

Large Cities.

Some Important Routes.

Distances in bee-line and those in reality /accessibility, length of routes, time of passage/ do not cover each other due to the diversity in relief and to the uneven network of railways. In Central Europe especially the Dinaric Alps, the Carpathians and the Eastern Alps serve as effective barriers to communication.

Our maps represent those strips of land which are lying around the cities of Berlin and Istambul, Trieste and Moscow, Munich and Constanza in the same distance by rail, and are to be reached within certain space of time respectively. /5-10-15 etc. hours./ The first four maps indicate the distances by rail, the other four ones the distances according to the time of passage. This latter means the time of passage by passenger trains included a uniform ten minutes period of waiting at the junctions.

The places lying in the same distance from Berlin do not give regular circles but oval lines running in an east-west direction. This fact is due to the winding roads running through the Alps and surmounting gradient grounds. As the map indicating the time of passage shows, there is less possibility for an easy communication in an east-west direction, as in the east the rail-net is not so dense and the capacity of lines is less as well. On both maps of Istambul the hindering role of the Lower Danube and the Southern Carpathians is extremely striking.

The circles of Trieste are rather regular but relatively small, as the mountains bordering the Adriatic serve as effective barriers to communication. The lines drawn around Moscow indicate an incomplete railway system and the hindering role of the Carpathians.

The railway lines of Munich clearly show that along the Danube there is a good natural railway connection, and that the Bavarian capital from the point of view of communication is better connected with the Austrian areas than with Central Germany. On the map illustrating the distance in time the advantage of the Danube-line disappears, which is primarily due to the great number of political boundaries. From the harbour of Constanza

one might reach Bucovina and Oltenia in a short way and time, while the Southern and Eastern Carpathians serve as physical barriers to communication which has to be carried on by long circulous routes.

The circles of Warsaw are fairly regular; less regular, however, are those of Thessalonica. There is hardly any possibility for a communication in an east-west direction on the Balkan Peninsula.

On the maps illustrating the distance in time the thick black lines indicate that route by which the named station may be reached from the other station in the shortest way. There are two short routes of such a kind on the diagram of Munich-Constanza: the Munich-Vienna-Morava Gate-Krakow-Lwów-Cernovitz-Constanza line, and the Munich-Salzburg-Villach-Ljubljana-Zagreb-Brod-Szabadka-Temeavár-Orsova-Bucharest-Constanza line. It is interesting to notice that none of the shortest routes in time corresponds to the railway line being the shortest in kilometers and running through Budapest.

Another special map represents the position of Central Europe on the continent as regards the fastest passenger traffic. The lines of different colours indicate the areas to be reached within 5-10-15-20 hours by fast and express trains from London, Moscow, Rome and Istambul. The isochronic lines of London are almost entirely congruent with those of Paris; thus this latter important European station had not been indicated separately on the map.

