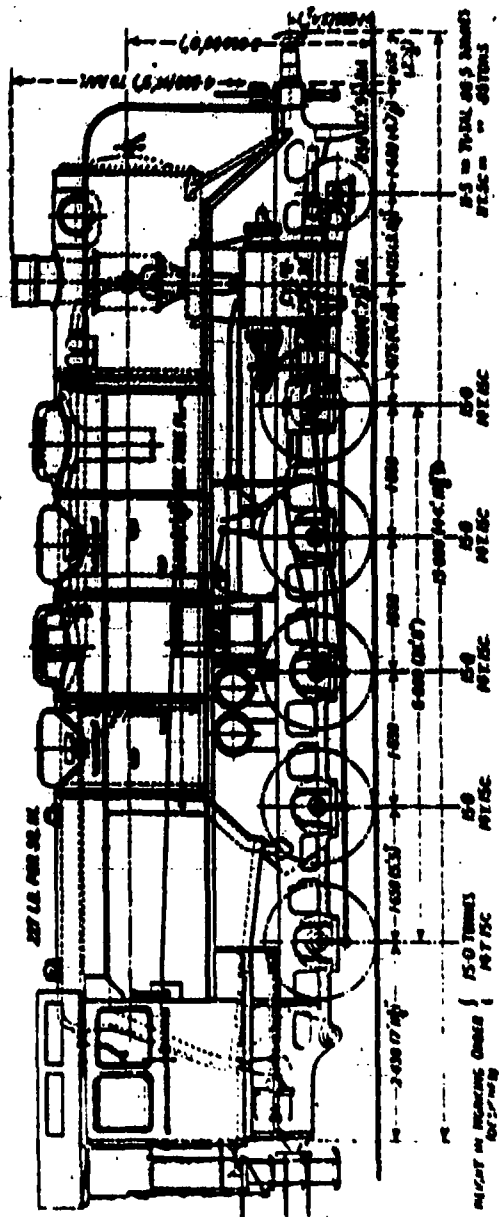
Reihe 85

Zwillings-Güterzug-
Tender-Lokomotive

Gattung Gt 17.20



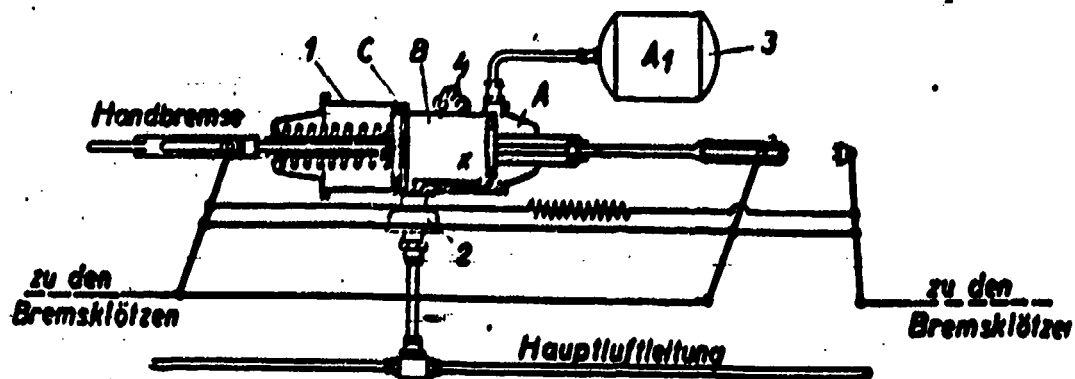
Below: General arrangement and weights of the "Series 50" 2-10-0 goods locomotive of the German State Railway, introduced in 1939—the basis of the "Austerity" locomotive



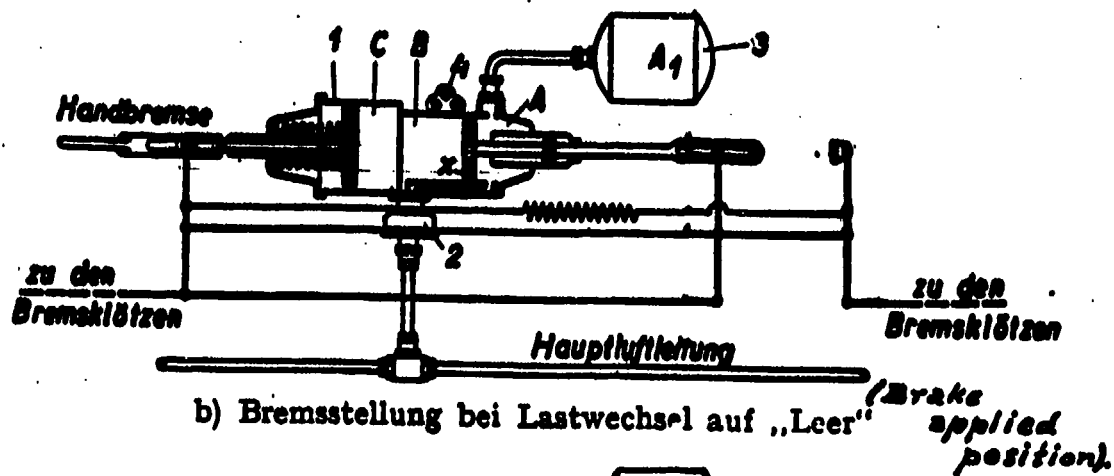
Drawings of German Class 50 and 52 locomotive type.



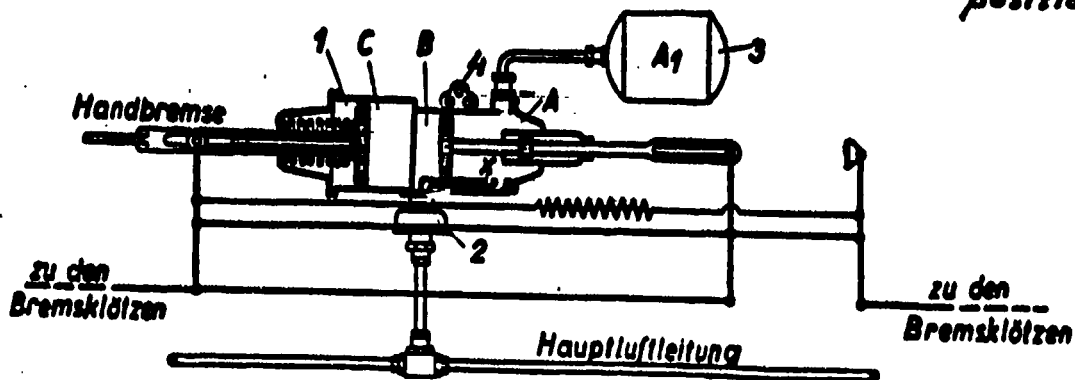
One of the Maybach-engined 820 h.p. twin-car articulated railcar sets used for accelerated interurban traffic in the Ruhr area.



a) Lösestellung (Running position.)



b) Bremsstellung bei Lastwechsel auf „Leer“ (Brake applied position).



c) Bremsstellung bei Lastwechsel auf „Beladen“ (Off position).

- 1 - Bremszylinder Brake Cylinder.
- 2 - Steuerventil Equalising Valve.
- 3 - A, Behälter Reservoir.
- 4 - Löseinrichtung Exhaust Valve.

Layout of Knorr-Lorenz vacuum brake used on German state railways.



Hildebrand-Knorr Freight Train Brake

The "Hik g" brake is an automatic brake with graduated release and single-chamber brake cylinders. It meets all requirements demanded from an up-to-date freight train brake, viz.:

Graduated application and graduated release

Loaded ratio by change of leverage in brake rigging

High transmission speed of brake action

throughout the train — at the rate of 200 metres p. sec. = 650 ft p. sec.

Quick pressure rise during initial stage of application, followed by slow rise until full pressure is reached, with uniform action regardless of whether car is loaded or empty

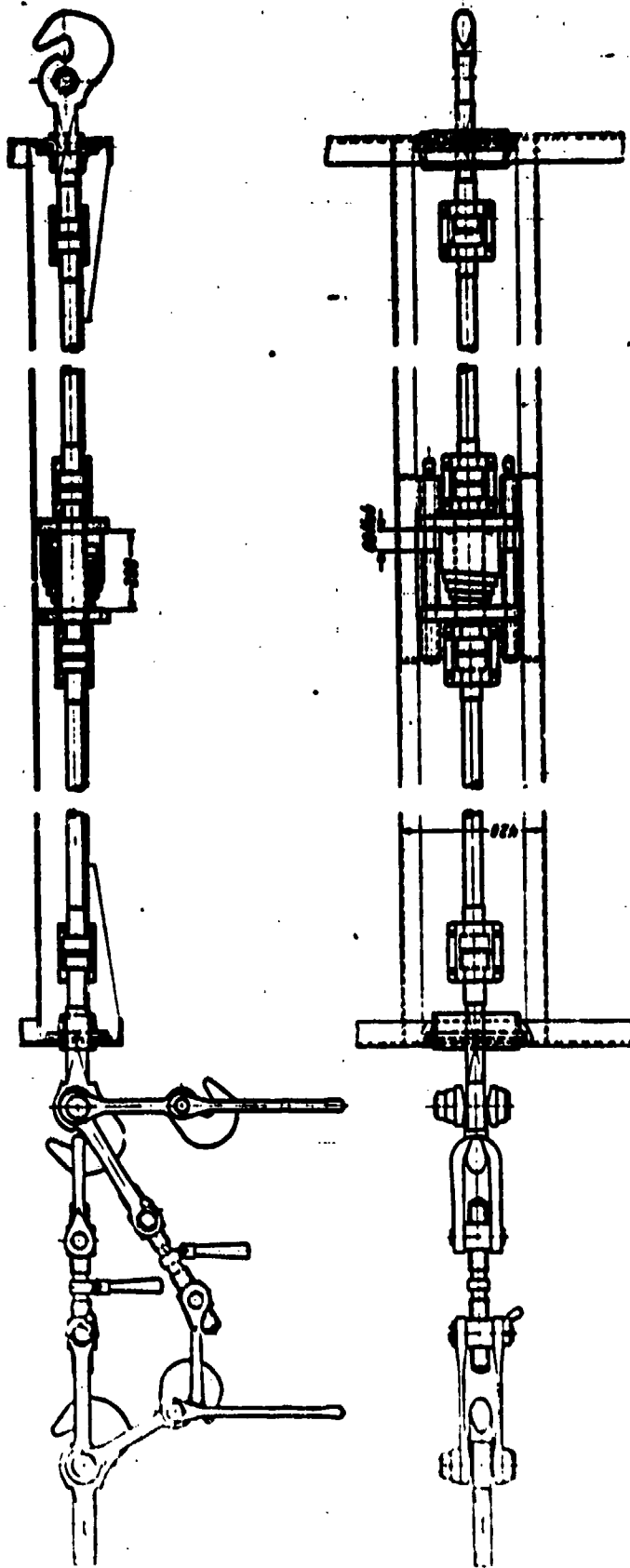
Quick release — release time after full application with 150 axles in train and braking percentage of 75 is 64 seconds

Inexhaustible air supply

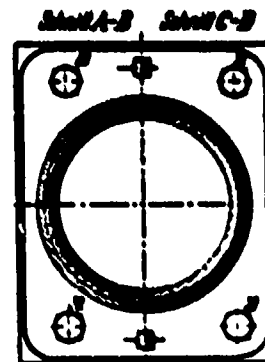
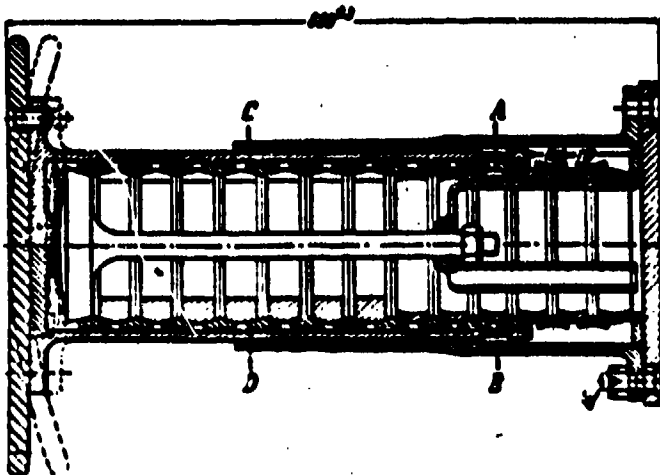
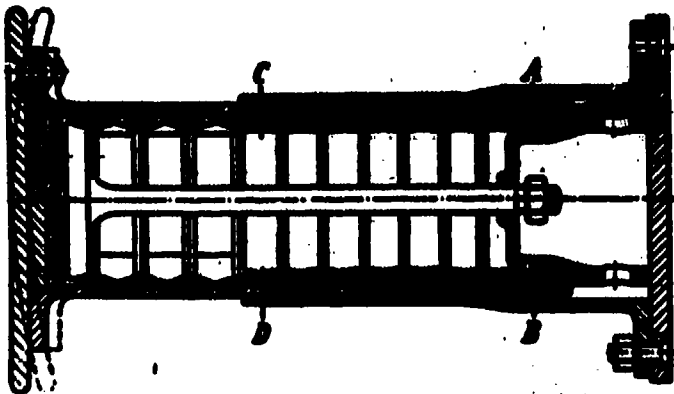
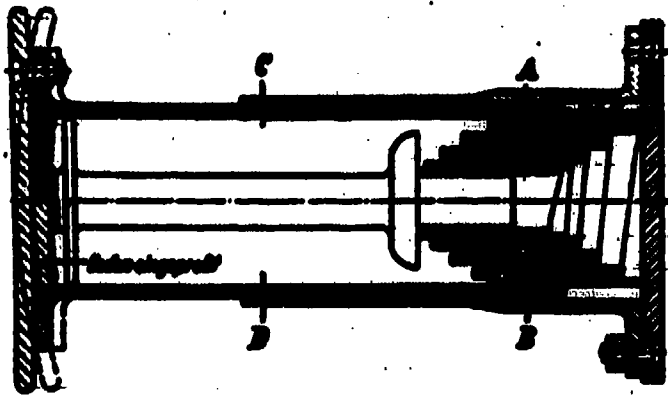
Low weight of brake equipment; compact design of triple valve

Absolute reliability

Photograph — Hildebrand-Knorr goods brake used on German State Railways.



Layout of drawgear and couplings used on German State Railways.



Sections of Buffer types used on German State Railways.

HAMM.— Plan of Marshalling Yard.

Abb. 1. Lageplan des Bahnhofes Hamm i. Westf.



HAMM. — Plan of Marshalling Yard.

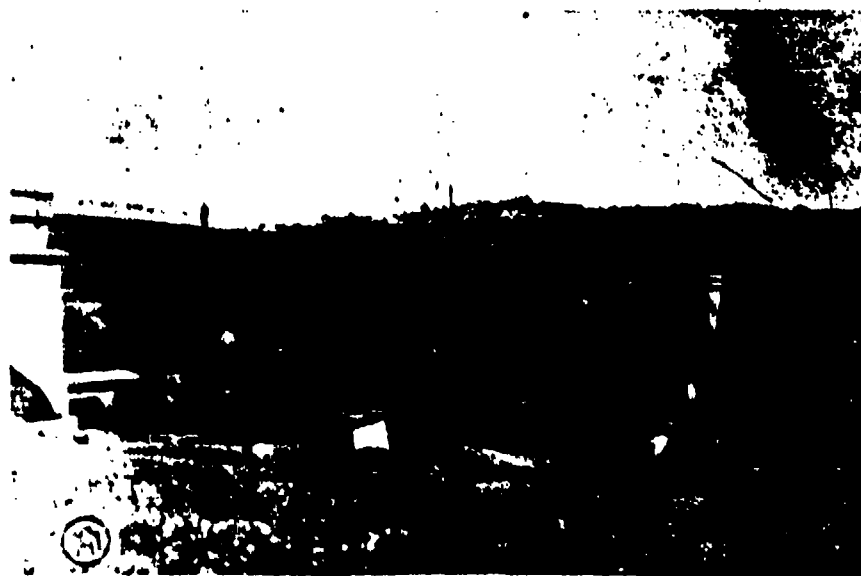
Abb. 1. Lageplan des Bahnhofes Hamm i. Westf.



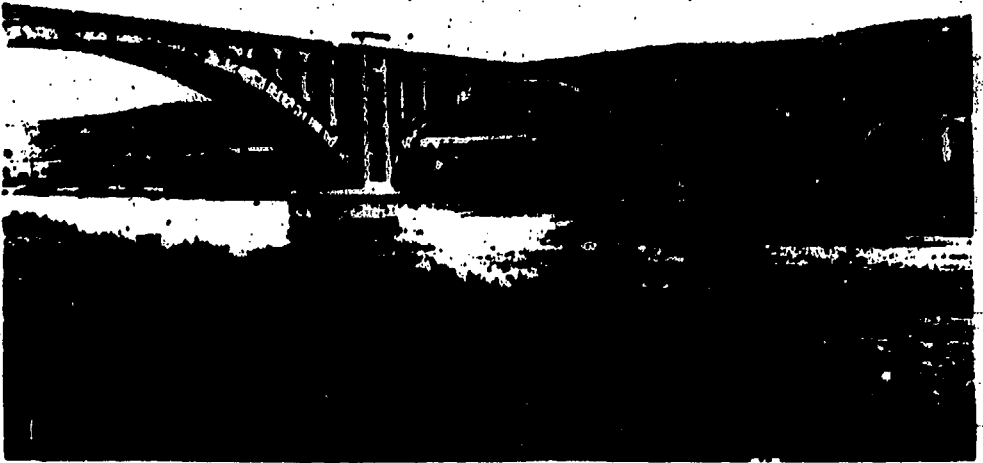
Appendix 26



Bridge at Lidge over R. House (Route 1.A. Bridge No. 2.)

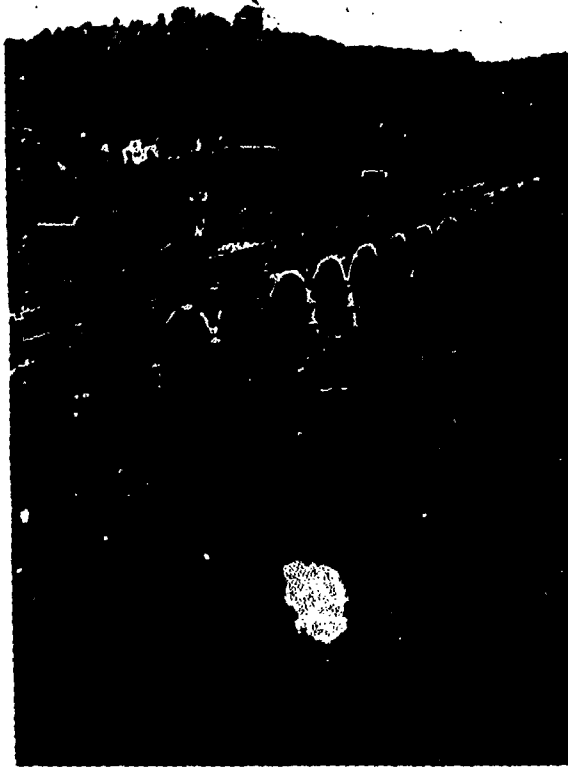


Bridge at Lidge over R. House (Route 1. Bridge No. 1.)

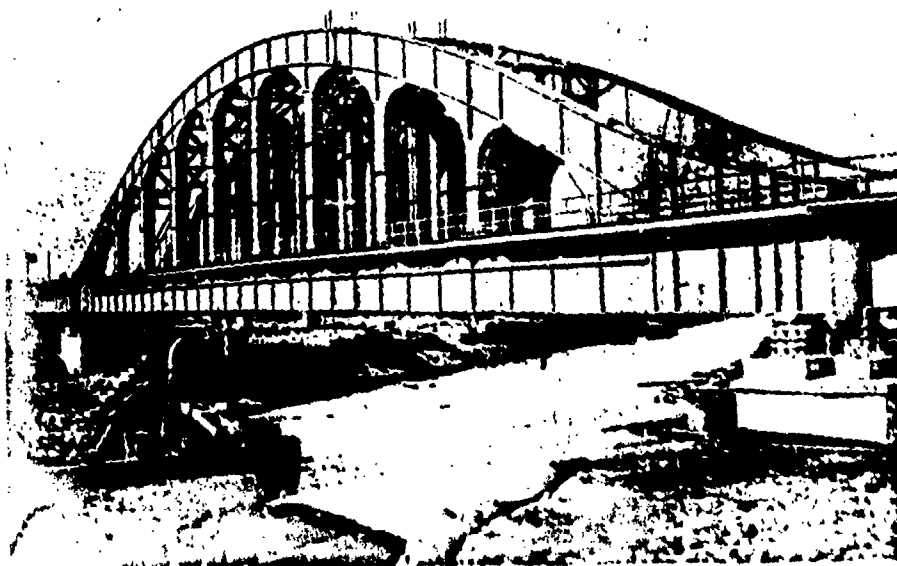


Renory Viaduct (Route 1. Bridge No. 4.)