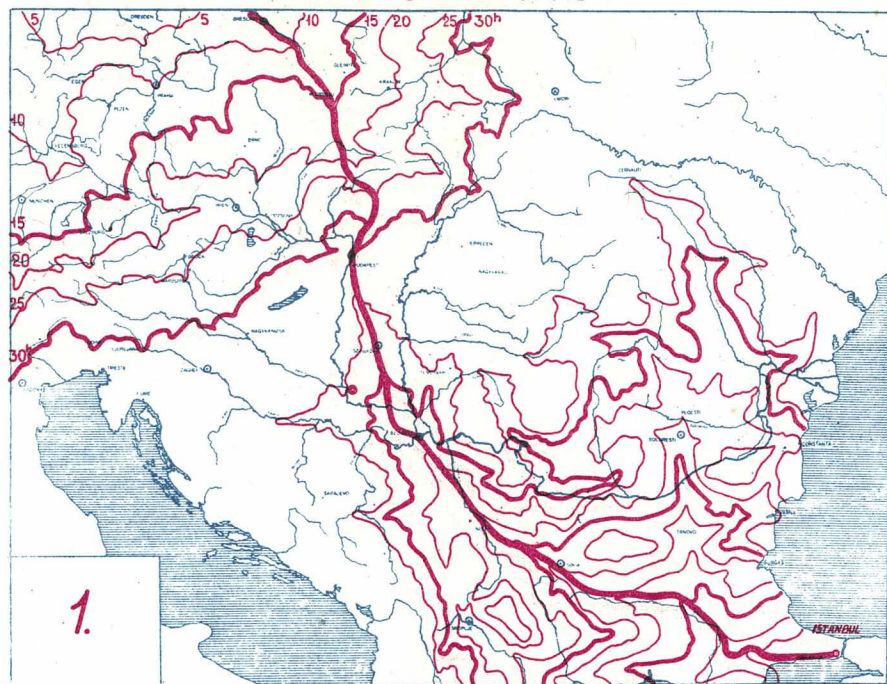
Hindrances due to relief not only lengthen the routes by way of gradient grounds and slopes, as well as of curves, they also limit the speed of transportation and tonnage. In the reports of the Hungarian Railways as regards the decrease in tonnage, owing to the gradient rails, we find the following data /constructed by Dr. George Welinazky/:



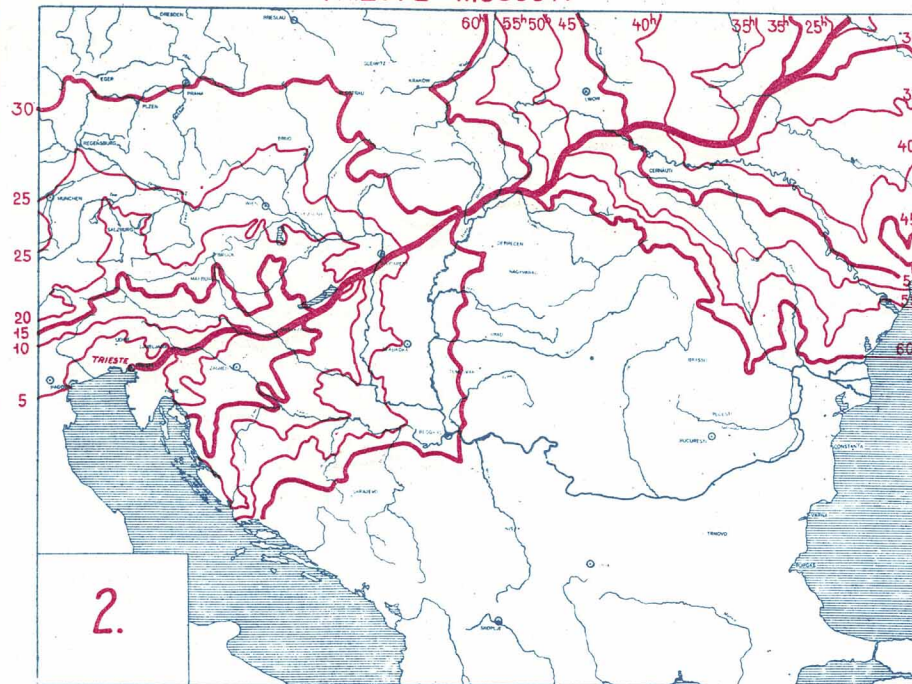
# ISOCHRONIC LINES FROM THE ADJOINING AREAS OF CENTRAL EUROPE

[BY SLOW TRAIN]