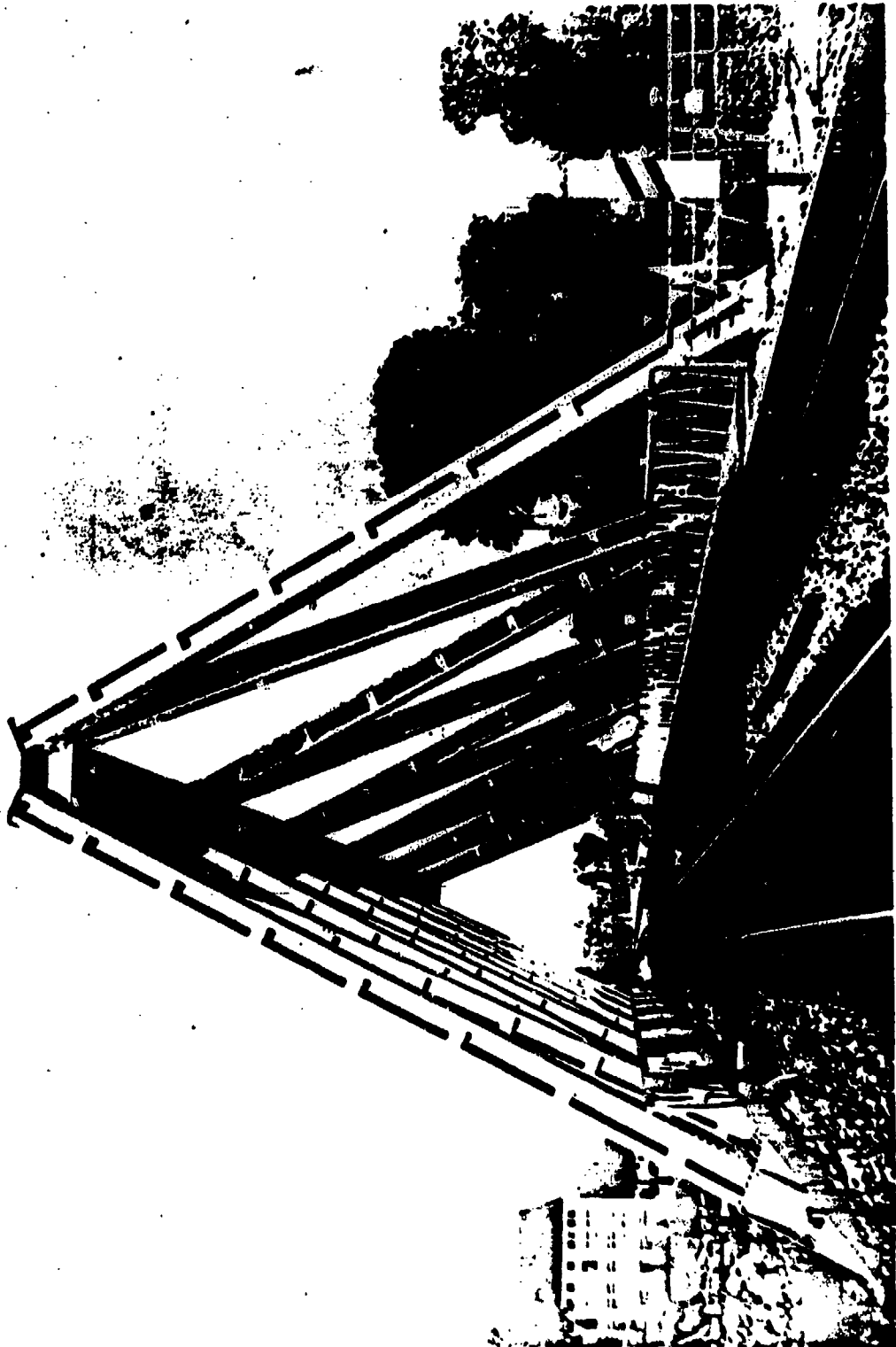
Appendix 28



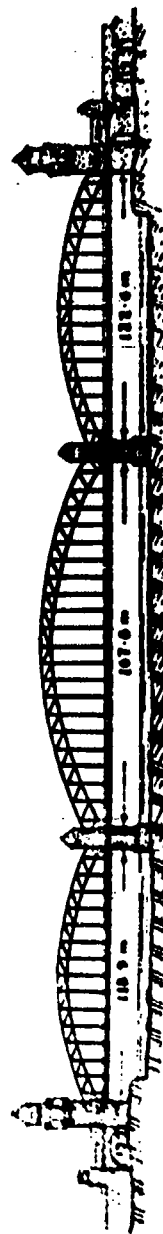
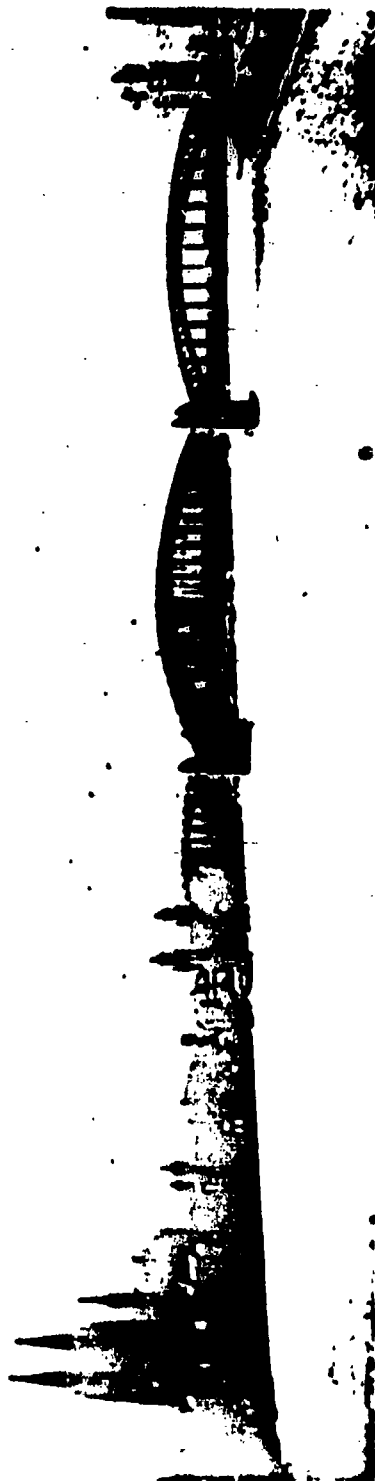
Dolhain Viaduct (Route 1. Bridge No. 22.)



Houthuizen Bridge (Route 1. Bridge No. 35.)



Paken Bridge over N. River (Route 1, Field No. 30.)

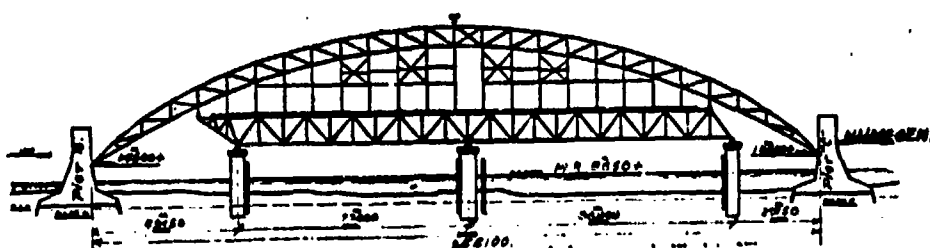


② Railway, Road & Tram Bridge, Köln, "Hohenzollern".

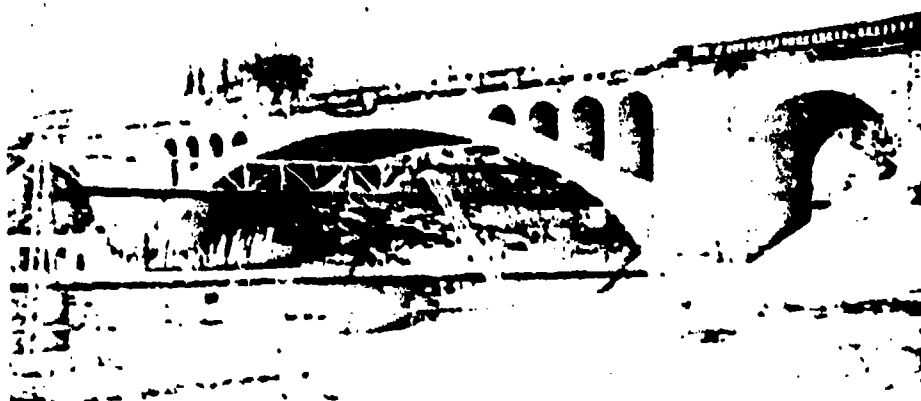
Köln ("Hohenzollern") Bridge over R. Rhine (Routes 6 and 18. Bridge No. 39.)



Oulenberg Bridge over R. Lek (Route 15. Bridge No. 63.)



Nijmegen Bridge over R. Waal (Route 17. Bridge No. 69.). (Shows method of erection of central span, with intermediate supports.)

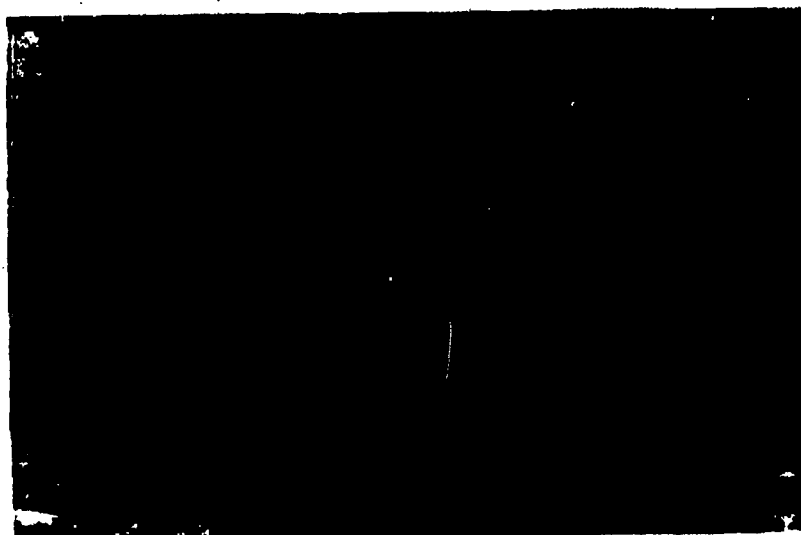


Nijmegen Bridge over R. Waal (Route 17. Bridge No. 69.)

Appendix 38



Bridge over R. Elbe (Route 20, Bridge No. 71.)

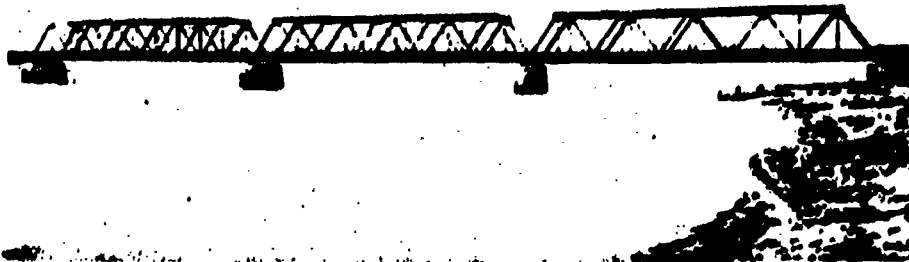


Bridge over R. Elbe (south) at Hamburg (Route 23, Bridge No. 72.)

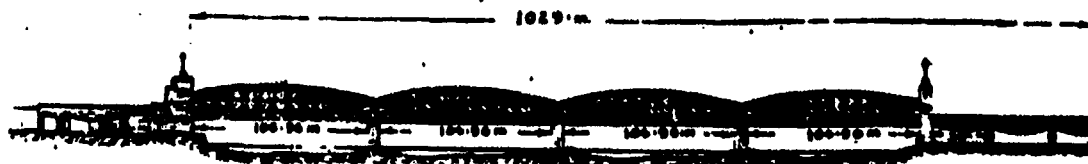


Bridge over R. Elbe (north) at Hamburg (Route 23, Bridge No. 73.)

Appendix 52



Bridge over R. Weser between Bremen and Draye (Route 18.
Bridge No. 74.)

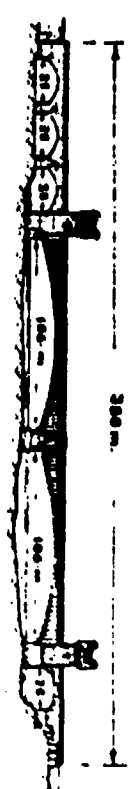


② Railway Bridge - Mainz.

Mainz (south) Bridge over R. Rhine (Route 54. Bridge No. 75.).
(Span dimensions are c. to c. bearings.)



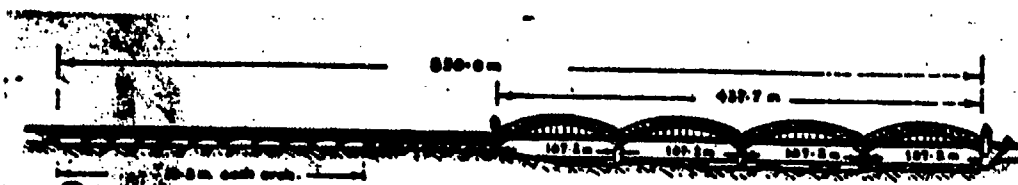
Mainz (south) Bridge over R. Rhine (Route 54. Bridge No. 75.).



Railway Bridge, Koblenz - Horchheim.

Koblenz (Horchheim) Bridge over R. Rhine (Route 6, Bridge No. 16.)

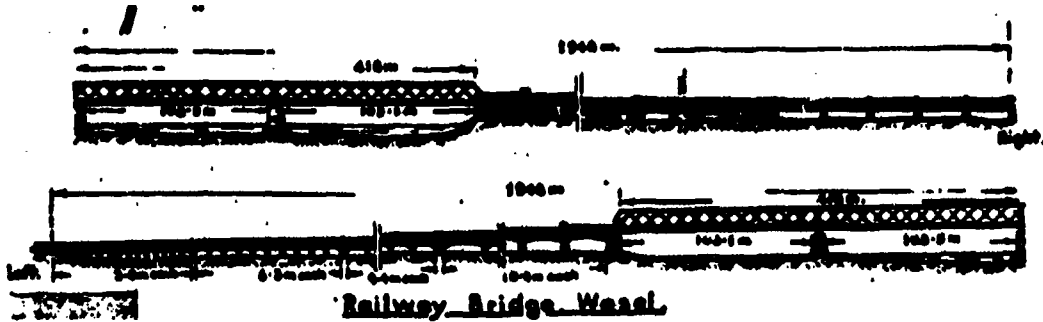
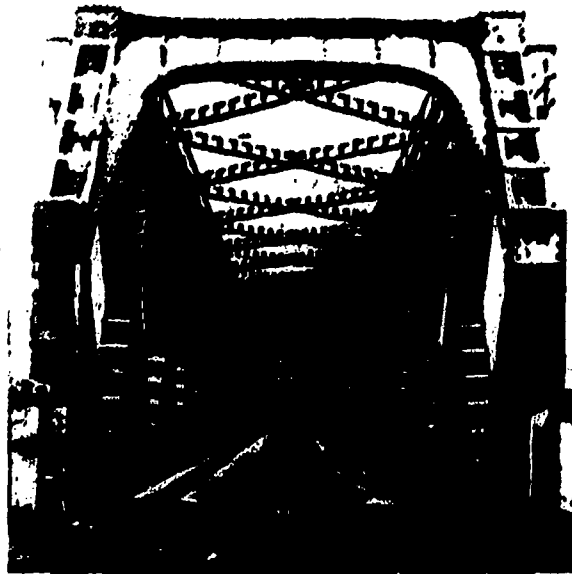
Appendix 32



Railway Bridge (Passenger). Düsseldorf.

Düsseldorf (Passenger) Bridge over R. Rhine (Route 7. Bridge No. 41.)

Appendix 33



Railway Bridge Weasel

Weasel Bridge over R. Rhine (Route 9. Bridge No. 44.)

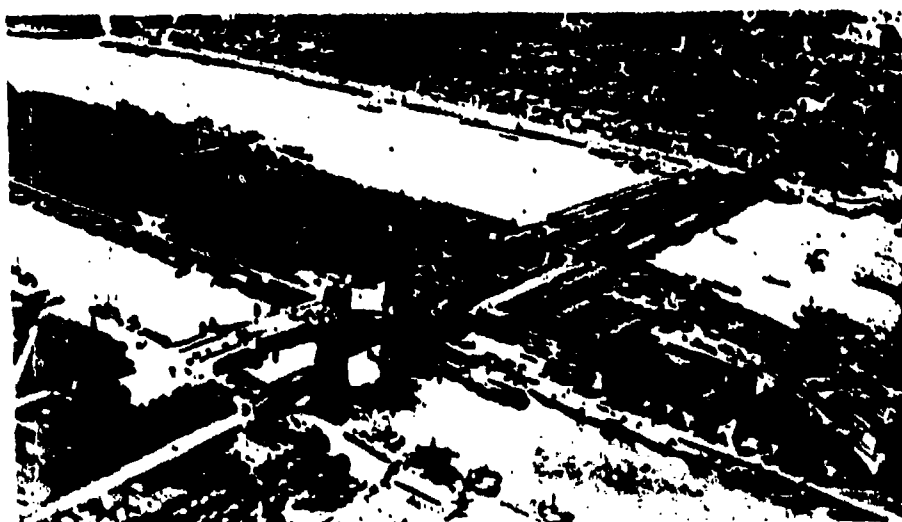


Salt Canal Bridge over R. Rhine (Route 13. Bridge No. 45.)

Amsterdam



Rotterdam. Lift bridge over R. Lek (Route 10. Bridge No. 46.)



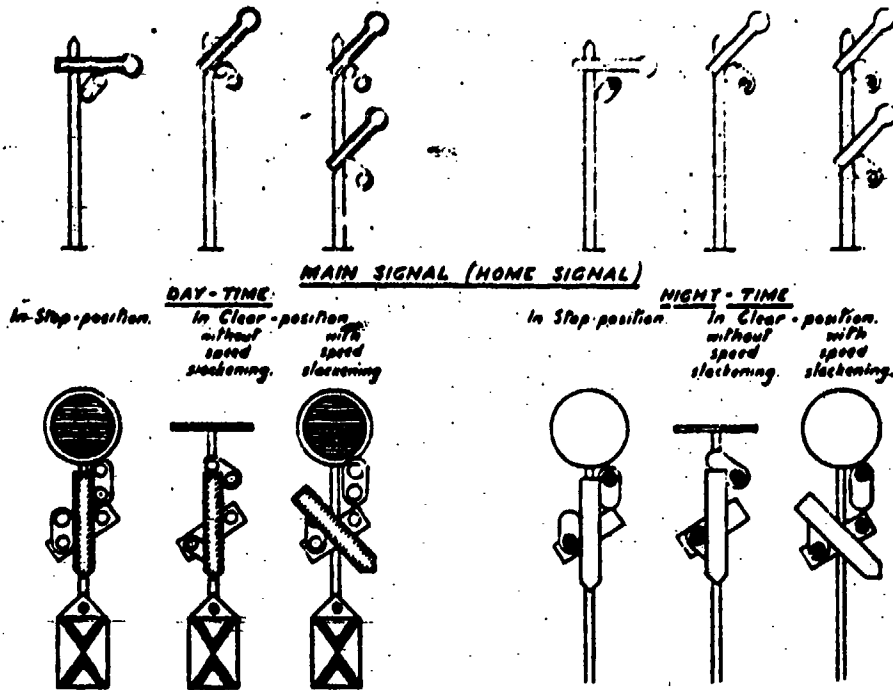
Rotterdam Bridges (Route 10). Bridge No. 65 to right. Bridge No. 46 to left.

Appendix 35

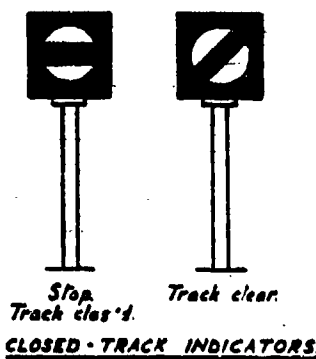


Moondik's Bridge over Hollanach Elop (Route 10. Bridge No. 43.)

SIGNAL INDICATIONS OF THE GERMAN STATE RAILWAYS.

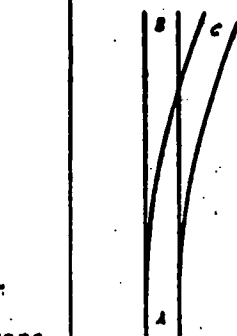


ADVANCE SIGNAL (DISTANT SIGNAL)

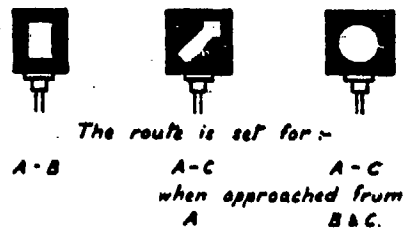


REFERENCE TO SIGNAL COLOURS.

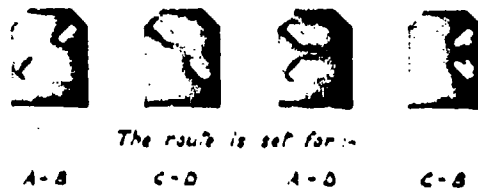
- Orange (Amber)
- Red.
- Green.



TURNOUT.

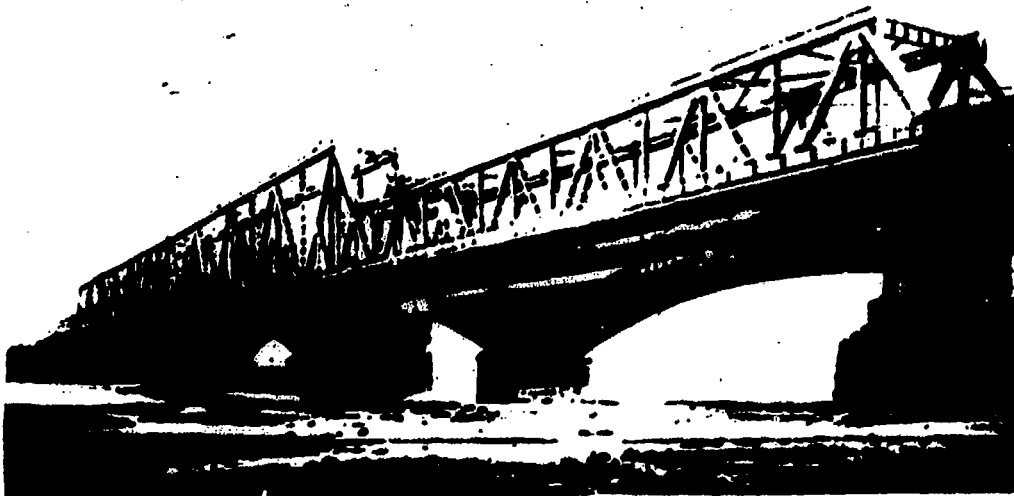


DOUBLE-SLIP CROSSING.



POINT INDICATORS (GROUND SIGNALS)

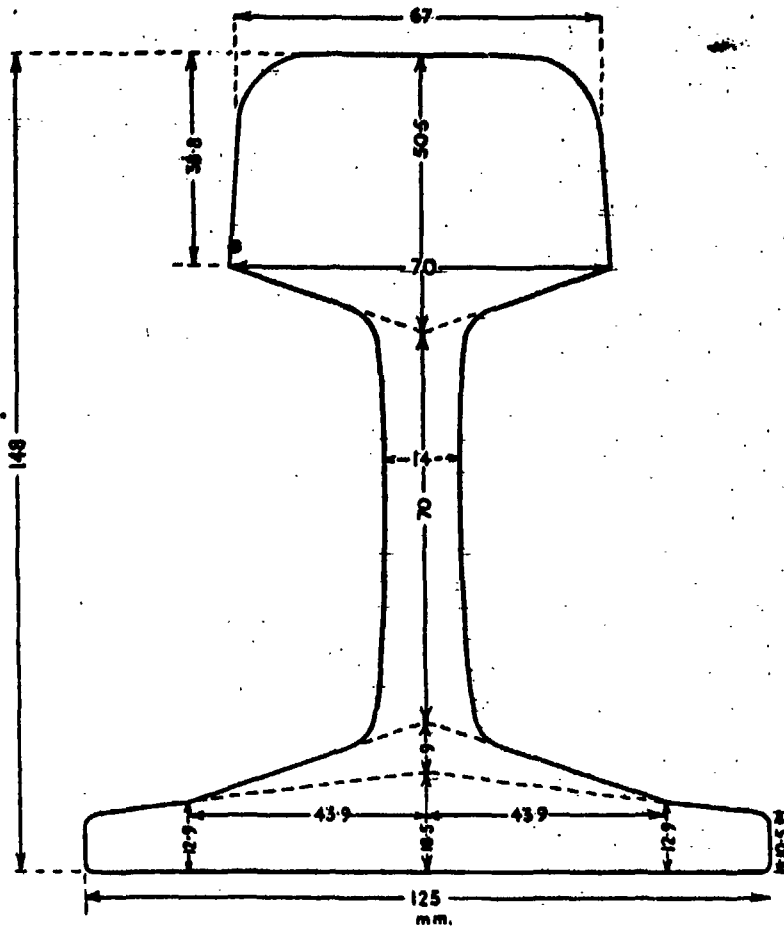
Appendix 55



2 Railway Bridge, Hochfeld.

Dalsburg (Hochfeld) Bridge over R. Rhine (Route 11. Bridge No. 54.)

STANDARD GERMAN RAIL - SECTION



Weight - 49 Kgs./metre (99 lbs./yard)

Section modulus - 234 cm³

Moment of inertia - 1781 cm⁴

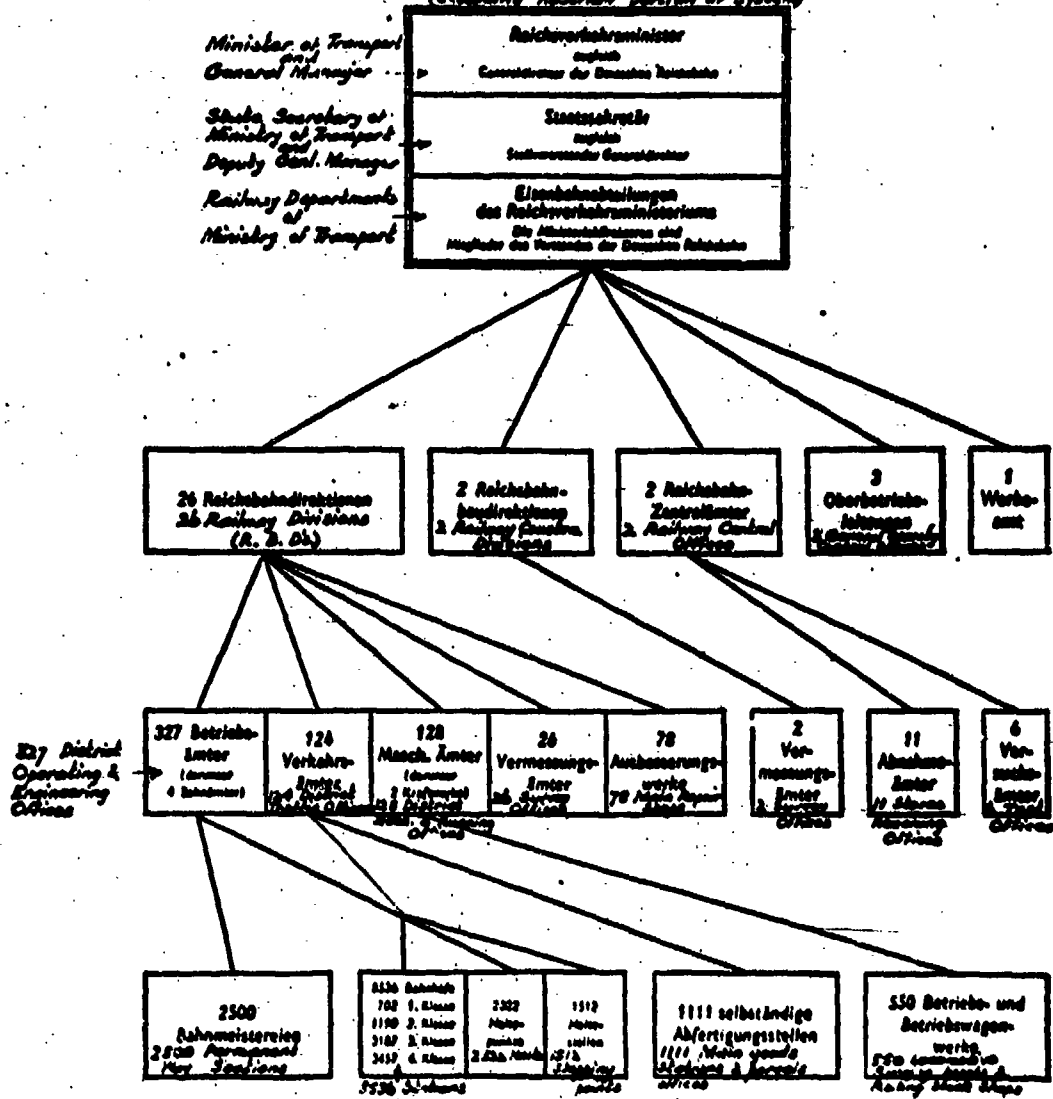
Tensile strength at least 70 Kg/mm² (44.4 tons per sq. in.)

Der Aufbau der Deutschen Reichsbahn

Stand 1. April 1938

(ohne den österreichischen Teil der Reichsbahn)

The Organization of the German State Railway
(excluding Austria which is united)



Außerdem: 7 Schwellenbahnstellen, 117 Gaserzeugungsanlagen, 70 Wasser- und Wärmekraftwerke, 1485 Umspann-, Umformer- und Stromrichterwerke und 1381 Bahnwasserwerke.

ROUTE No. 1 MOUVAIN TO AACHEN LINE DIAGRAM

JANUARY, 1944

APPEND

6

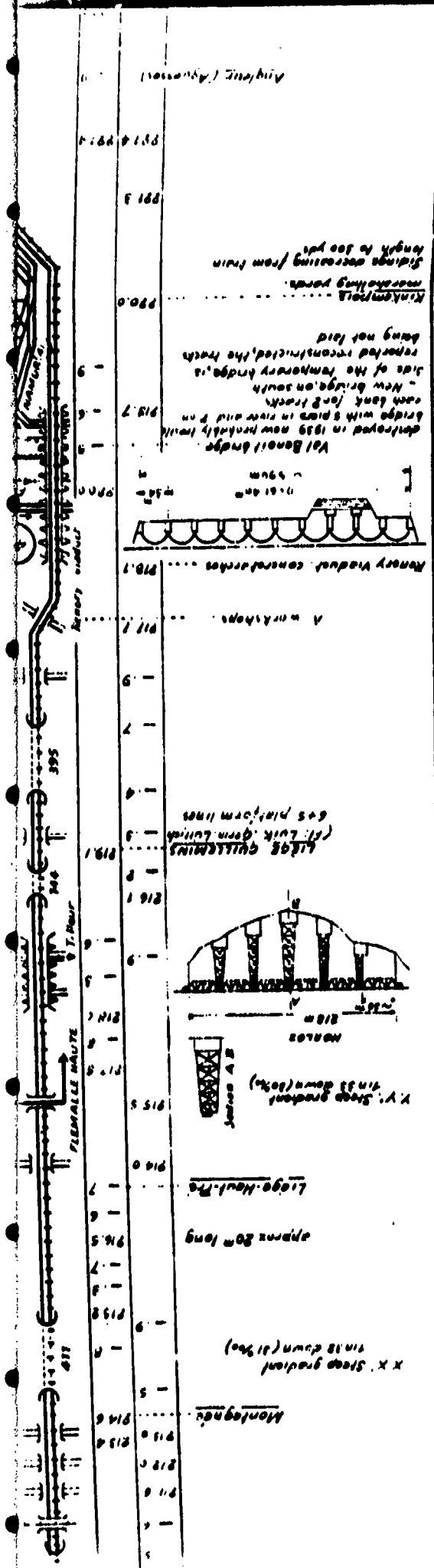
throughout.

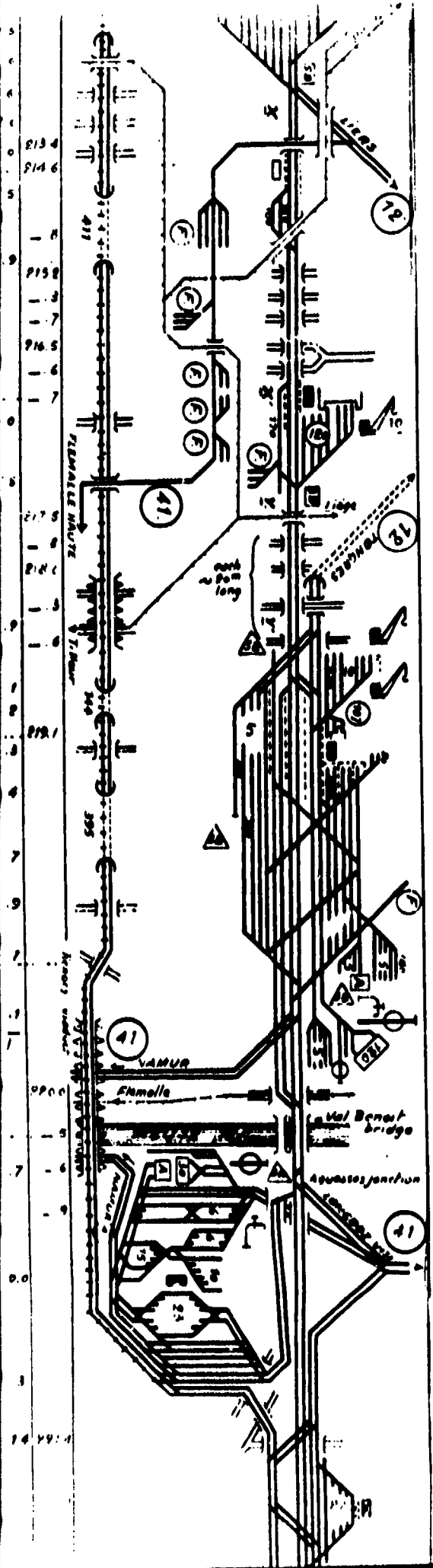
0m radius (25 chains) except between Liège and
they are not less than 300m. radius (15 chains).

RADIANT down 31% max; other alternative section
down 10% max; Other sections between
max; between Papinister and German frontier
d BLOCK SYSTEM (Siemens type) throughout.
il-Raeren, fitted with telephone and block system.
throughout.

res between stations is correct, but the progressive not be taken into consideration for the purpose of

KM?	DIAGRAMS	STATIONS AND PARTICULARS	KM?	DIAGRAMS
2024		<u>Freipont</u>	2	
2040		12 m. span. Masonry arches	5	
2044			6	
2048			8	
2052			11.1	
2056			13	
2060			15	
2064			18	
2068			21.1	
2072			24	
2076			27	
2080			30	
2084			33	
2088			36	
2092			39	
2096			42	
2100			45	
2104			48	
2108			51	
2112			54	
2116			57	
2120			60	
2124			63	
2128			66	
2132			69	
2136			72	
2140			75	
2144			78	
2148			81	
2152			84	
2156			87	
2160			90	
2164			93	
2168			96	
2172			99	
2176			102	
2180			105	
2184			108	
2188			111	
2192			114	
2196			117	
2200			120	
2204			123	
2208			126	
2212			129	
2216			132	
2220			135	
2224			138	
2228			141	
2232			144	
2236			147	
2240			150	
2244			153	
2248			156	
2252			159	
2256			162	
2260			165	
2264			168	
2268			171	
2272			174	
2276			177	
2280			180	
2284			183	
2288			186	
2292			189	
2296			192	
2300			195	
2304			198	
2308			201	
2312			204	
2316			207	
2320			210	
2324			213	
2328			216	
2332			219	
2336			222	
2340			225	
2344			228	
2348			231	
2352			234	
2356			237	
2360			240	
2364			243	
2368			246	
2372			249	
2376			252	
2380			255	
2384			258	
2388			261	
2392			264	
2396			267	
2400			270	
2404			273	
2408			276	
2412			279	
2416			282	
2420			285	
2424			288	
2428			291	
2432			294	
2436			297	
2440			300	
2444			303	
2448			306	
2452			309	
2456			312	
2460			315	
2464			318	
2468			321	
2472			324	
2476			327	
2480			330	
2484			333	
2488			336	
2492			339	
2496			342	
2500			345	
2504			348	
2508			351	
2512			354	
2516			357	
2520			360	
2524			363	
2528			366	
2532			369	
2536			372	
2540			375	
2544			378	
2548			381	
2552			384	
2556			387	
2560			390	
2564			393	
2568			396	
2572			399	
2576			402	
2580			405	
2584			408	
2588			411	
2592			414	
2596			417	
2600			420	
2604			423	
2608			426	
2612			429	
2616			432	
2620			435	
2624			438	
2628			441	
2632			444	
2636			447	
2640			450	
2644			453	
2648			456	
2652			459	
2656			462	
2660			465	
2664			468	
2668			471	
2672			474	
2676			477	
2680			480	
2684			483	
2688			486	
2692			489	
2696			492	
2700			495	
2704			498	
2708			501	
2712			504	
2716			507	
2720			510	
2724			513	
2728			516	
2732			519	
2736			522	
2740			525	
2744			528	
2748			531	
2752			534	
2756			537	
2760			540	
2764			543	
2768			546	
2772			549	
2776			552	
2780			555	
2784			558	
2788			561	
2792			564	
2796			567	
2800			570	
2804			573	
2808			576	
2812			579	
2816			582	
2820			585	
2824			588	
2828			591	
2832			594	
2836			597	
2840			600	
2844			603	
2848			606	
2852			609	
2856			612	
2860			615	
2864			618	
2868			621	
2872			624	
2876			627	
2880			630	
2884			633	
2888			636	
2892			639	
2896			642	
2900			645	
2904			648	
2908			651	
2912			654	
2916			657	
2920			660	
2924			663	
2928			666	
2932			669	
2936			672	
2940			675	
2944			678	
2948			681	
2952			684	
2956			687	
2960			690	
2964			693	
2968			696	
2972			699	
2976			702	
2980			705	
2984			708	
2988			711	
2992			714	
2996			717	
3000			720	
3004			723	
3008			726	
3012			729	
3016			732	
3020			735	
3024			738	
3028			741	
3032			744	
3036			747	
3040			750	
3044			753	
3048			756	
3052			759	
3056			762	
3060			765	
3064			768	
3068			771	
3072			774	
3076			777	
3080			780	
3084			783	
3088			786	
3092			789	
3096			792	
3100			795	
3104			798	
3108			801	
3112			804	
3116			807	
3120			810	
3124			813	
3128			816	
3132			819	
3136			822	
3140			825	
3144			828	
3148			831	
3152			834	
3156			837	
3160			840	
3164			843	
3168			846	
3172			849	
3176			852	
3180			855	
3184			858	
3188			861	
3192			864	
3196			867	
3200			870	
3204			873	
3208			876	
3212			879	
3216			882	
3220			885	
3224			888	
3228			891	
3232			894	
3236			897	
3240			900	
3244			903	
3248			906	
3252			909	
3256			912	
3260			915	
3264			918	
3268			921	
3272			924	
3276			927	
3280			930	
3284			933	
3288			936	
3292			939	
3296			942	
3300			945	
3304			948	
3308			951	
3312			954	
3316			957	
3320			960	
3324			963	
3328			966	
3332			969	
3336			972	
3340			975	
3344			978	
3348			981	
3352			984	
3356			987	
3360			990	
3364			993	
3368			996	
3372			999	
3376			1002	
3380			1005	
3384			1008	
3388			1011	
3392			1014	
3396			1017	
3400			1020	
3404			1023	
3408			1026	
3412			1029	
3416			1032	
3420			1035	
3424			1038	
3428			1041	
3432			1044	
3436			1047	
3440			1050	
3444			1053	
3448			1056	
3452			1059	
3456			1062	
3460			1065	
3464			1068	
3468			1071	
3472			1074	
3476			1077	
3480			1080	
3484			1083	
3488			1086	
3492			1089	
3496			1092	
3500			1095	
3504			1098	
3508			1101	
3512			1104	
3516			1107	
3520			1110	
3524			1113	
3528			1116	
3532			1119	
3536			1122	
3540			1125	
3544			1128	
3548			1131	
3552			1134	
3556			1137	
3560			1140	
3564			1143	
3568			1146	
3572			1149	
3576			1152	
3580			1155	
3584			1158	
3588			1161	
3592			1164	
3596			1167	
3600			1170	
3604			1173	
3608			1176	
3612			1179	
3616			1182	
3620			1185	
3624			1188	
3628			1191	
3632			1194	
3636			1197	
3640			1200	
3644			1203	
3648			1206	
3652			1209	
3656			1212	
3660			1215	
3664			1218	
3668			1221	
3672			1224	
3676			1227	
3680			1230	
3684			1233	
3688			1236	
3692			1239	
3696			1242	
3700			1245	
3704			1248	
3708			1251	
3712		</		





PEPINSTER

~ 38m long. Masonry arch type 241.1

~ 50m

ENSIVAL

VERVIERS-CENTRAL

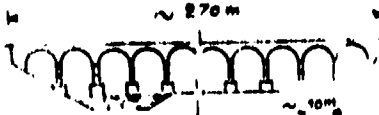
Verriers - Ouest

Verriers - Palais

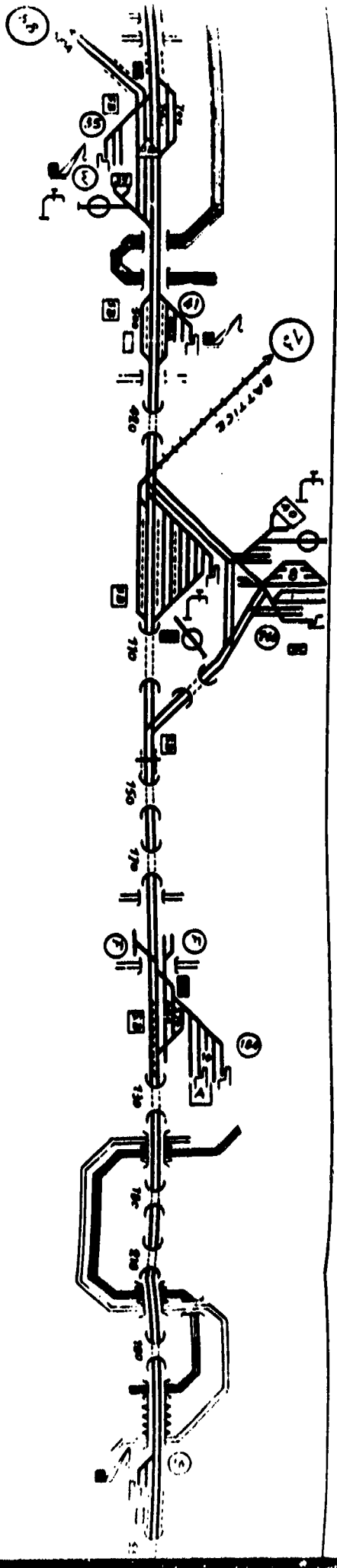
Verriers - Est

A. Goods shed

~ 90m



Dolkain Gilonne



~ 20m long

TIRL
4 r. main tracks.

Esemool

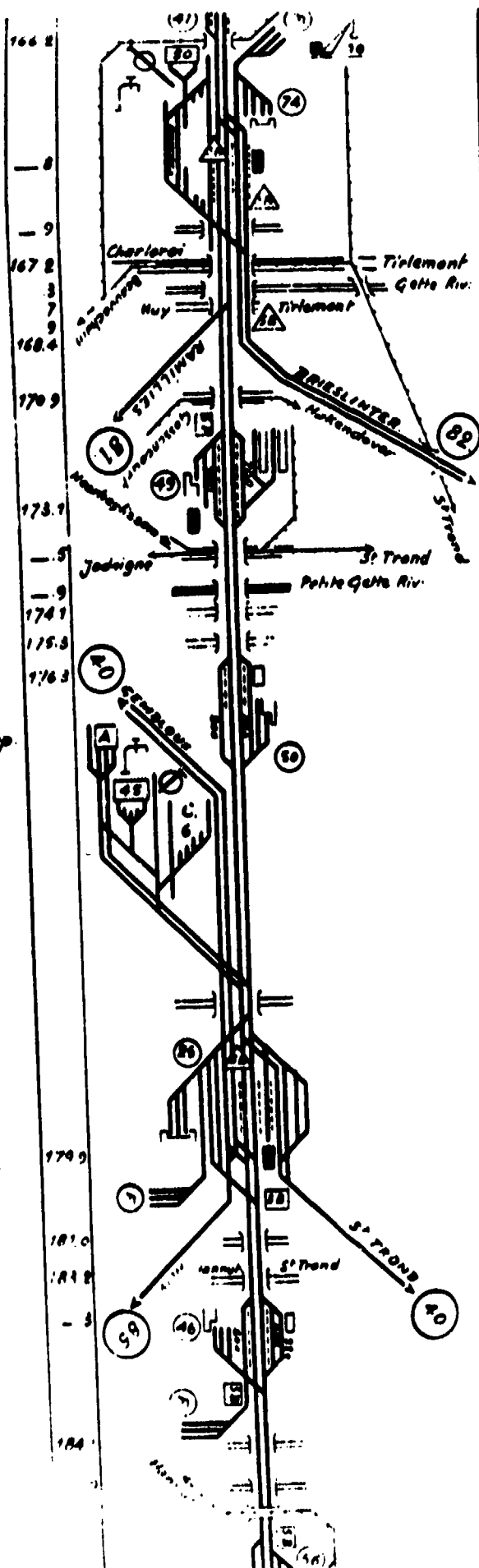
Neerwinden

A wagens workshop.

C: coal

LANDEN

Gingelom



marshalling yards.
Sidings decreasing from 100
length to 300 yds.

Angleur (Aguesses)...