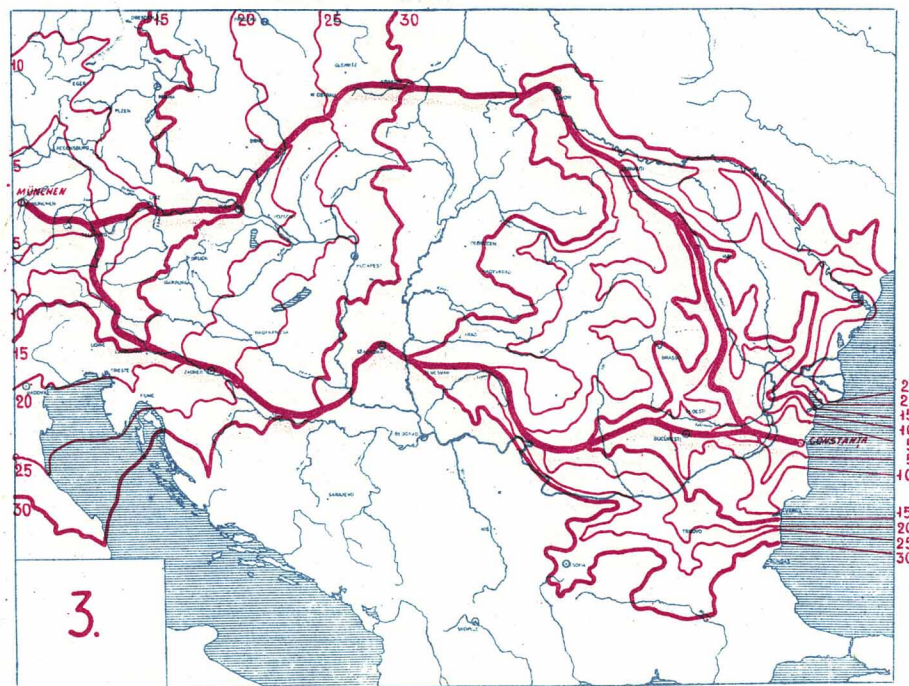
BERLIN - CONSTANTINOPLE



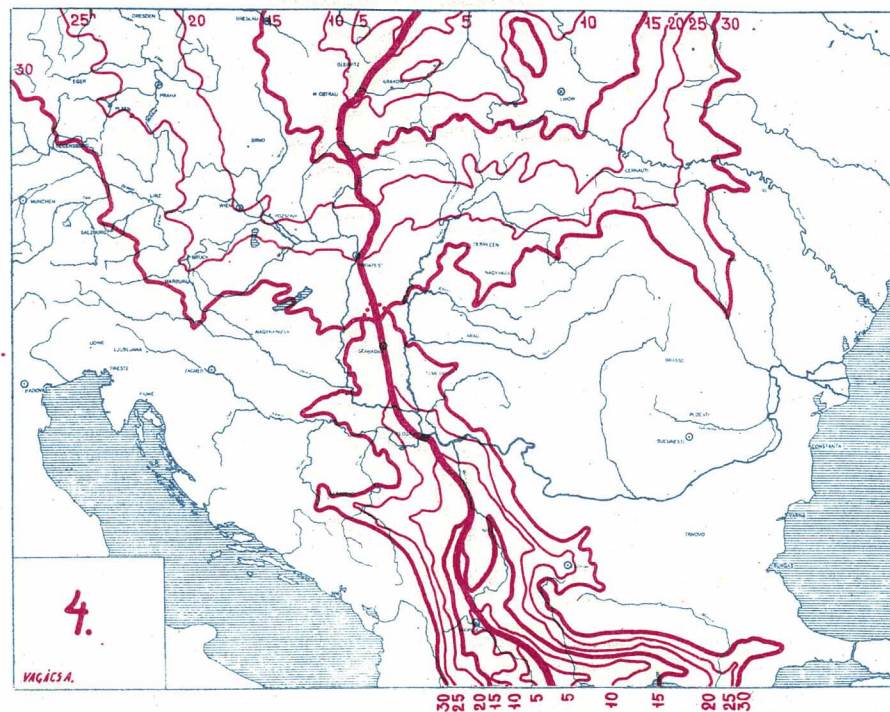
TRIESTE - MOSCOW



MUNICH - CONSTANZA



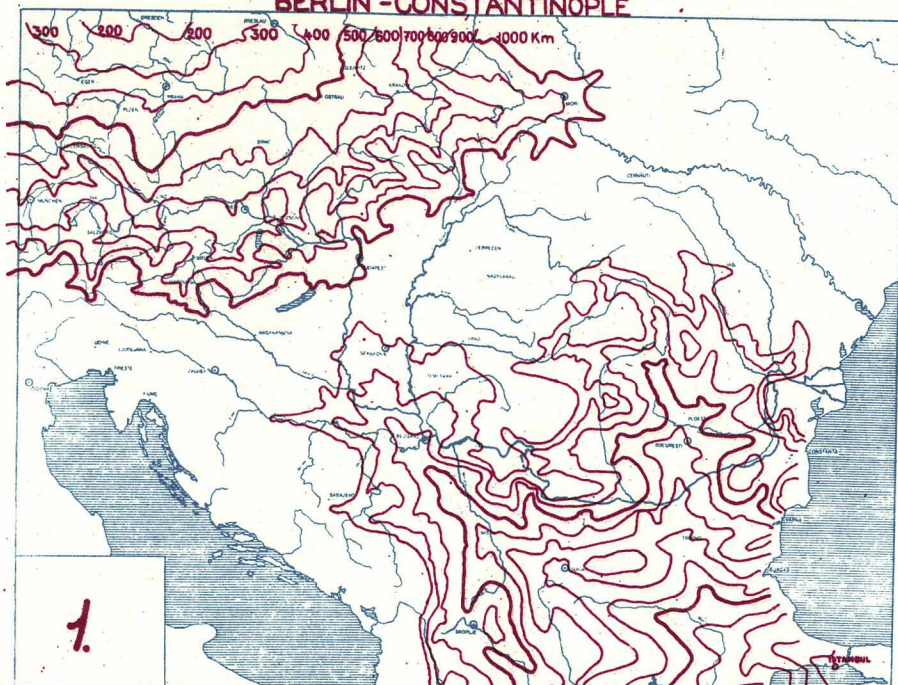
WARSAW - SALONIKI



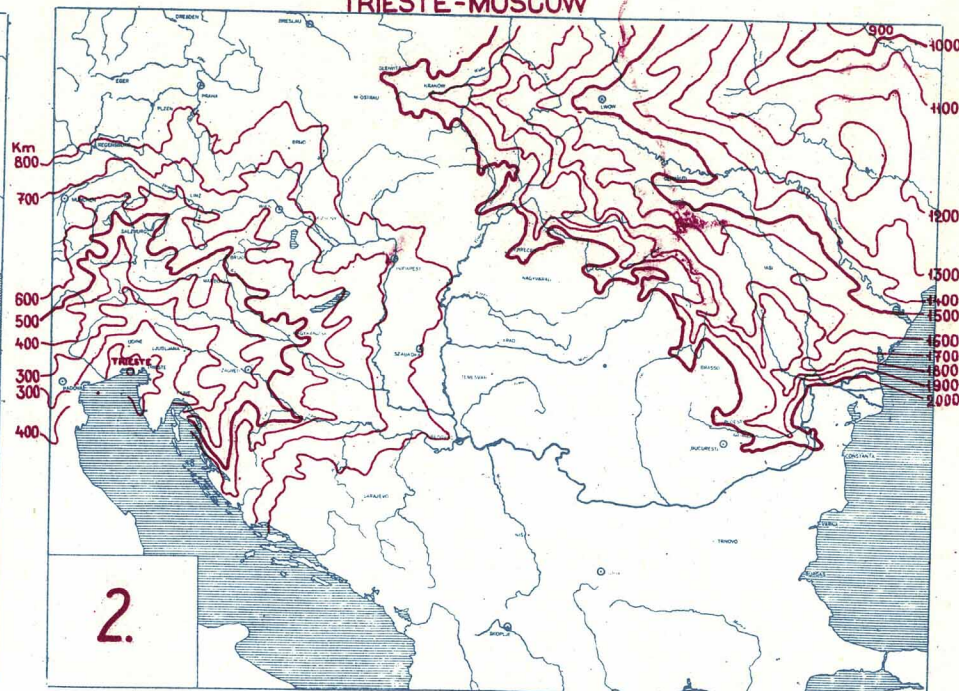


# **LINES OF EQUAL DISTANCES BY RAIL FROM SOME IMPORTANT CENTERS NEAR CENTRAL EUROPE**

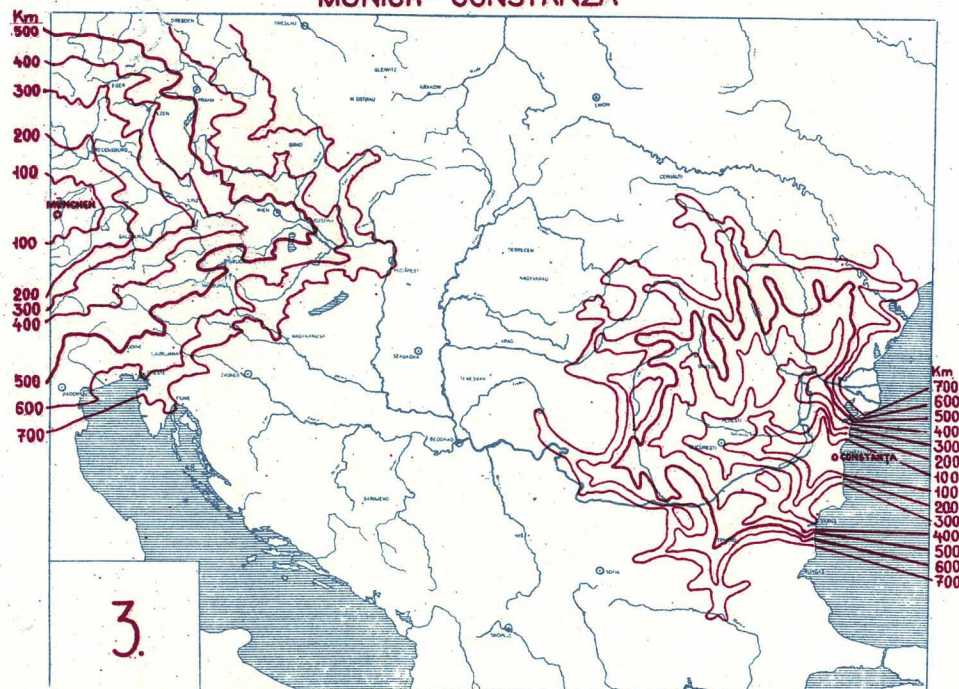
**BERLIN - CONSTANTINOPLE**



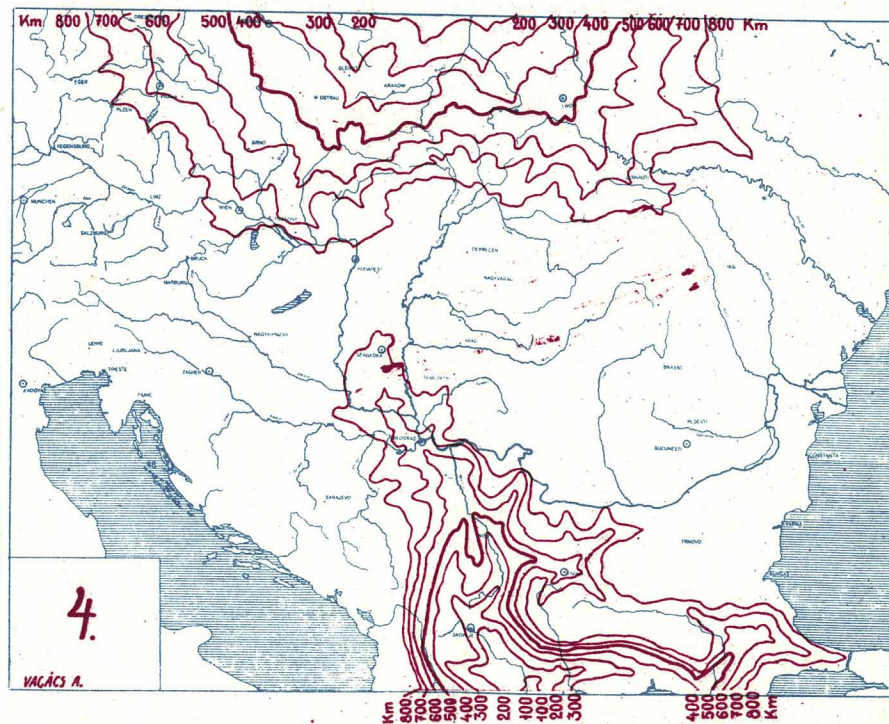
**TRIESTE - MOSCOW**



**MUNICH - CONSTANZA**



**WARSAW - SALONIKI**



VACACS A.



Rising meter	per km	Tonnage of Freight Trains	
		Tons	%
0 - 3		2030	100.-
3 - 5		1700	83.8
5 - 7		1280	63.2
7 - 8		1060	50.2
8 -10		920	45.3
10 -12		780	38.3
12 -14		680	33.3
14 -16		600	29.6
16 -18		530	26.1
18 -20		490	24.2
20 -22		440	21.7
22 -24		410	20.2
25		360	17.8

Higher elevation than that of 25 pro mille cannot be built on adhesion-rails; on slopes steeper than this cogwheel rails should be used. The decrease in tonnage is lower on passenger and fast trains. The rails showing an elevation of 5 pro mille are regarded in practice as having the same capacity as the horizontal ones; accordingly the capacity of the rails containing slopes of 10-25 pro mille is 79 per cent, that of the latter category of 34 per cent.

Country	Length of lines	Of these				Per cent proportion				Straight rails		Curves with a	
		horizontal	sloping	horizontal	sloping	of 0-5	5-10	10-25	pro mille	km	%	radius of below 500 m	%
Austria	5.972	1.128	18.9	4.844	81.1	39.2	20.0	18.6	3.3	3.470	62.6	24.3	
Czecho-Slovakia	13.297	2.769	20.8	10.528	79.2	35.7	18.7	23.3	1.5	7.924	59.6	27.0	
Bulgaria	3.344	923	26.7	2.421	72.4	26.4	17.6	28.4	-	2.172	65.0	21.6	
Rumania	11.272	3.248	28.8	8.024	71.2	45.6	16.9	8.6	0.1	8.662	76.8	13.2	
Jugoslavia	9.461	3.366	35.6	6.095	64.4	36.5	13.9	12.9	1.1	.	.	.	
Hungary	7.894	3.373	42.7	4.521	57.3	40.6	13.5	3.2	-	6.318	81.2	8.5	

Union Internationale des Chemins de Fer 1937.

As for the capacity of the categories of slopes are in relation to each other as follows: 100:99:79:34

The speed of trains is influenced by the curves as well. The shorter is the radius of the curves, the more should be the speed reduced. As for this, the Hungarian data are as follows:

Radius of curves meter	Highest speed	
	km	%
1300	120	100.0
1100	105	92.0
900	100	88.4
700	90	75.0
500	80	66.7
300	65	54.2
200	50	41.6
150	40	33.4
100	25	20.8

Table below indicates the sections of railway-lines falling to the horizontal and sloping rails and the degree of steepness of the slopes; it also indicates the number of straight-lined rails and the length of the winding rails. The per cent proportion of the curves with a radius of below 500 m is also given. They require a considerable limit of speed. /one-third part/.

/Source: Union Internationale des Chemins de Fer 1937./



ISOCHRONIC LINES FROM SOME IMPORTANT EUROPEAN CENTERS [BY FAST TRAIN]  
LONDON MOSCOW ROME CONSTANTINOPLE