ANGLEUR

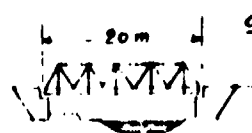
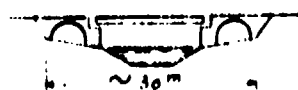


~ 50 m. long

CHENÉE

~ 40 m. long

Henne



Chaudfontaine

221.3

221.4 221.4

— 9

222.8

— 3

— 5

— 7

— 8

223.1

— 5

— 8

224.2

— 7

— 9

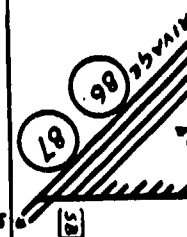
225.4

— 6

— 8

226.6

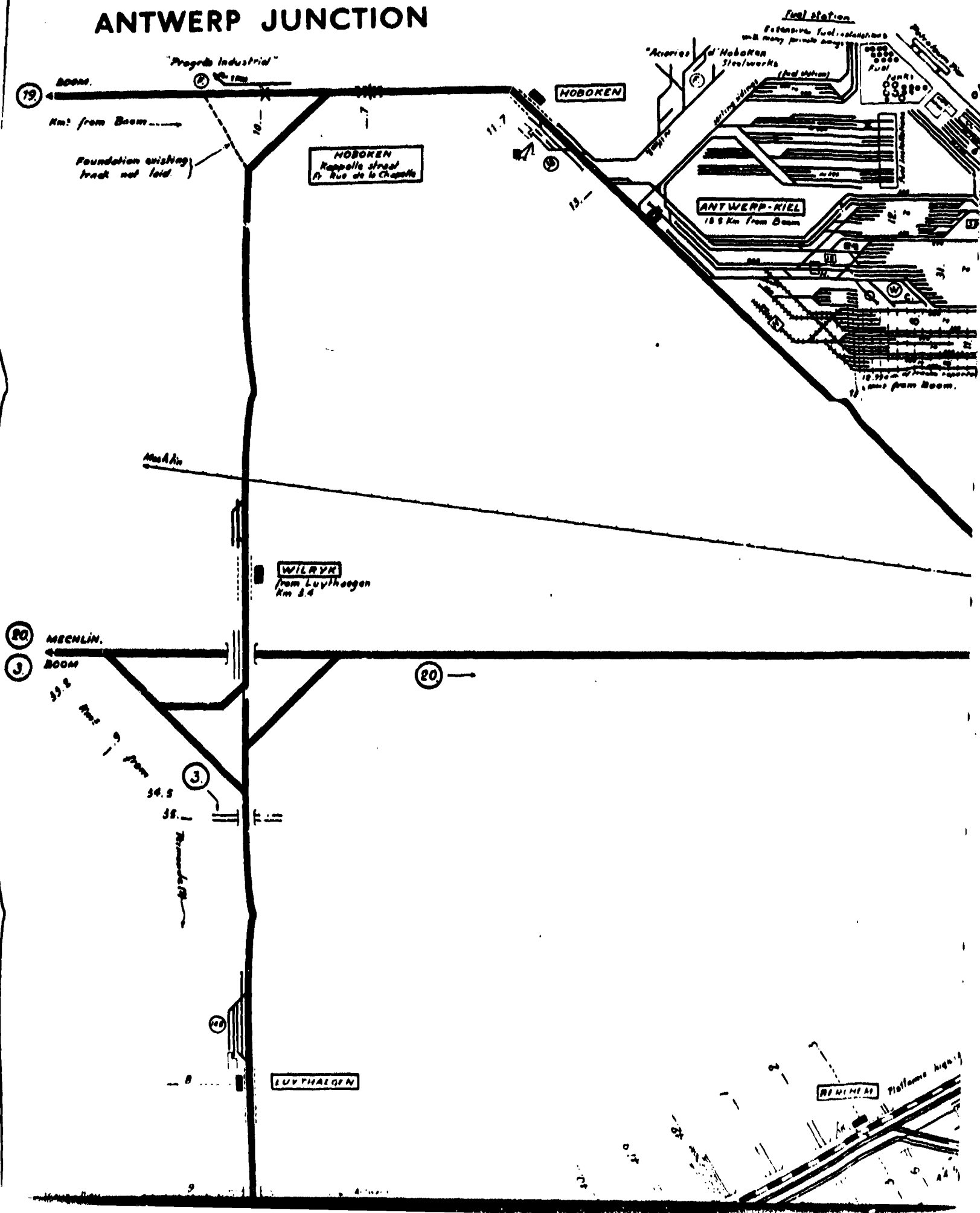
227.0

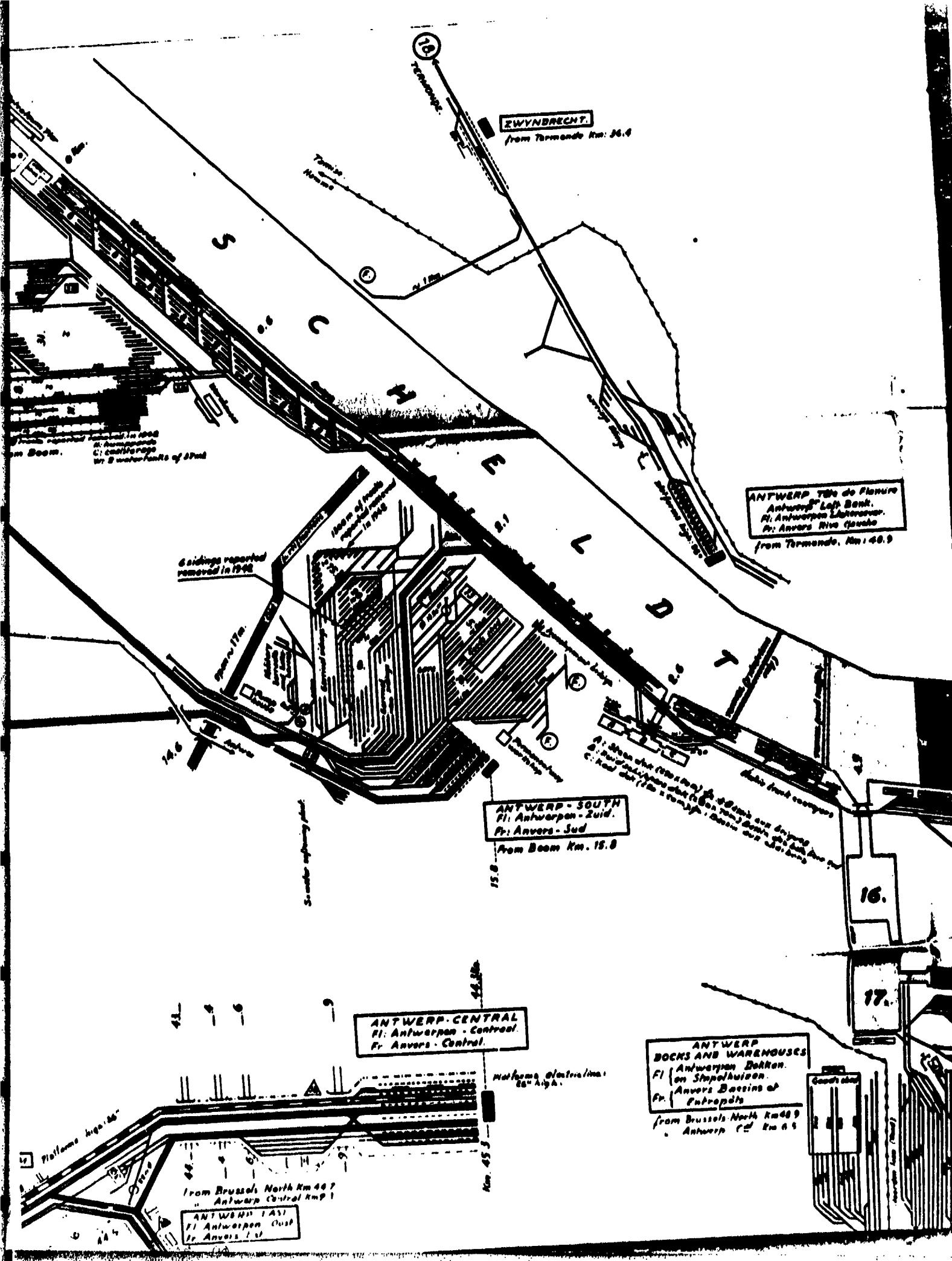


Qu

Ly 1/2 railway
to Poulseur







ZWYNBRECHT.

from Tormonde Km: 36.4

ANTWERP Tête de Fleuve
Antwerp Left Bank.
Fr: Antwerpen Linkerover.
Fr: Anvers Rive Gauche

from Tormonde, Km: 40.9

Gardings reported removed in 1940

ANTWERP - SOUTH
Fr: Antwerpen - Zuid.
Fr: Anvers - Sud

from Boom Km. 15.8

ANTWERP - CENTRAL
Fr: Antwerpen - Central.
Fr: Anvers - Central.

ANTWERP
DOCKS AND WAREHOUSES
Fr: Antwerpen Docks.
Fr: Antwerpen Baken.
Fr: Anvers Bassins of Entrepôts

from Brussels North Km 40.9
Antwerp Cd Km 4.5

from Brussels North Km 40.9
Antwerp Central Km 1

ANTWERP EAST
Fr: Antwerpen Oost
Fr: Anvers Est

10

EWYNDRECHT.

from Tormonde Km: 36.4

ANTWERP TON de Flandre
Antwerp Left Bank.
Fl: Antwerpen Lakenover.
Fr: Anvers Rive Gauche
from Tormonde, Km: 48.9

RIV:

ANTWERP - SOUTH
Fl: Antwerpen - Zuid.
Fr: Anvers - Sud

from Boom Km: 15.8

1. When the (Belgian) Government has ordered the construction of a (Belgian) fort, the fort must be built on the (Belgian) side of the river.

ANTWERP DOCKS AND WAREHOUSES
Fl: Antwerpen Dokken
en Stapelhuizen
Fr: Anvers Bassins et Entrepôts
from Brussels North Km: 48.9
Antwerp (S) Km: 6.5

TRIAL
control
1.

Platforme, Olanterima:
26° 41' 44".

Km 45.3

Good roads

16.

17.

12.

14.

13.

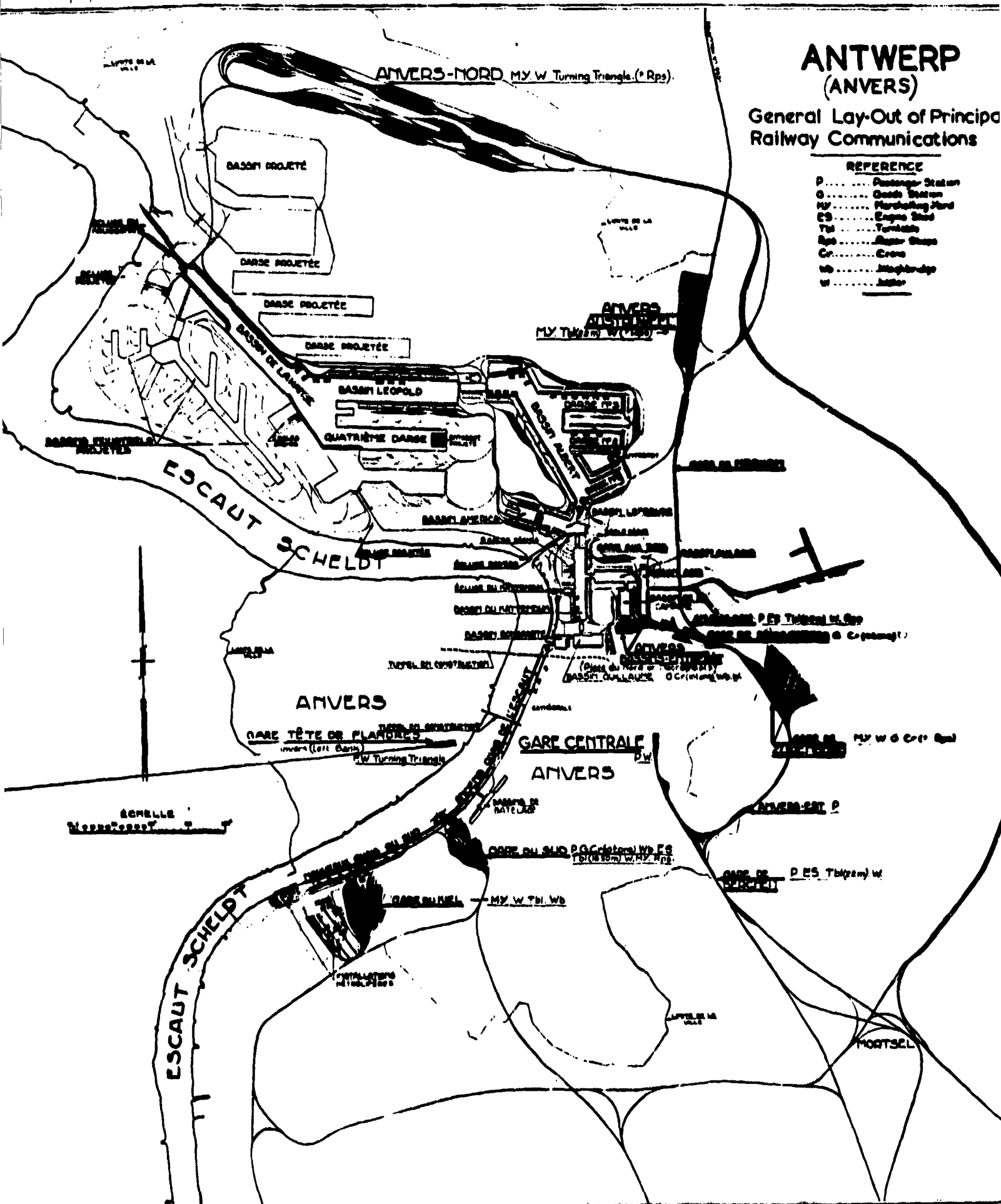
11.

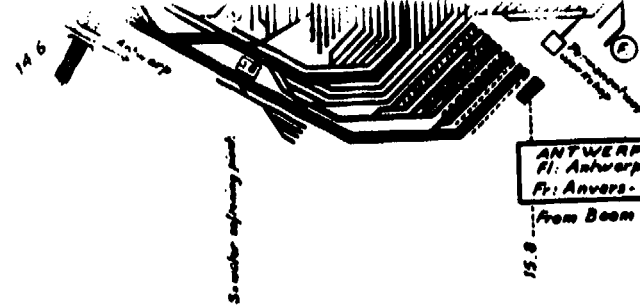
10.

9.

General Lay-Out of Principal Railway Communications

P..... Passenger Station
Q..... Goods Station
NY..... Marshalling Yard
ES..... Engine Shed
Tol..... Turntable
Rps..... Repair Shop
Cr..... Crows
Wb..... Workshop
W..... Water





ANTWERP - SOUTH
Pl: Antwerpen - Zuid.
Fr: Anvers - Sud
From Boom Km. 15.8

ANTWERP - CENTRAL
Pl: Antwerpen - Central.
Fr: Anvers - Central.

ANTWERP
DOCKS AND WAREHOUSES
Pl: Antwerpen Docks.
on Stapelhuizen.
Anvers Bassins et
Entrepôts
from Brussels-North Km 48.9
Antwerp - CE Km 6.5

From Brussels-North Km 44.7
Antwerp - Central Km 8.3

ANTWERP - EAST
Pl: Antwerpen - Oost
Fr: Anvers - Est

Mathema. Elevat. (m):
66" A.P.A.

STUYVENBERG

From Brussels-North Km 49.5
Antwerp - CE Km 7.5

SCHIJNPOORT
ZURENBERG

from Brussels-North

200m of tracks reported
removed in 1942

200m of tracks reported
removed in 1942

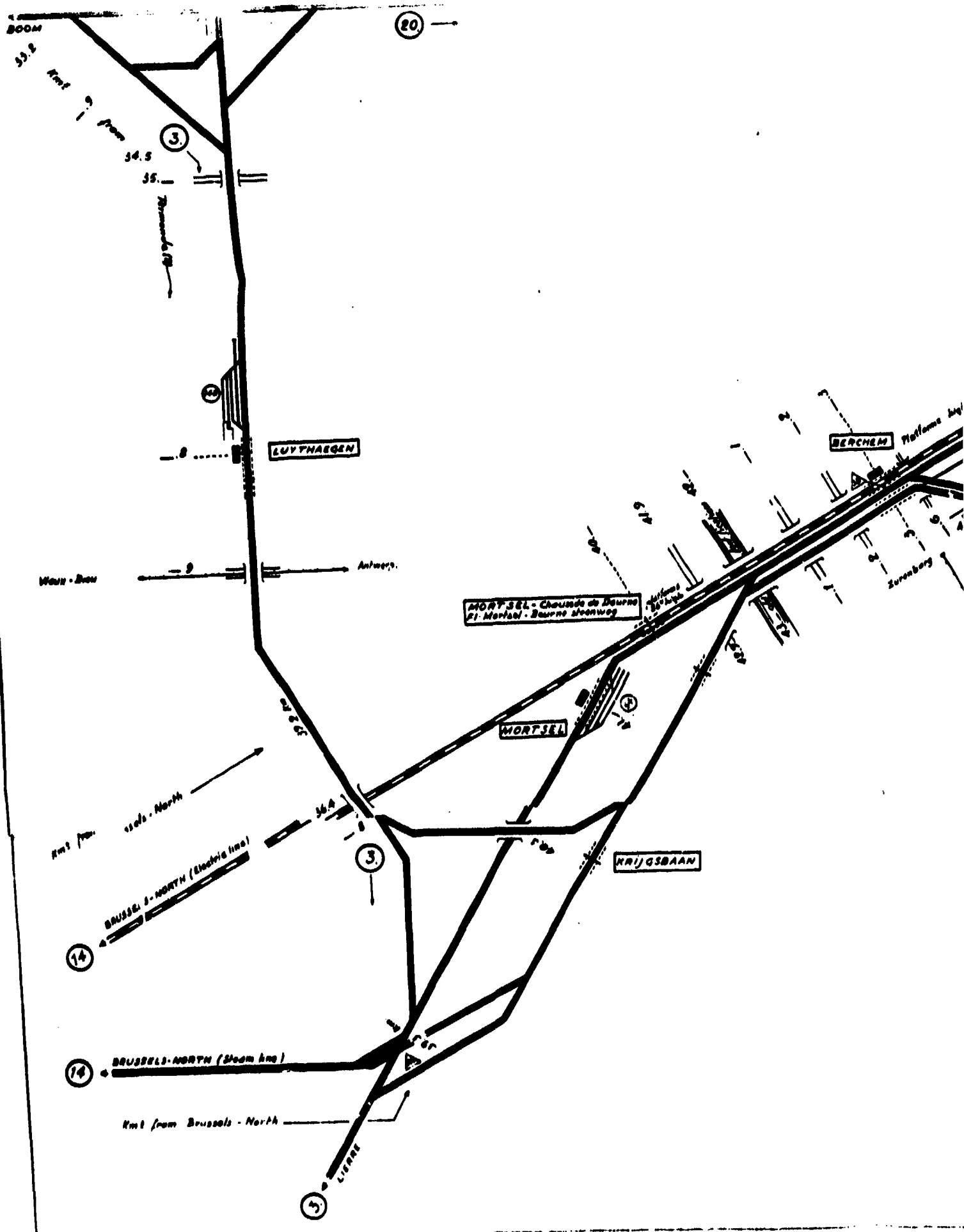
Garage.

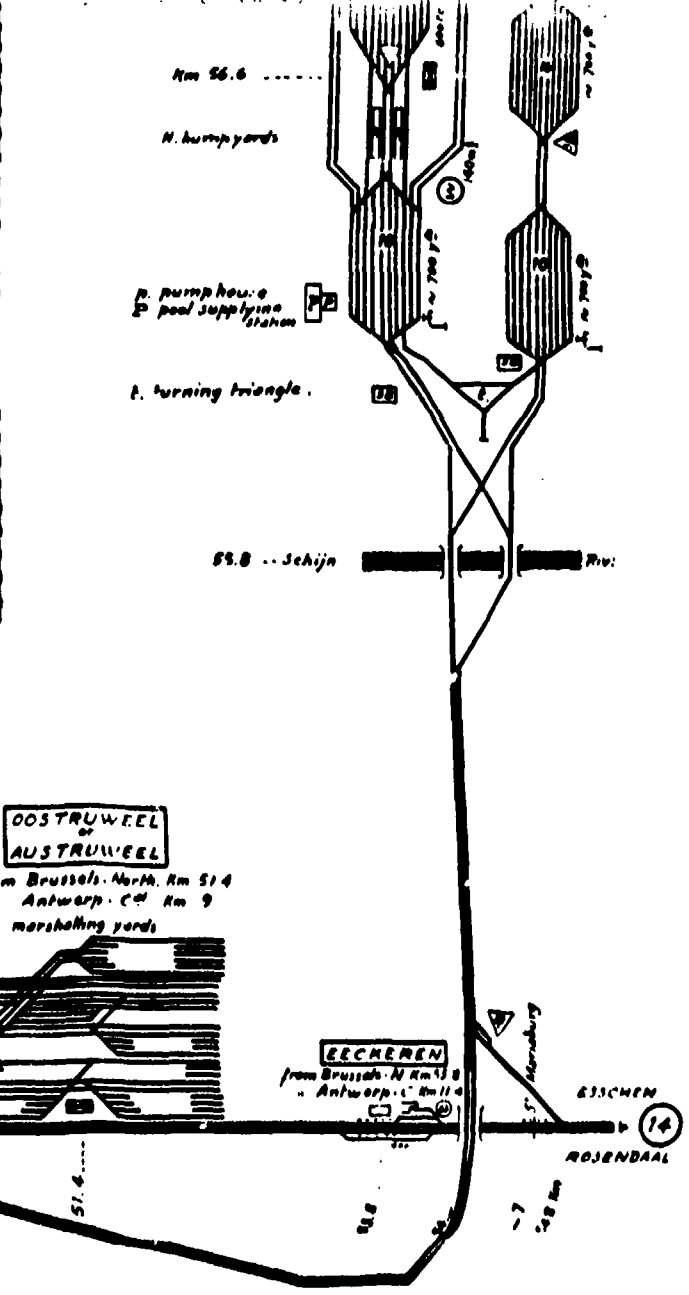
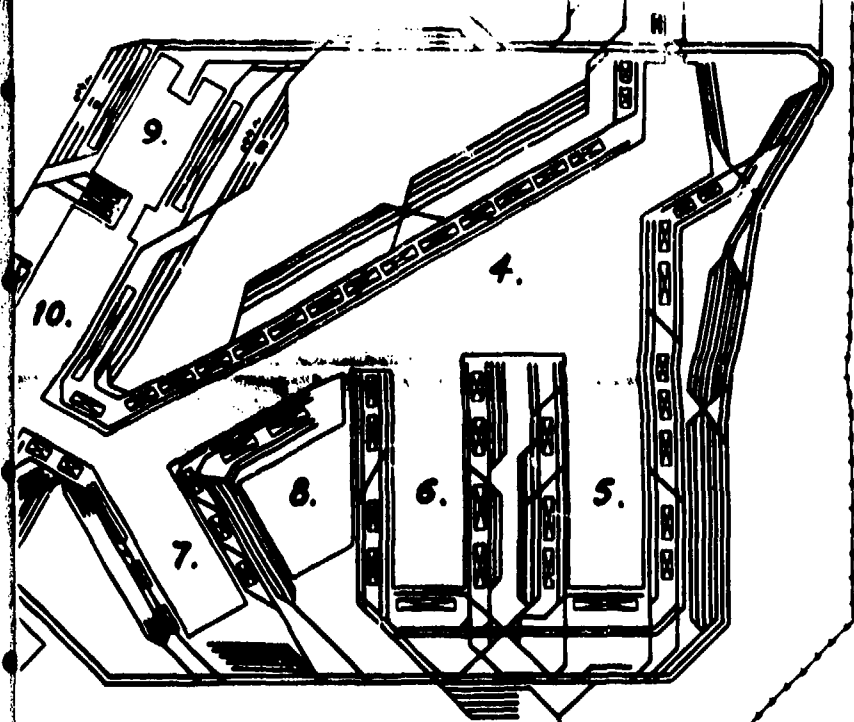
Marshalling
sidings

- 1. arrival sidings
- 2. departure
- 3. through
- 4. marshalling sidings
- 5. sidings

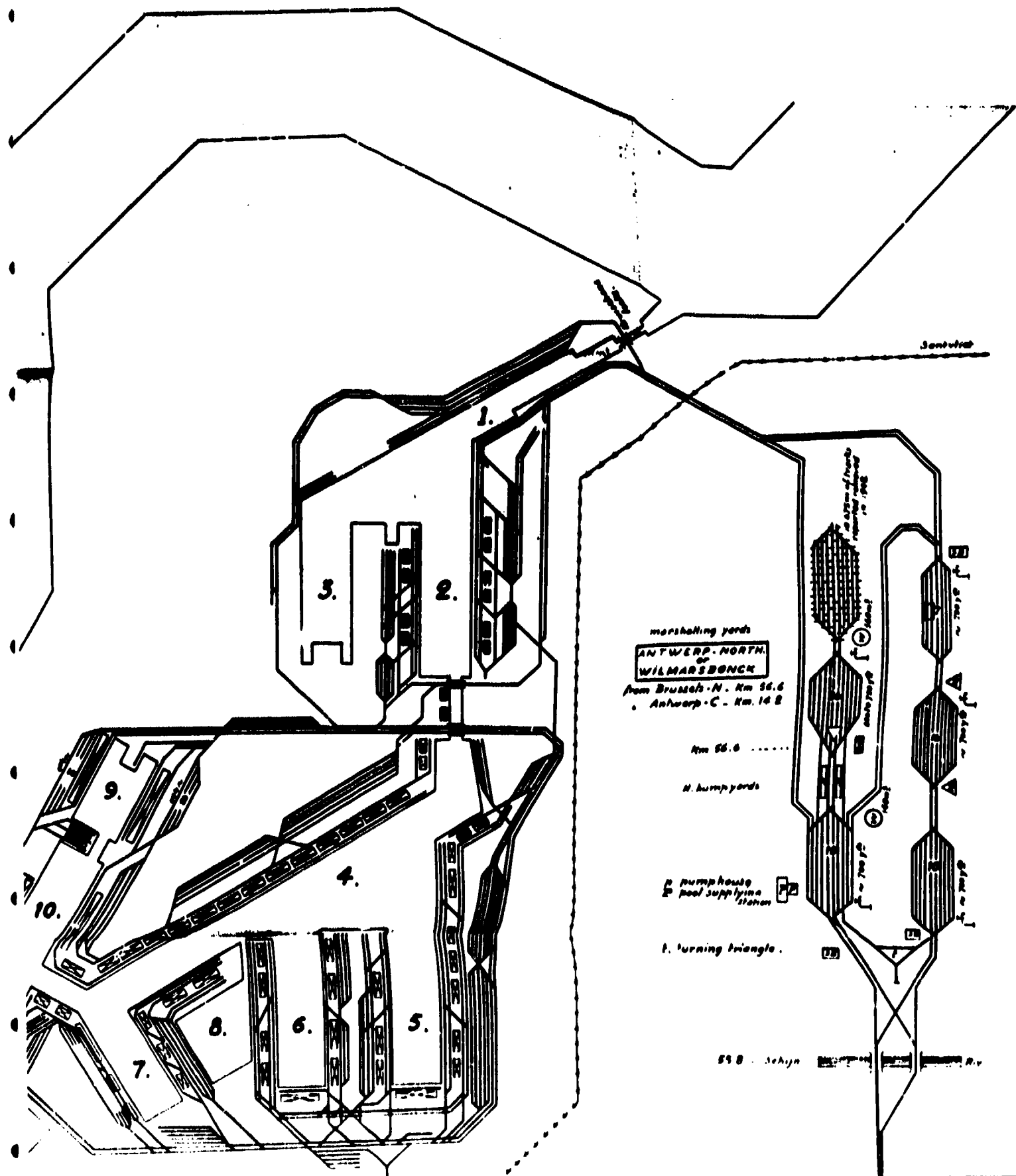
goods yards

Well





INDEX OF THE DOCKS			YARDS	
			LENGTH	WIDTH
1 Kanaaldek C	Bassin canal C or Leopold		2300	200 to 400
2 " B	" " B		1750	380
3 Viende Havendek	Quatrieme darse		1600	380
4 Albert dek	Bassin Albert		2300	270
5 Derde Havendek	Troisieme darse		840	230
6 Tweede "	Deuxieme "		770	230
7 Eerste "	Premiere "		400	230
8 Schuifdek voor lichters	Bassin pour allages		370	280
9 Americadek	" America		400	200
10 Lefebvredok	" Lefebvre		550	200
11 Straatsburg dek	" de Strasbourg		550	300
12 Hollandschdek	" du Hollandyk		1040	130
13 Houtdek	" du bois		550	160
14 Kampischdek	" de la Campine		380	175
15 Aziadek	" Asia		750	90
16 Bonapartedek	" Bonaparte		175	150
17 Willemdek	" Guillaume		380	150



RIV:

ANTWERP - SOUTH
Pl: Antwerpen - Zuid.
Fr: Antwerp - Sud
From Boom Km. 15.8

P-CENTRAL
nan - Control.
Control.

Mathema. Electric/Ans.
85° Angl.

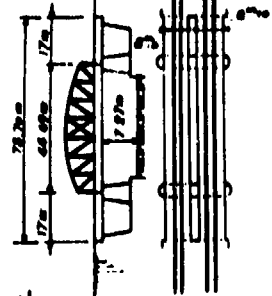
ANTWERP
DOCKS AND WAREHOUSES
Pl: Antwerpen Docks.
on Stapelhuizen.
Fr: Anvers Docks et
Entrepôts
from Brussels-North Km 48.9
Antwerp - Cd Km 6.5

STUYVENBERG
from Brussels-North Km 47.6
Antwerp - Cd Km 5.2

SCHIJNPOORT
ZURENBERG
from Brussels-North Km 46.5

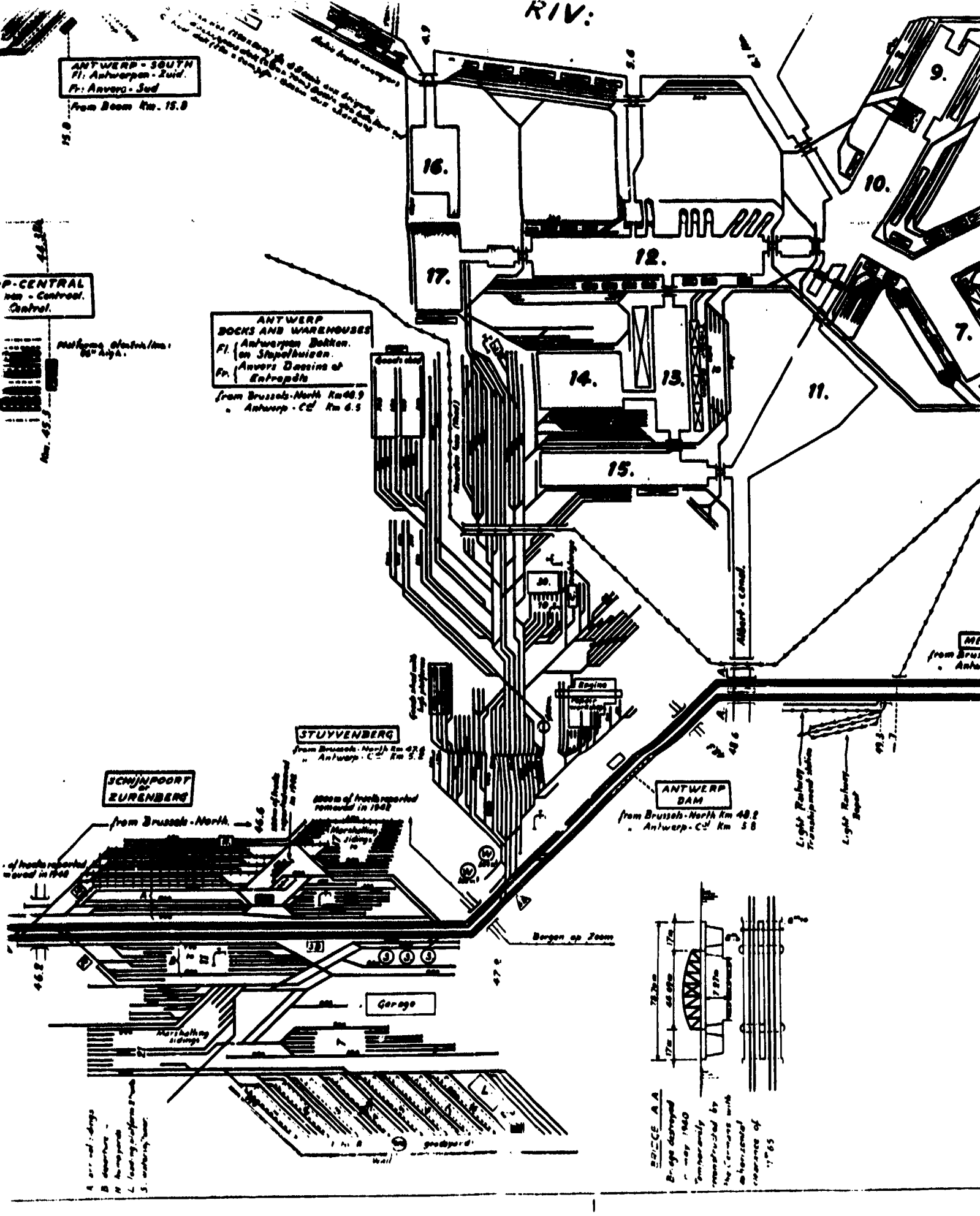
ANTWERP
DAM
from Brussels-North Km 48.2
Antwerp - Cd Km 5.8

Garage



BRIDGE A A
Bridge destroyed
- May 1940
temporarily
reconstructed by
the Germans with
a horizontal
clearance of
11m '65

- 1. all rail sidings
- 2. sidings
- 3. sidings
- 4. sidings
- 5. sidings



ROUTE No.9 SECTION ANTWERP TO ESSEN LINE DIAGRAM

APPENDIX 8
January 1944

DOUBLE TRACK ANTWERP TO ESSEN
No CURVES less than 500m. (25 chains)
STEEP GRADIENTS max: 7‰
LOCK and BLOCK system throughout
DISPATCHING SYSTEM between ANTWERP & Essen
NOTE:-
Dis. in Kilometres between stations is correct but the
prog. dist. Kilometric distance should not be taken into
consideration for the purpose of this report.

DIAGRAMS

STATION AND
PARTICULARS

KM:
42.9 41.9

43 42

1 2

3 4

5 6

TO ANTWERP
CENTRAL

43 42

4 5

6 7

8 9

10 11

12 13

14 15

16 17

18 19

20 21

22 23

24 25

26 27

28 29

30 31

32 33

34 35

36 37

38 39

40 41

42 43

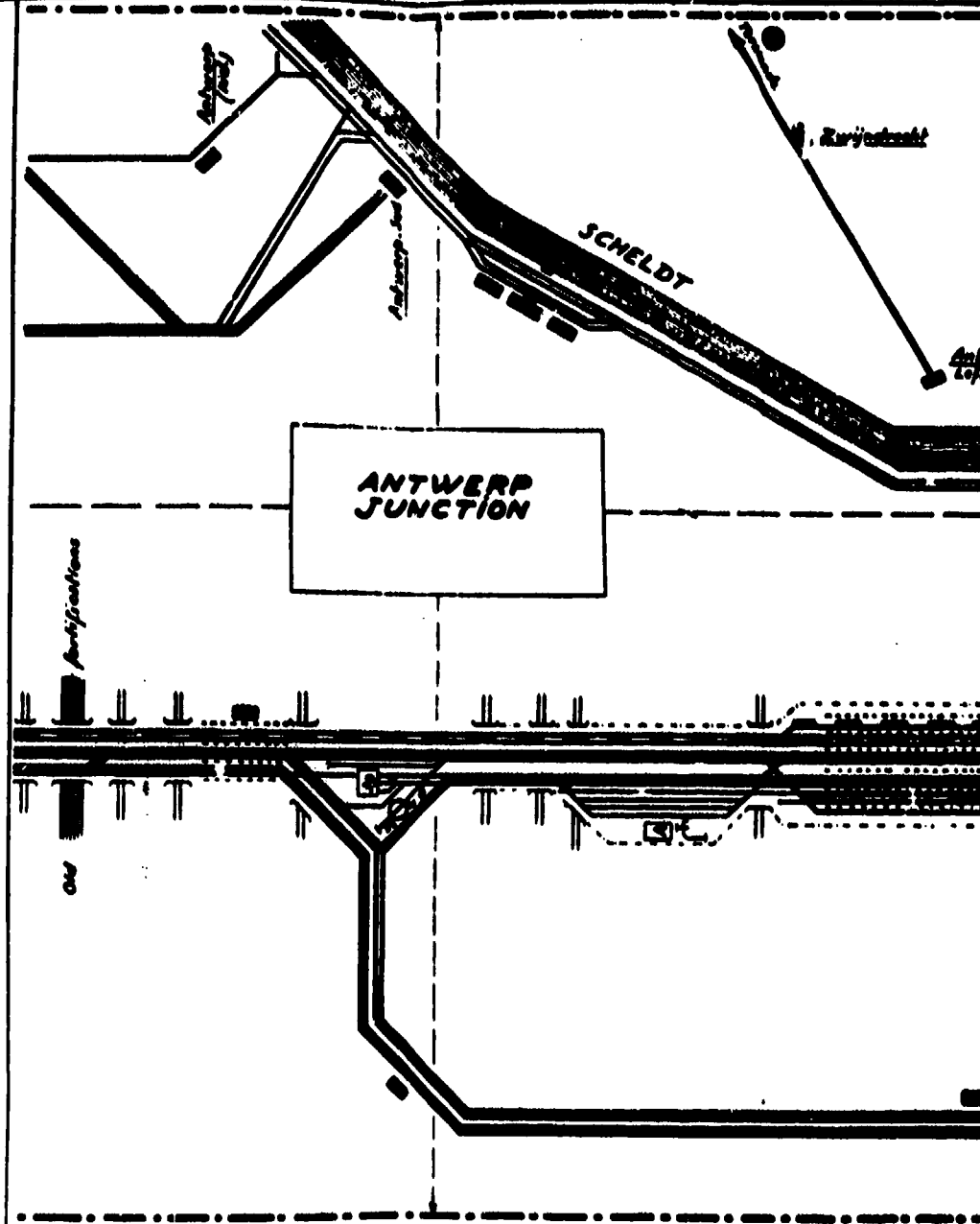
44 45

46 47

Antwerpen
Ost

Antwerpen
West

ANTWERP
JUNCTION



EAST LINE VIA EURENBERG.

BERGHEM

Antwerp - Ess.

A. Wertheim

Schiedt or
Zurenborg

ROUTE N

SECTION : LOUVAIN

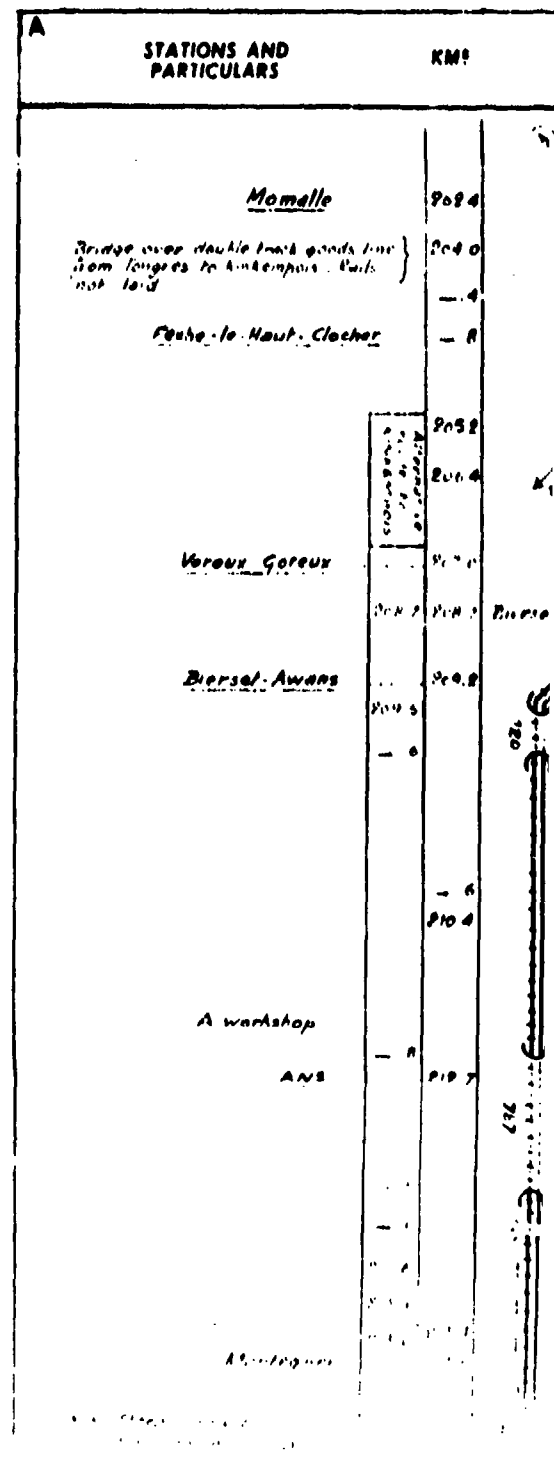
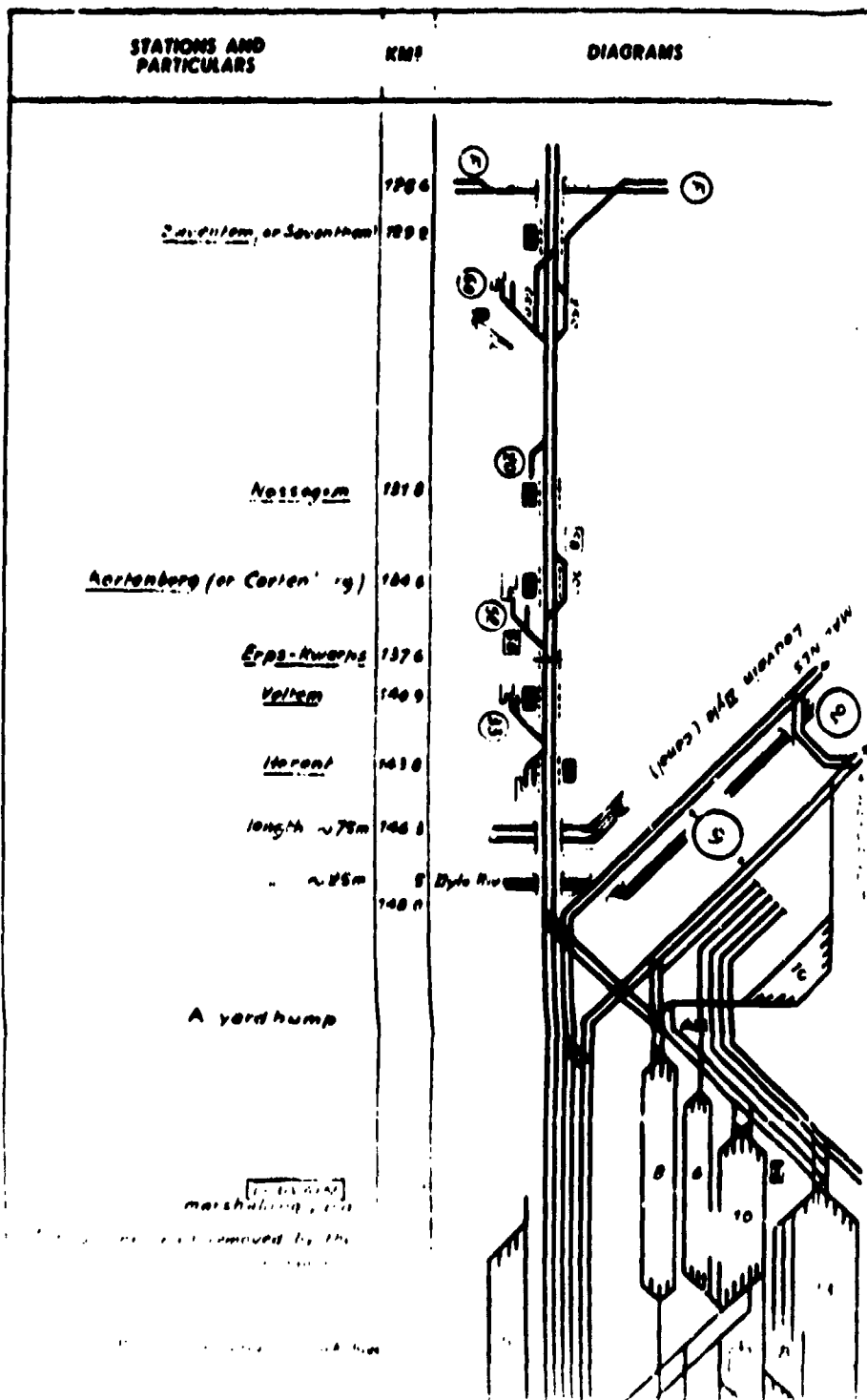
LINE DIAGR.

Route is DOUBLE TRACK throughout.

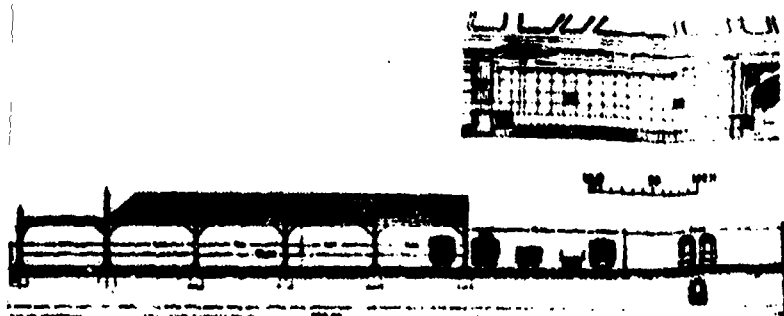
No CURVES less than 500m. radius (25 cha German frontier where they are not less than

Between Ans and Liège GRADIENT down 31% (Fexhe-Kinkempois) gradient down 10% r Louvain and Pepinster 6% max : between P 8% max : Lock and BLOCK SYSTEM except between Herbsthal-Raeren, fitted with DISPATCHING SYSTEM throughout.

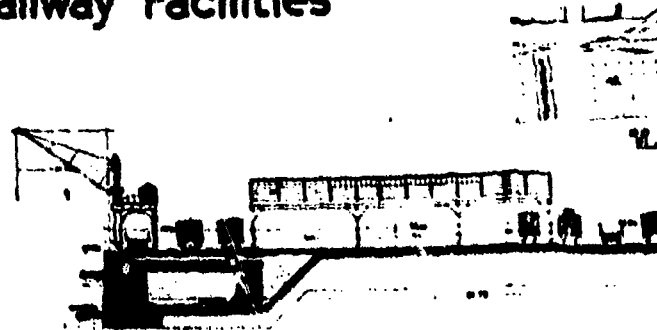
NOTE : Distance in Kilometres between station Kilometric distance should not be taken into c this report.



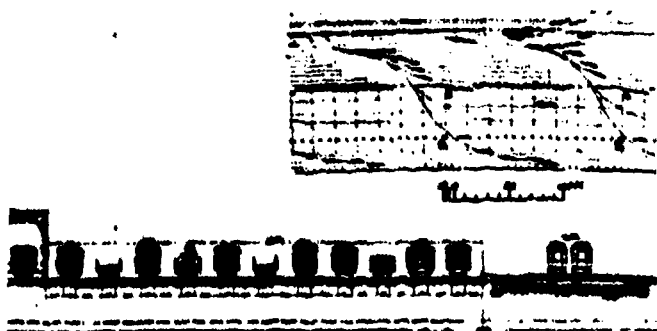
PORT of ANTWERP Railway Facilities



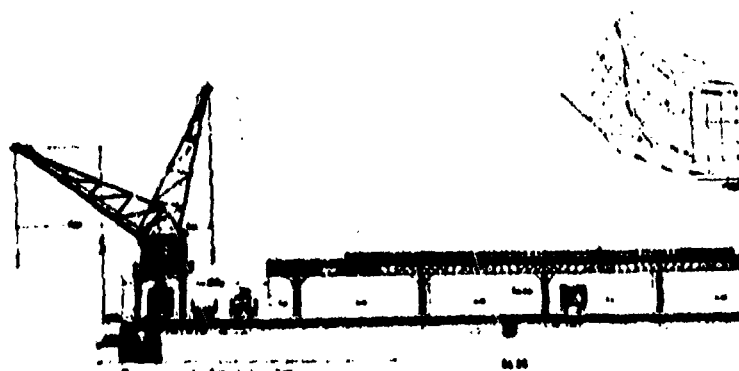
Old River Quay (Shade 22-23)



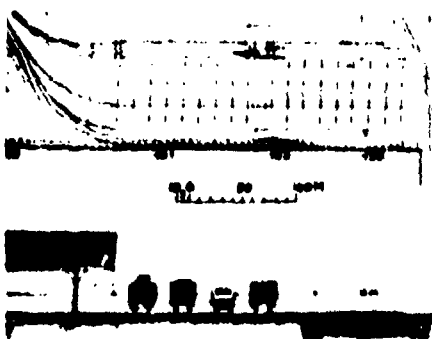
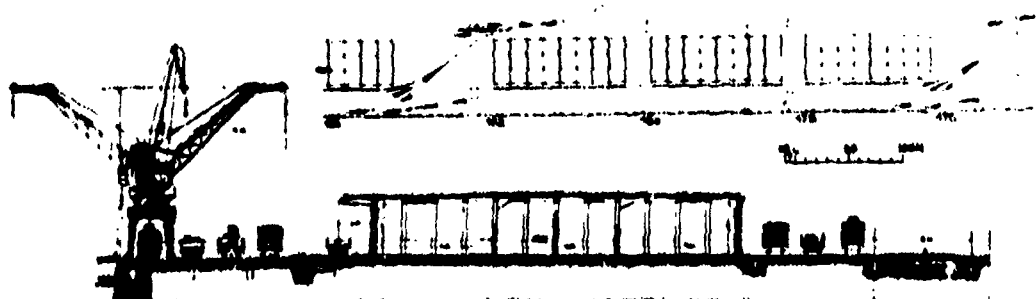
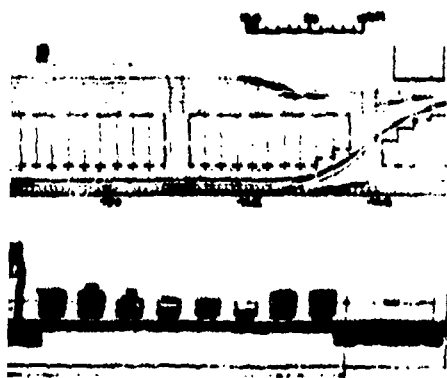
Old River Quay (Shade 11-13)



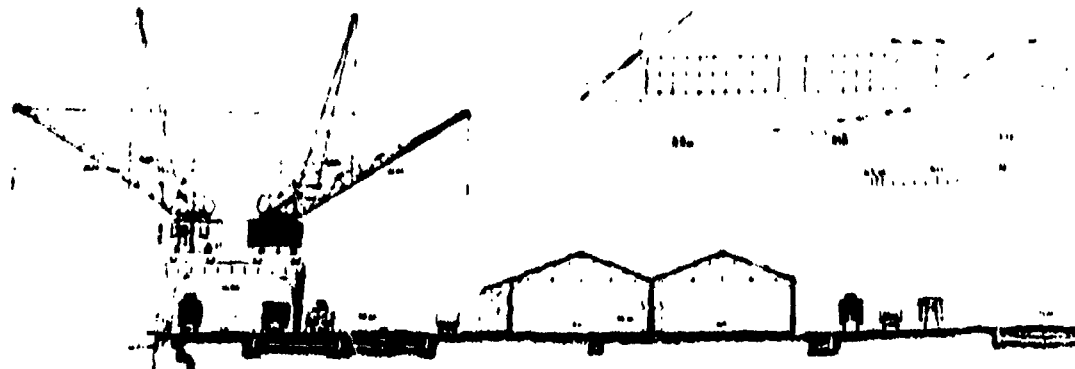
Connecting passage Lafabre - Canal Basin A (Short Dock) Quay



Nº 3 Dock Northern Quay



Shade 19-20



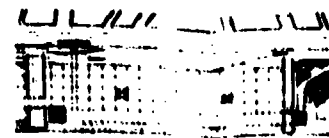
Canal Basin A (Shade 21A-22B)



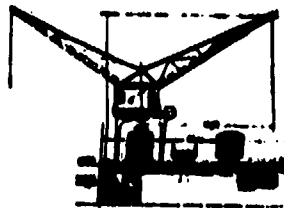
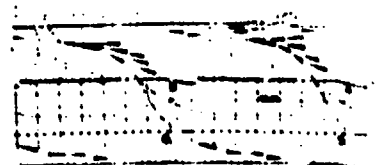
William Dock Quay



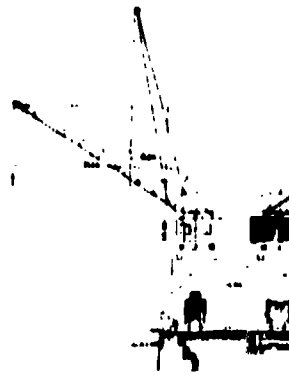
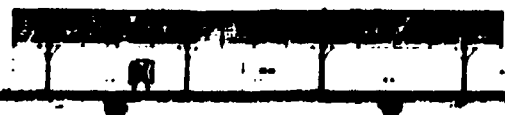
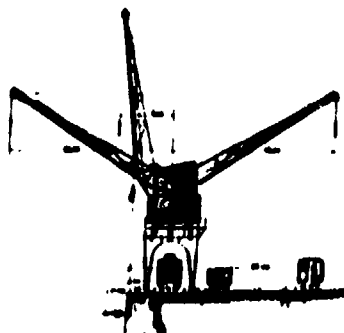
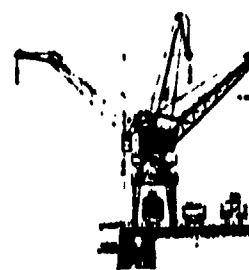
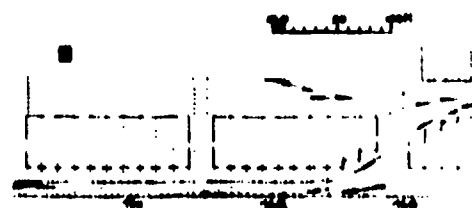
Old River Quay (Sheds 22-23)



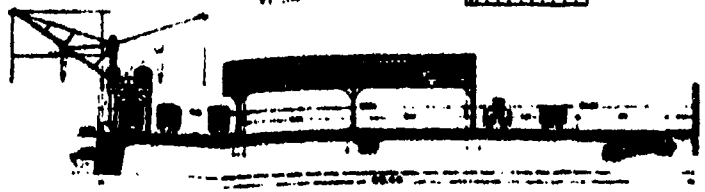
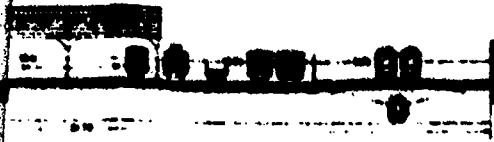
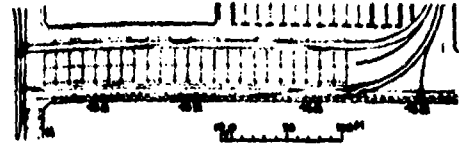
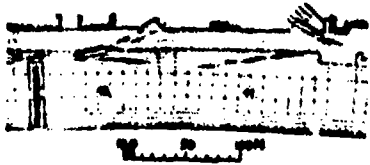
New South River Quay



No 2 Dock (North Quay)

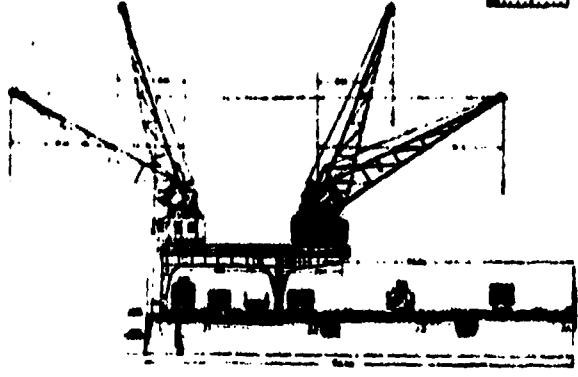
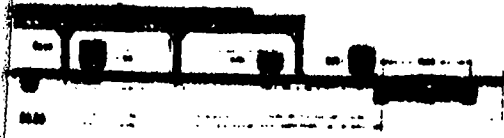
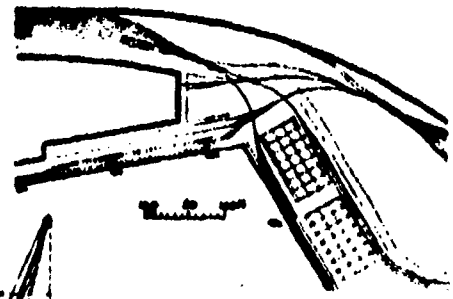
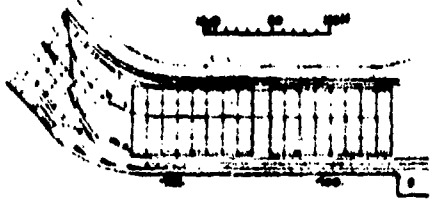


Albert Dock (Formerly called Canal Basin A) Sheds 131-135



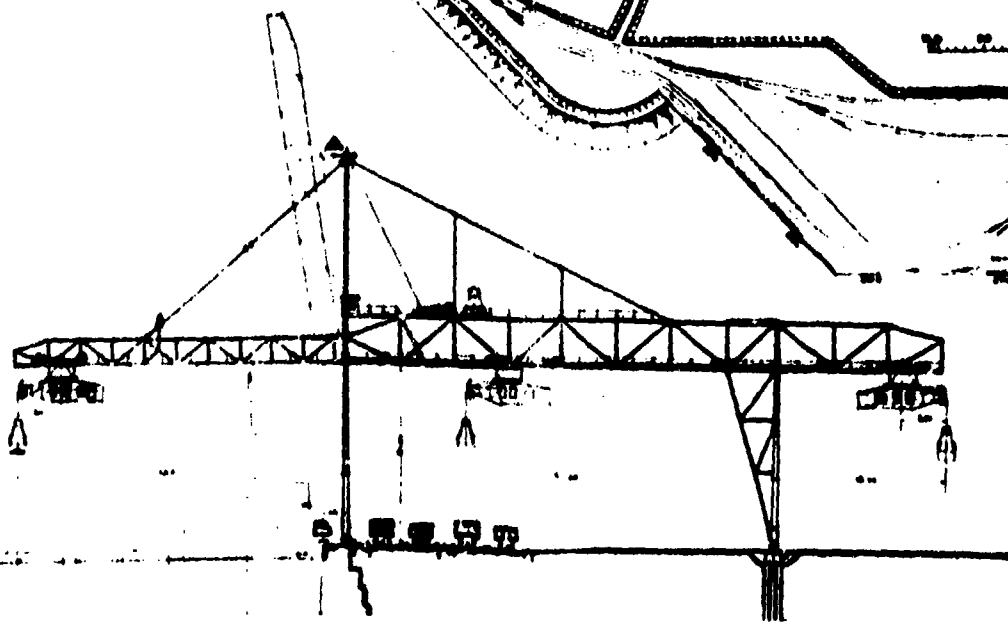
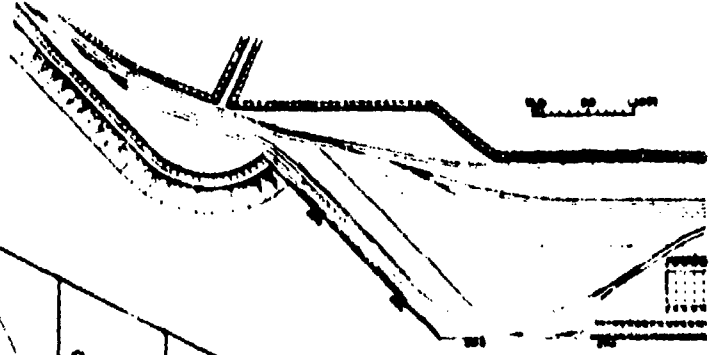
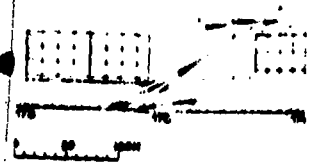
River Quay (Sheds 11-13)

Kilbuck Dock West Quay



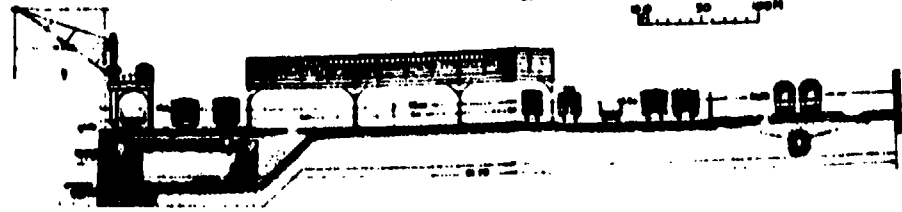
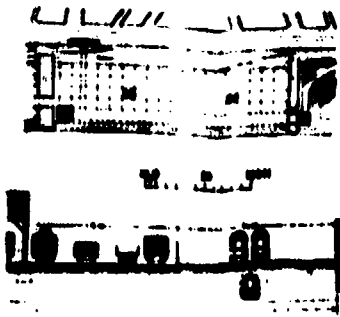
Canal Basin A (Albert Dock) Quay 100-102

Albert Dock (Quays 102-104)

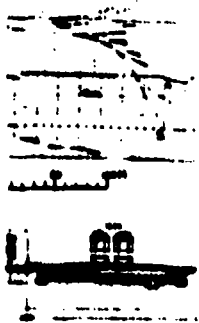


Canal Basin C (Quays 104-106)

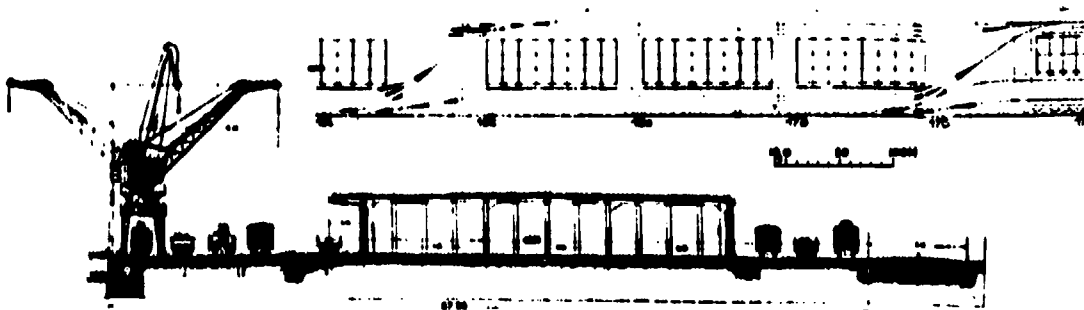
PORT of ANTWERP Railway Facilities



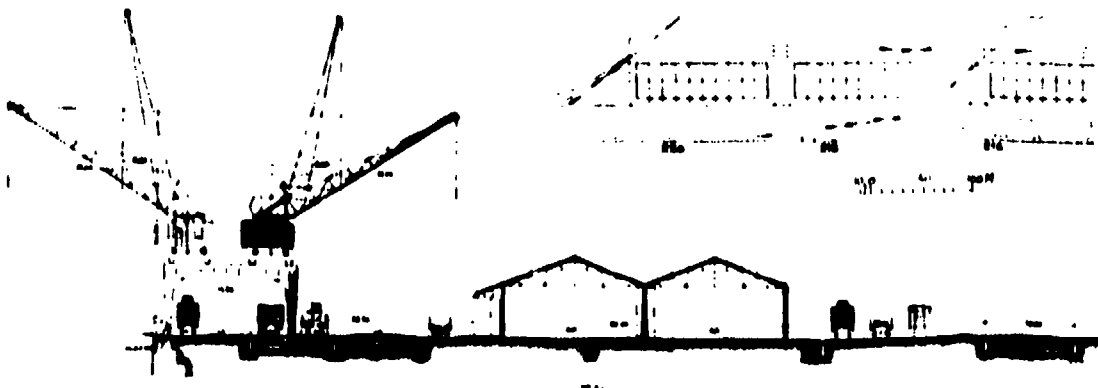
Old River Quay (Sheds 11-15)



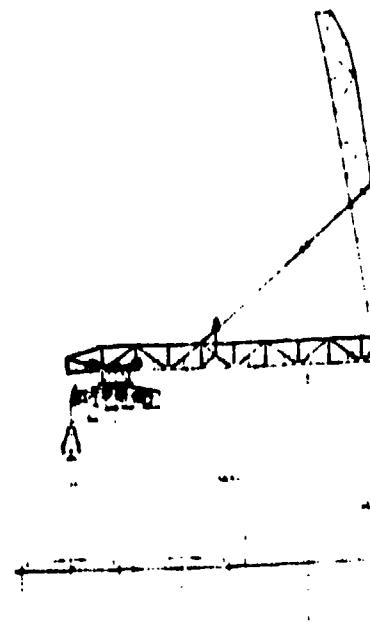
Connecting passage Lefebvre - Canal Basin A (Albert Dock) Quays 100-103.

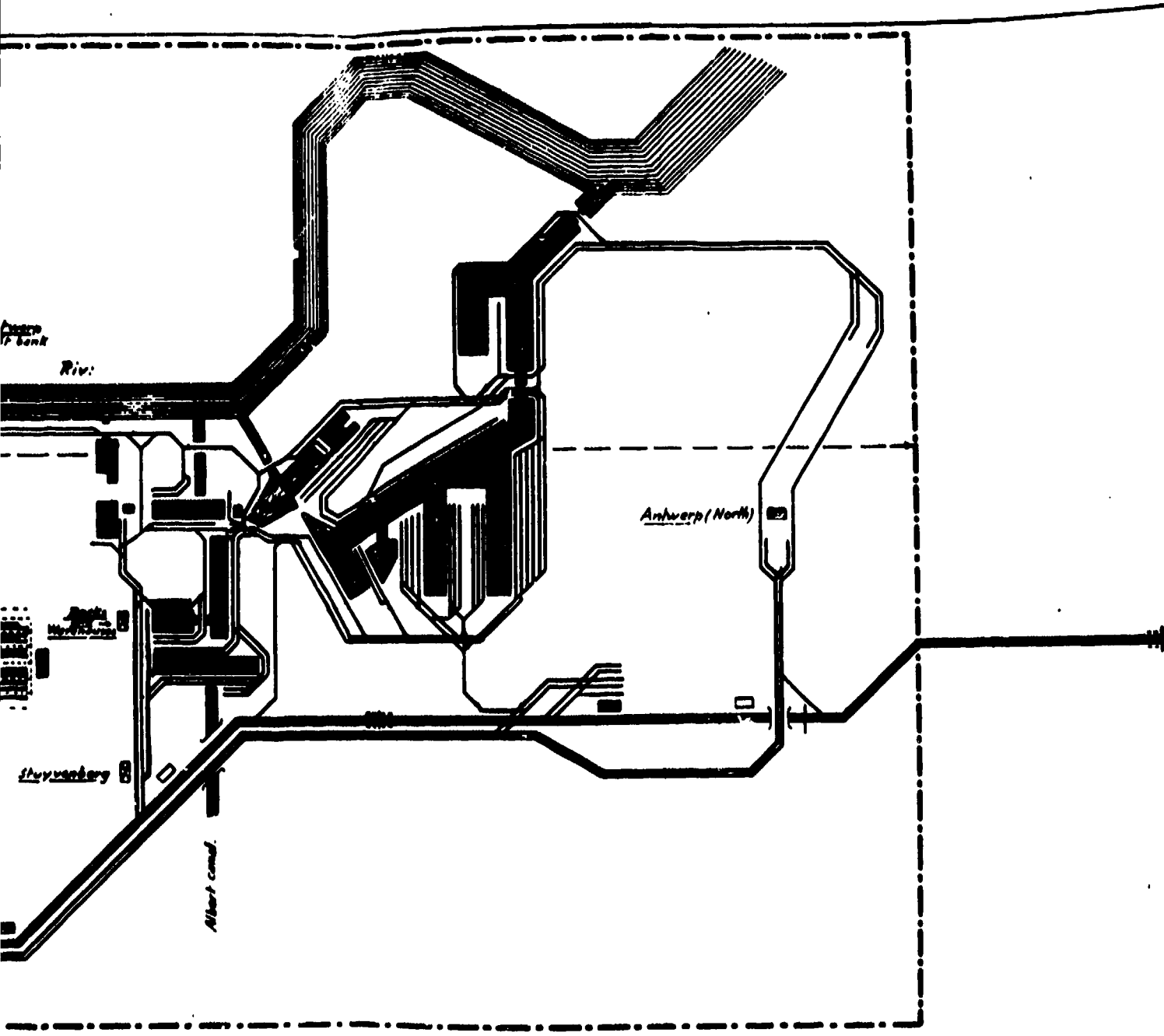


Nº 3 Dock Northern Quay

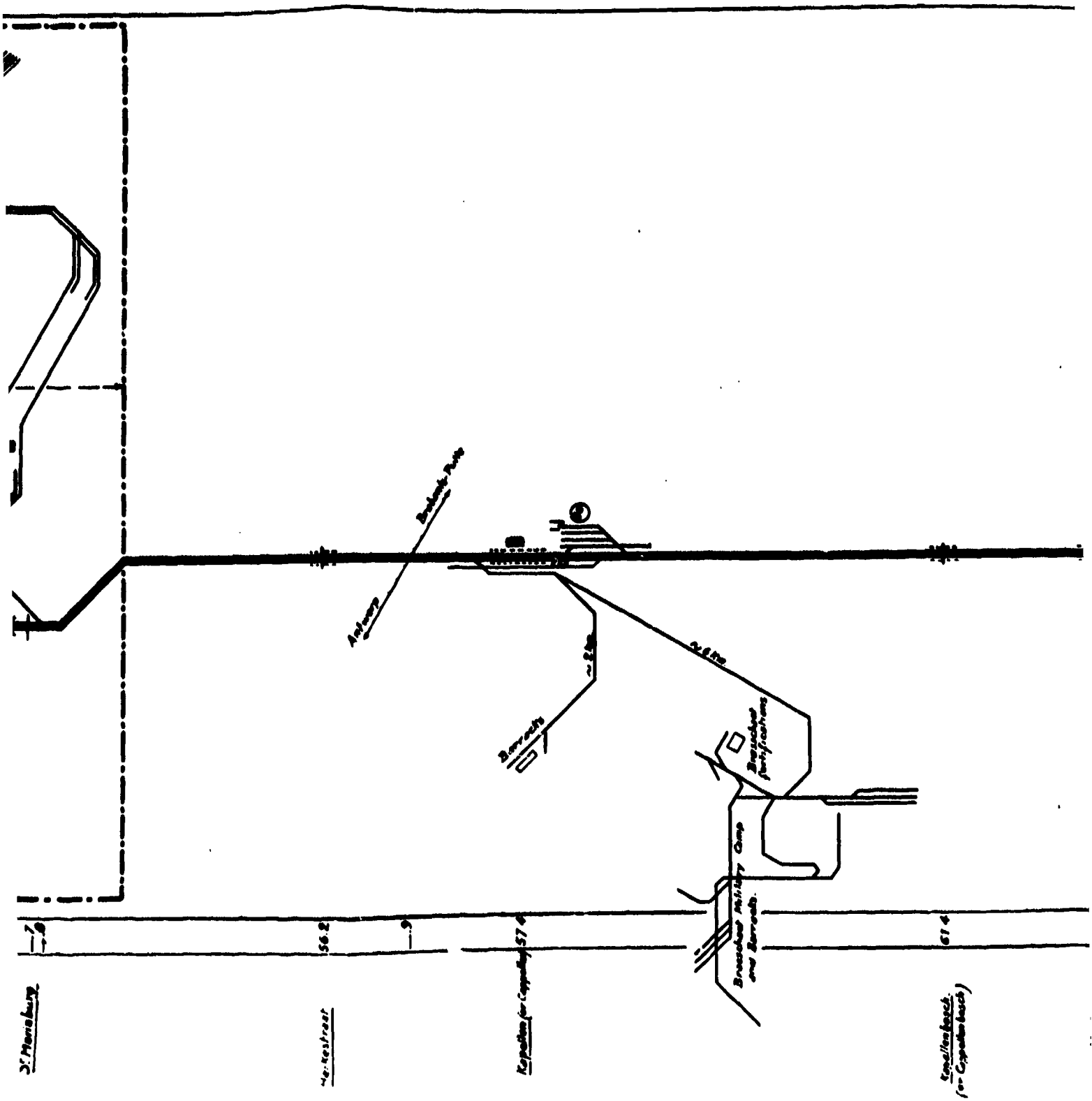


Canal Basin B (Sheds 210-220)





45.1-44.3	48.8	50.6	51.4	54	57
ANTWERP CENTRAL	Antwerp - Dam	Morsem - Dam	AUS TRUNWEL or Oudtrunwiel	Eeckeren	St. Mariaburg



by Kunt

65-

Kalapa Mount
(or Calapa Mount)

66.6

Small span

69.2

Widert

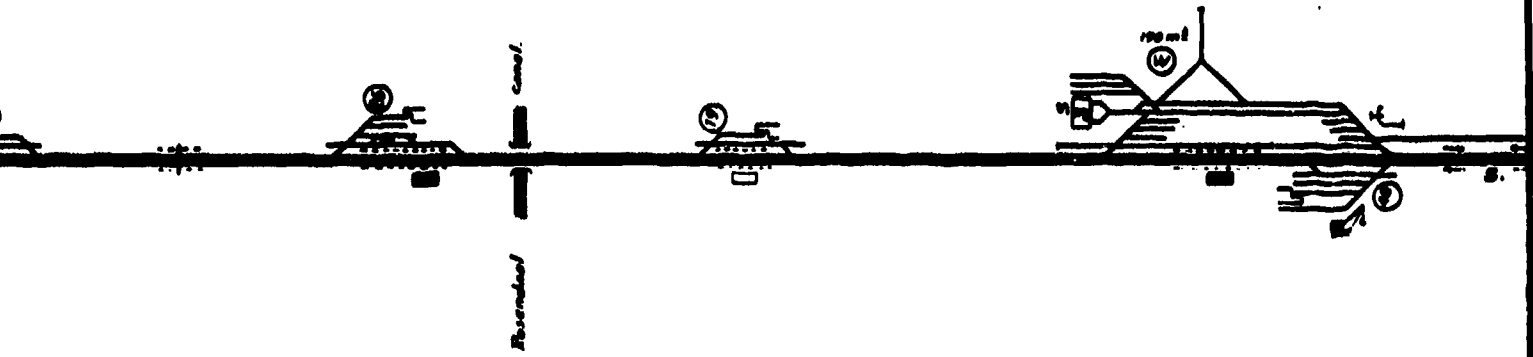
70.9

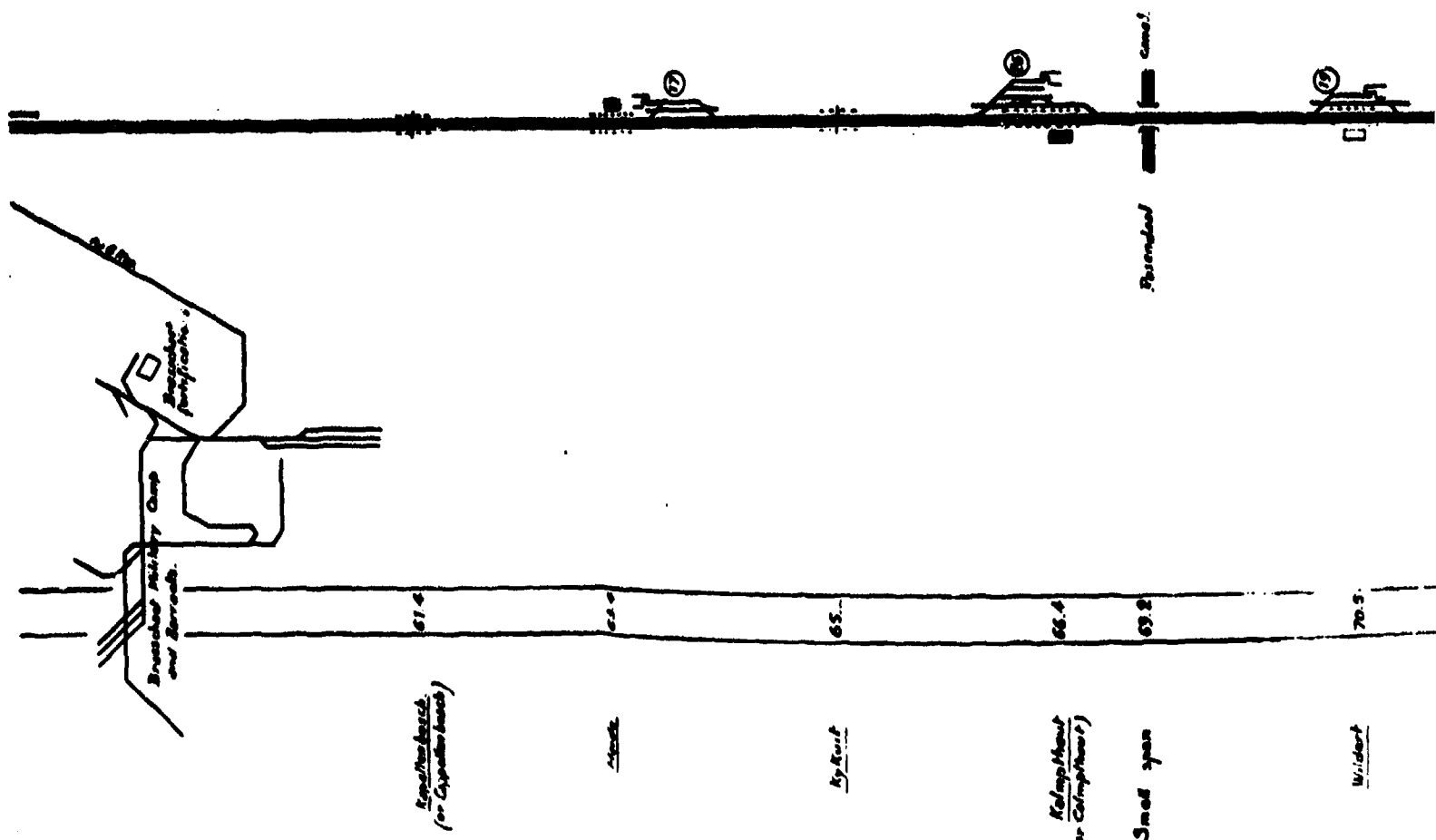
Small engine shed without fuel
first empty water capacity
30000

Eschen

75.2

5. 30000 cranes
From left to right hand
running





Legation
(or Capitan's house)

House

Ky Kunt

Kelap Munt
(or Capitan's house)

Small span

Wider

Resender
(Dark Railways)

T T T T T T T T T T
T H O L L A N D

3055079

ROTTERDAM

BREDA

ROUTE No 1

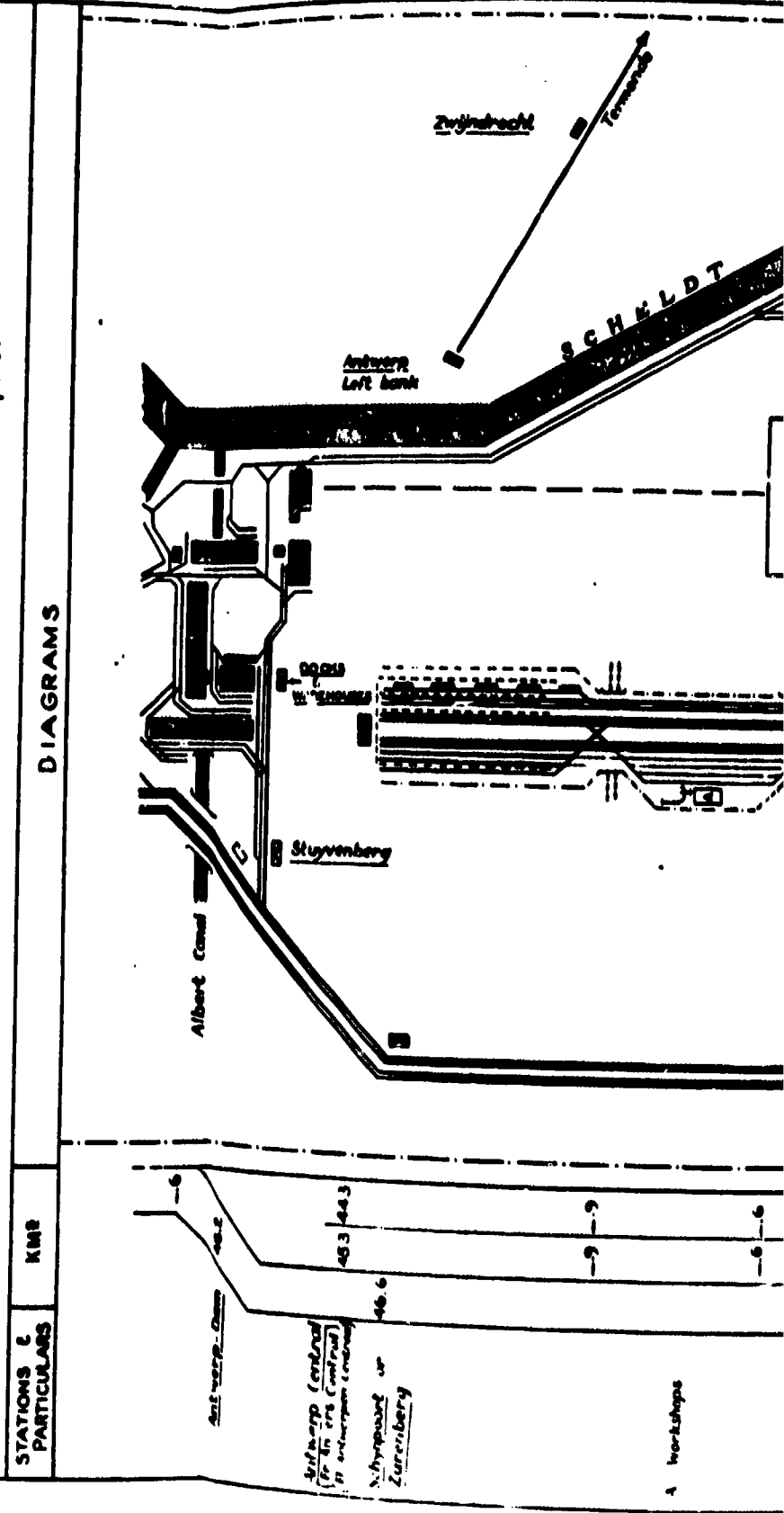
Section Antwerp to Malines

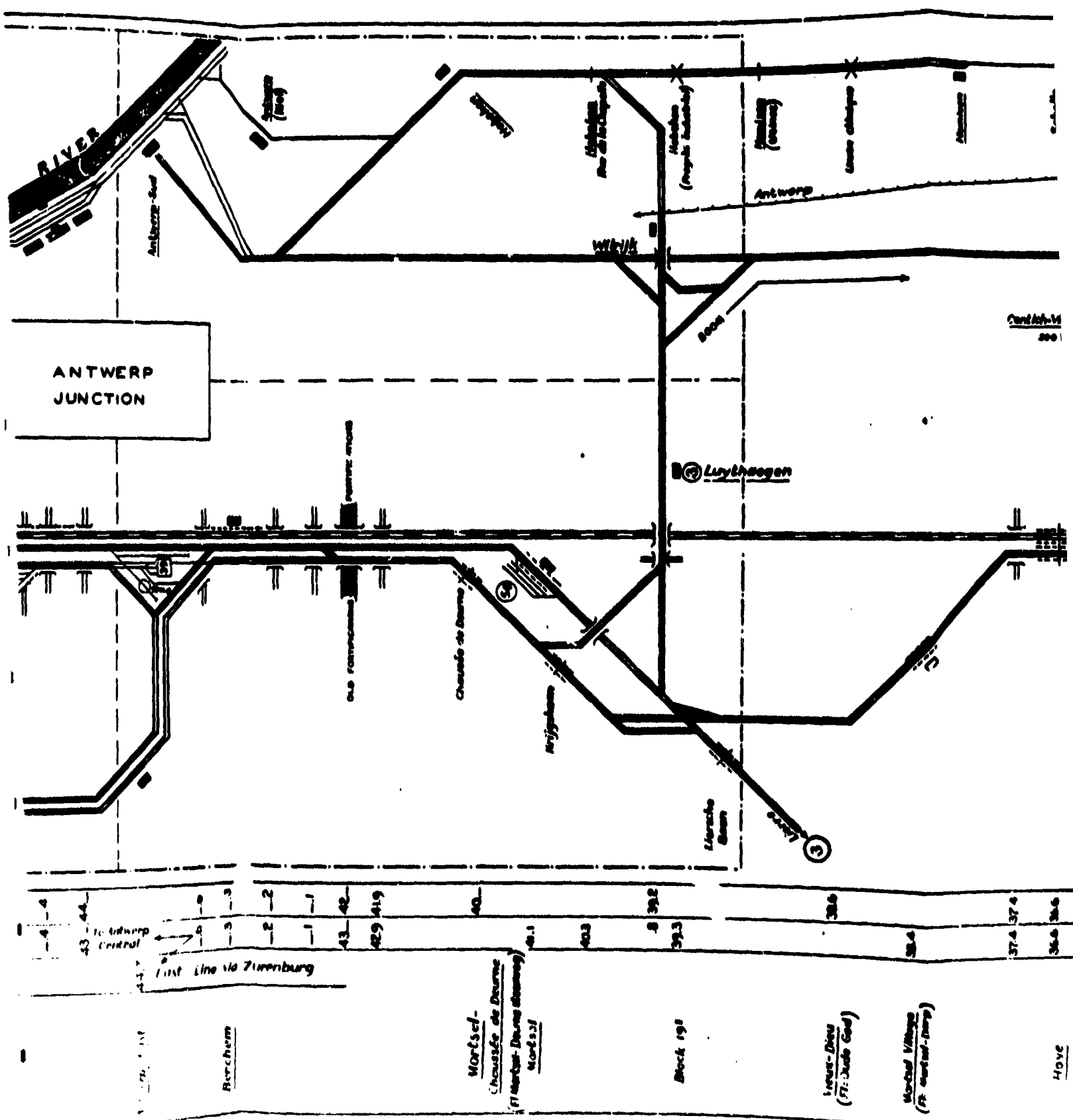
Line Diagram

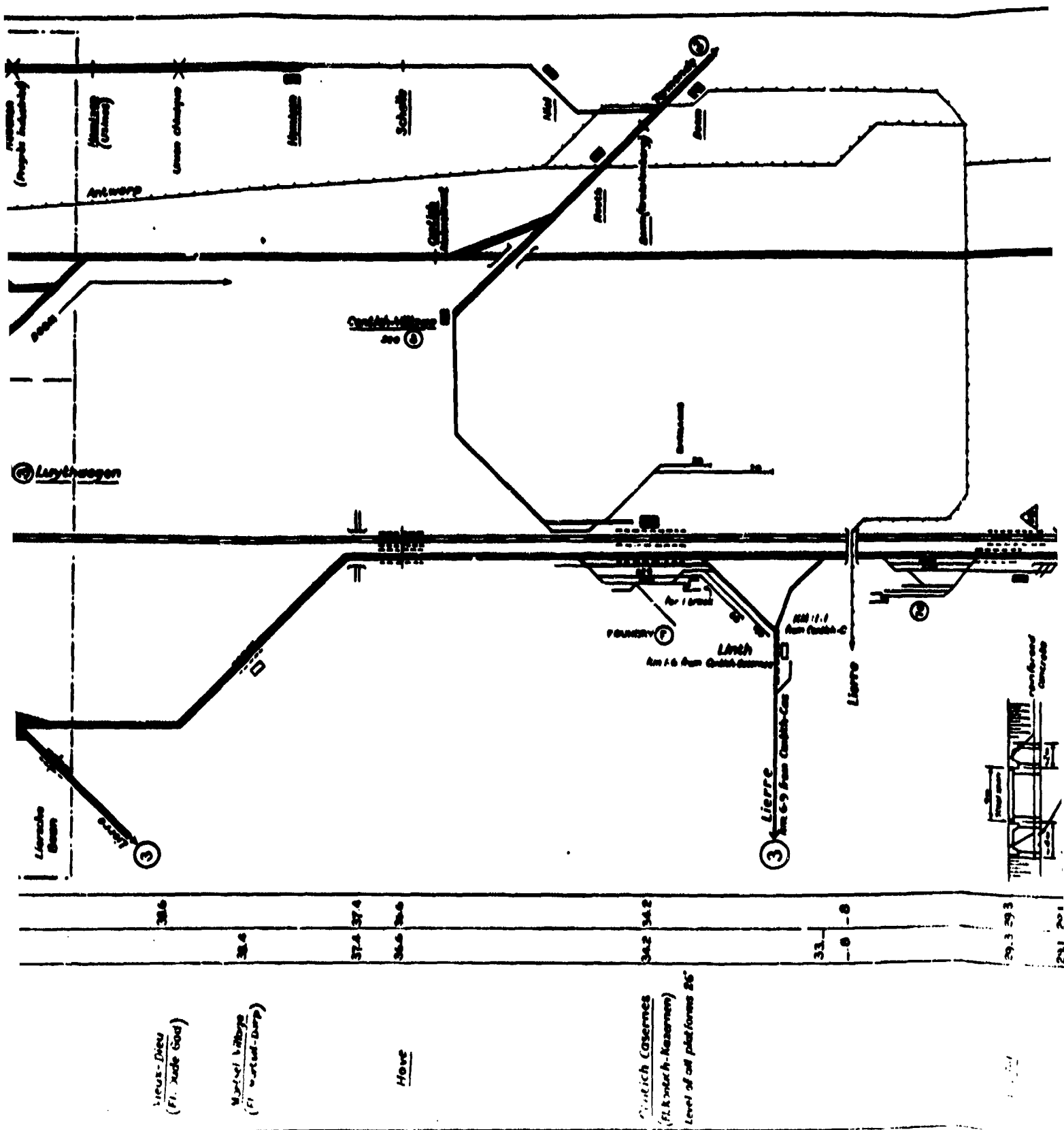
- 4 TRACKS (2 electrified) throughout.
- NO CURVES less than 500 m. (25 chains)
- STEEP GRADIENTS max: 7‰.
- LOCK and BLOCK system throughout.
- DISPATCHING SYSTEM throughout.

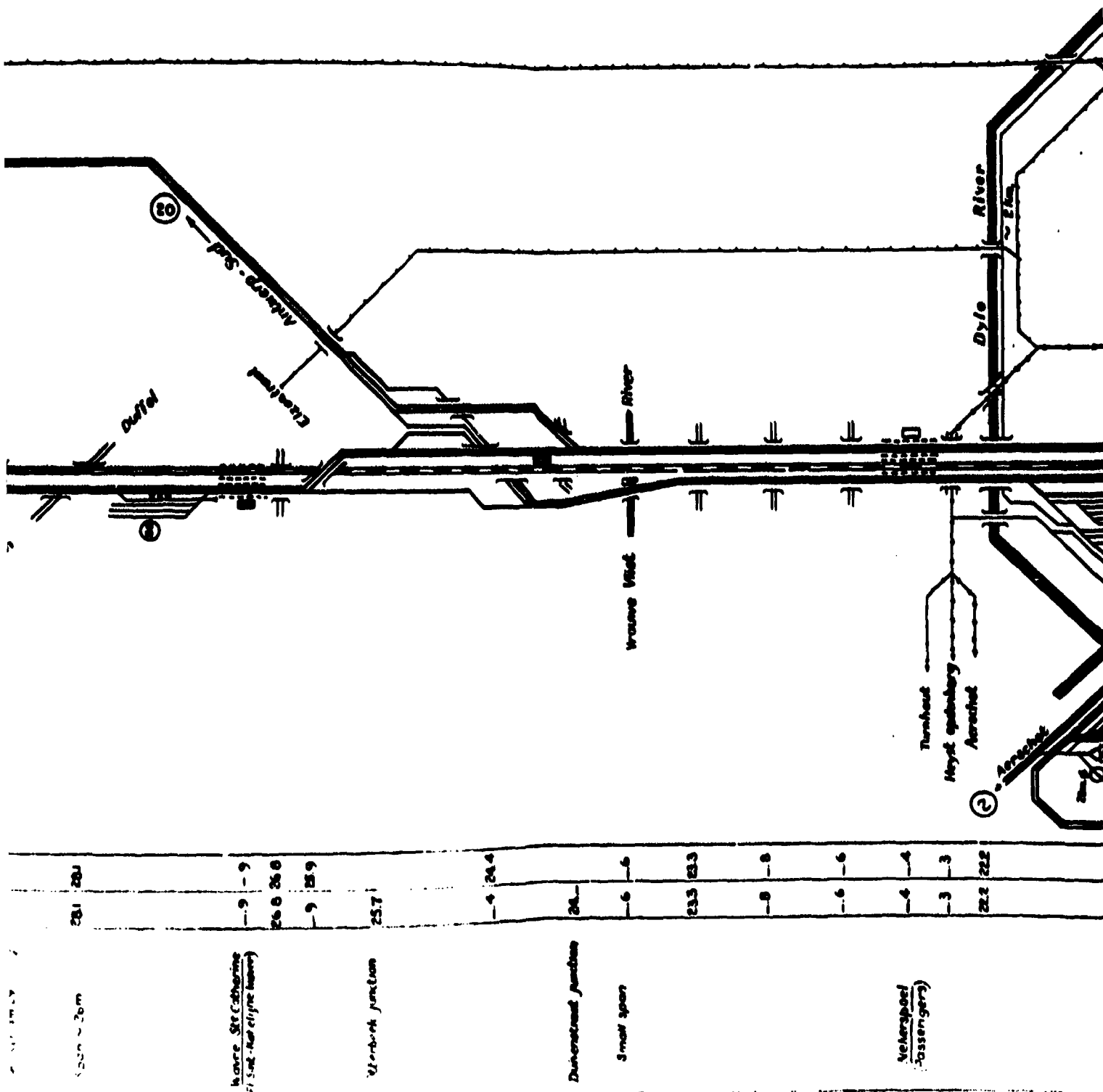
The passenger platforms of the electrified line are 26' high above rail level.

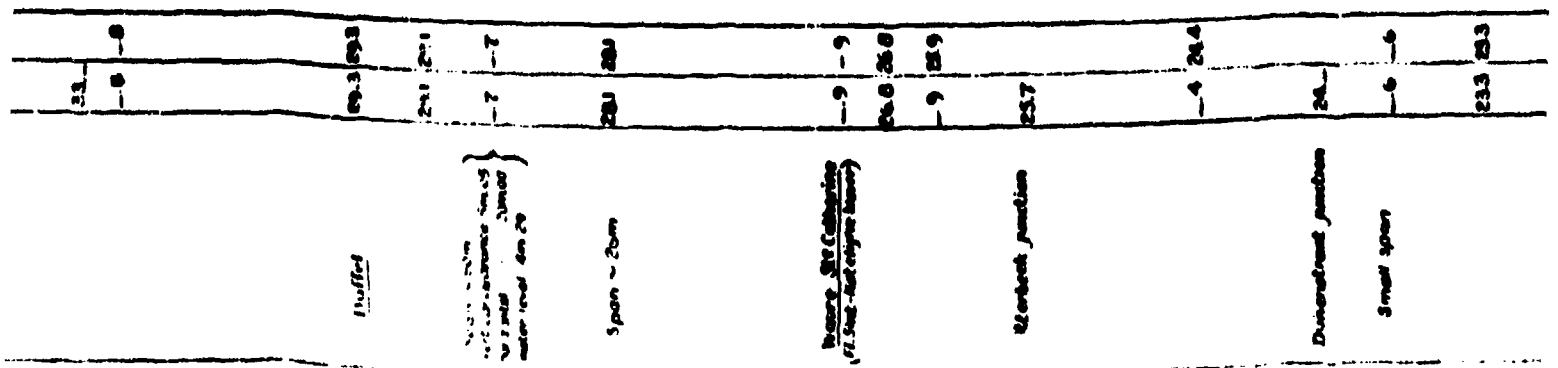
Note:- Distance in Kilometres between stations is correct, but the progressive Kilometric distances should not be taken into consideration for the purpose of this report.

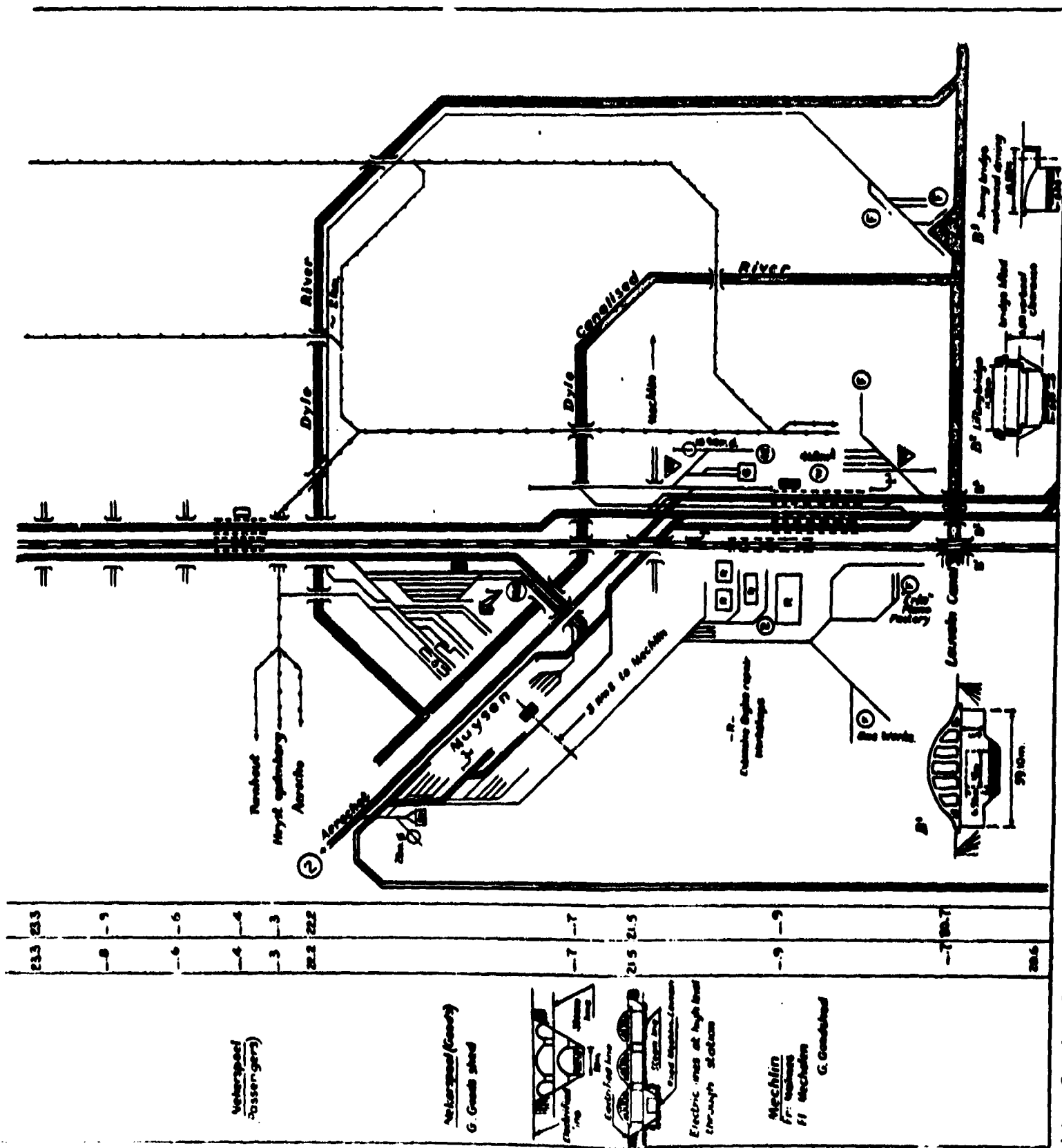






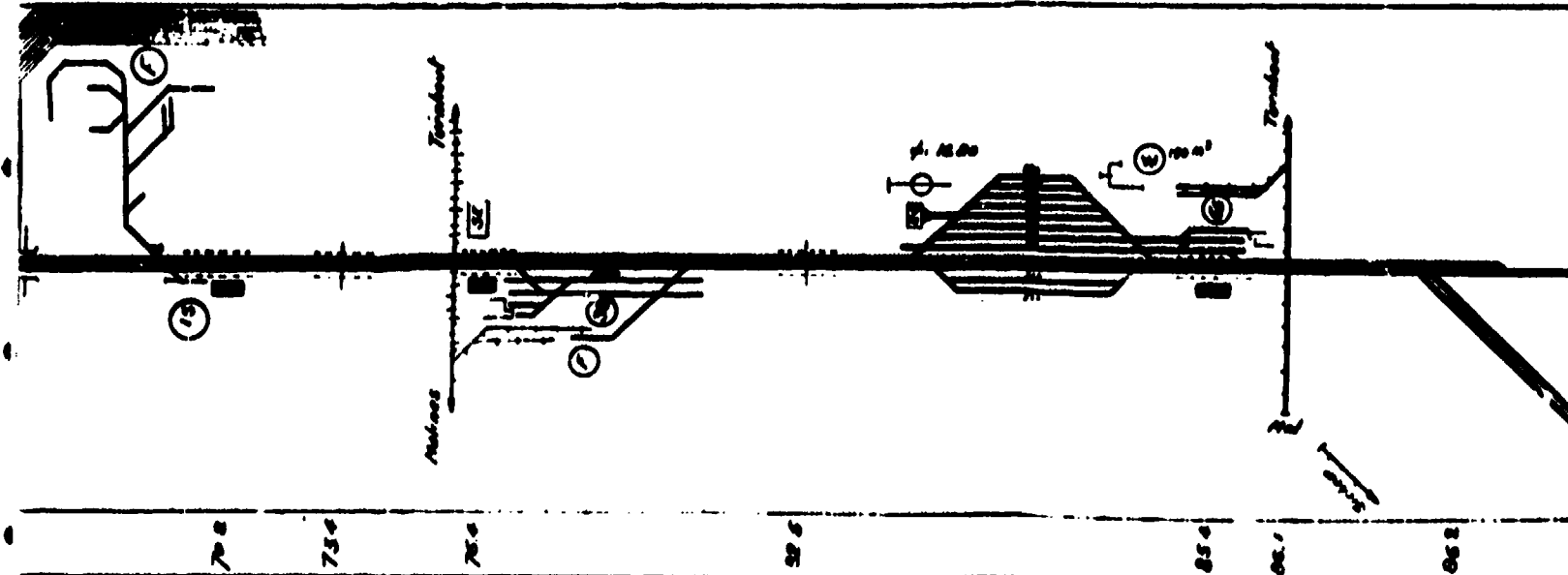
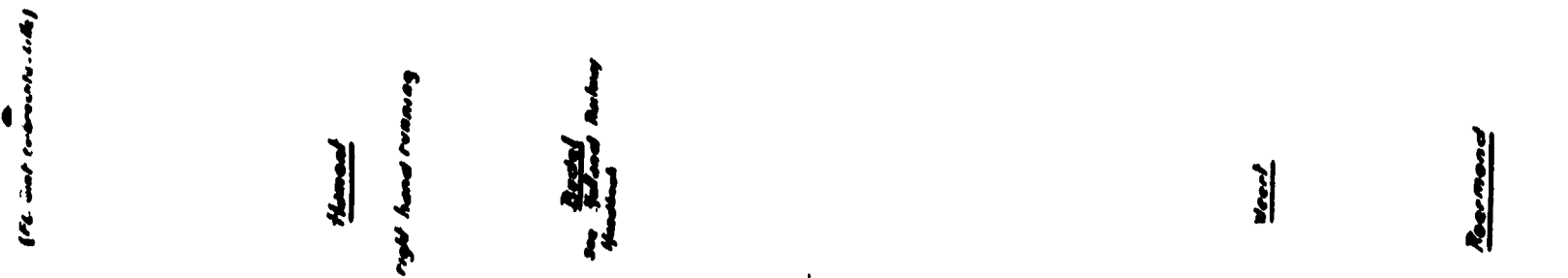
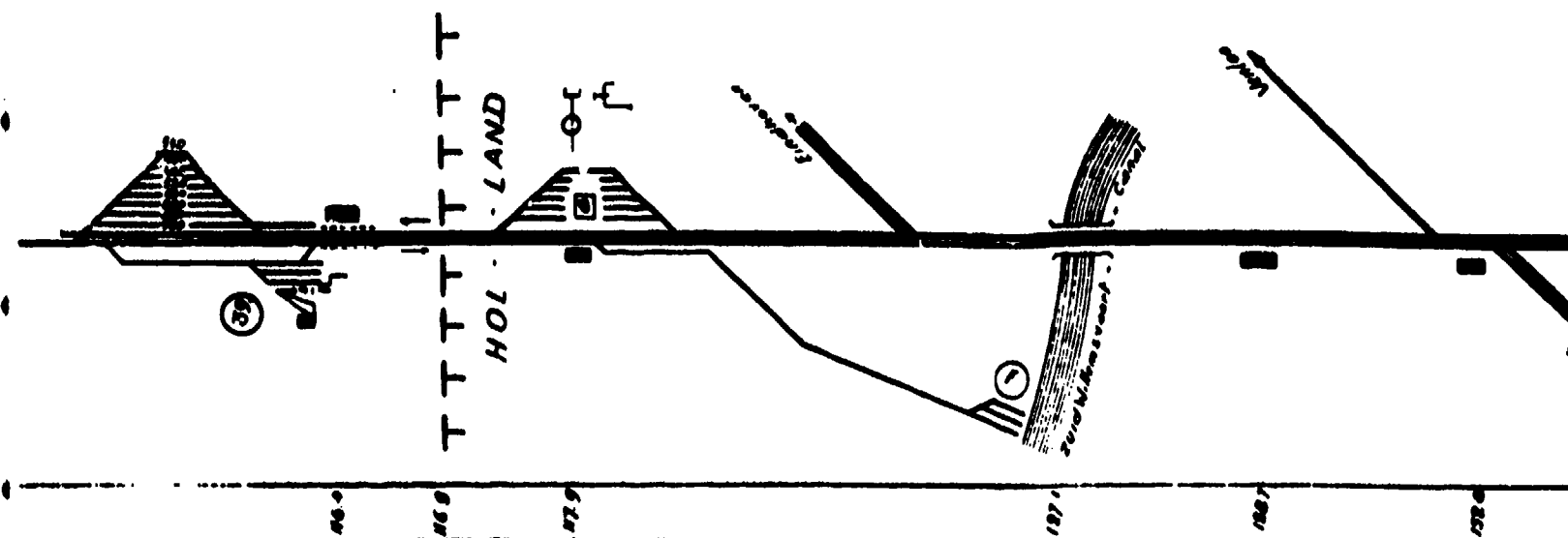


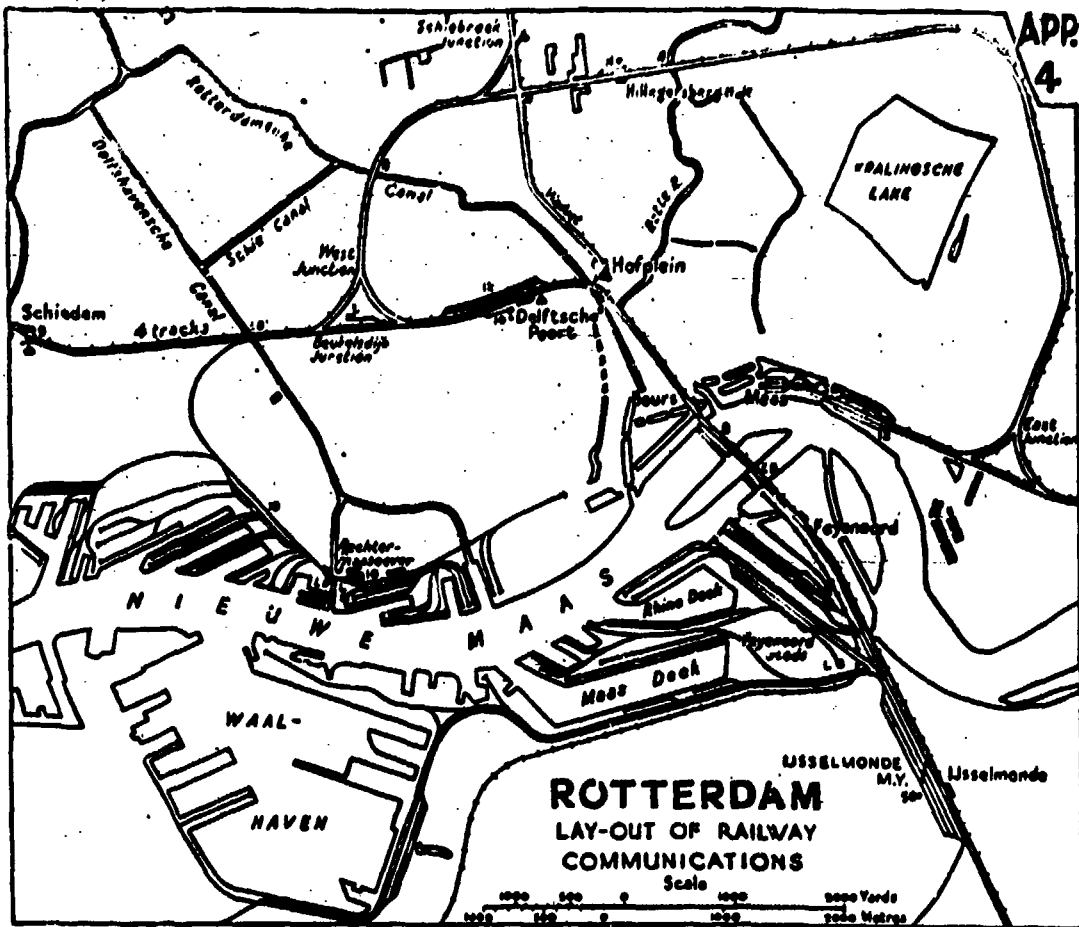




NOTE:
Distance in Kilometers between stations is correct, but the progressive Kilometeric distances should not be taken into consideration for the purpose of this report.

STATION AND PARTICULARS	KM ²	DIAGRAMS
2.52 RE (or less) 40.5 500 ft. ca. railway station, 300 ft. railway on E. side	40.5	
4.350'	40.4	
4.350'	39.4	
3.000'	38.4	
2.52 RE (or less) 40.5	37.4	
2.52 RE (or less) 40.5	36.4	
2.52 RE (or less) 40.5	35.4	
2.52 RE (or less) 40.5	34.4	
2.52 RE (or less) 40.5	33.4	
2.52 RE (or less) 40.5	32.4	
2.52 RE (or less) 40.5	31.4	
2.52 RE (or less) 40.5	30.4	
2.52 RE (or less) 40.5	29.4	
2.52 RE (or less) 40.5	28.4	
2.52 RE (or less) 40.5	27.4	
2.52 RE (or less) 40.5	26.4	
2.52 RE (or less) 40.5	25.4	
2.52 RE (or less) 40.5	24.4	
2.52 RE (or less) 40.5	23.4	
2.52 RE (or less) 40.5	22.4	
2.52 RE (or less) 40.5	21.4	
2.52 RE (or less) 40.5	20.4	
2.52 RE (or less) 40.5	19.4	
2.52 RE (or less) 40.5	18.4	
2.52 RE (or less) 40.5	17.4	
2.52 RE (or less) 40.5	16.4	
2.52 RE (or less) 40.5	15.4	
2.52 RE (or less) 40.5	14.4	
2.52 RE (or less) 40.5	13.4	
2.52 RE (or less) 40.5	12.4	
2.52 RE (or less) 40.5	11.4	
2.52 RE (or less) 40.5	10.4	
2.52 RE (or less) 40.5	9.4	
2.52 RE (or less) 40.5	8.4	
2.52 RE (or less) 40.5	7.4	
2.52 RE (or less) 40.5	6.4	
2.52 RE (or less) 40.5	5.4	
2.52 RE (or less) 40.5	4.4	
2.52 RE (or less) 40.5	3.4	
2.52 RE (or less) 40.5	2.4	
2.52 RE (or less) 40.5	1.4	
2.52 RE (or less) 40.5	0.4	





Note:- The Lay-out of the WAALHAVEN area shown above differs from that on PLAN 3. The corrections have been made from AIR COVER dated 1943.

REFERENCE

Railways (steam), standard gauge, two or more tracks	—————
Railways (steam), standard gauge, single track	
Railways (electrified), standard gauge, two or more tracks	—————
Railways (electrified), standard gauge, single track	
Railway, single track being converted to double track	
Railway, steam being electrified	
Tramways, steam or electric (standard gauge only where stated)	
Junctions	✕
Station, with Sidings (number stated)	—
Station, with Passing loops (number stated)	—
Passing Loops and Sidings, number indefinite but known to exceed that stated	—
Marshalling Yards	MY
Locomotive Sheds, Large goods Sheds	—
Railway Workshops	—
Railway Bridges, foot, swing, etc.	—
Canal Stations and Ship Stations	—
Swingable bridges and Locks	—

Received 2/8/00



DEPARTMENT OF DEFENSE
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW
1155 DEFENSE PENTAGON
WASHINGTON, DC 20301-1155

2 JAN 2000

Ref: 98-M-0165/A1

[REDACTED]

This refers to our letter to you dated October 7, 1999, regarding your appeal to the Information Security Oversight Office for 14 documents previously requested under Mandatory Declassification Review procedures. One document (AD346727) was provided to you by our letter dated November 19, 1999.

The review of 11 British documents you requested is complete and there are no objections to release. Titles of these documents are contained on the enclosed sheet and a copy of each is enclosed. We will advise you as soon as the reviews of the remaining two documents are completed.

*Per our letter,
Please mark these 11
documents "available
to the public."*

Sincerely,

SIGNED

H. J. McIntyre
Director

AD-036 799
AD-044 992
AD-048 643
AD-057 151
AD-057 524
AD-057 525
AD-057 526
AD-057 527
AD-122 495
AD-136 830
AD-139 544



*I verified the docs
could be marked
available for public
release via telecon
with Pat Skinner,
DoD Security Review,
695-7556/6428 on
21 Jan 2000.*

*Kelly Akers
DRIE-RS*

Received 2/8/2000