

THE DEVELOPMENT OF EUROPEAN TRANSPORTS (XIXth-XXth centuries) A
COMPUTERIZED CARTOGRAPHICAL PROJECT

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Abstract

We present the main features of the project on a computerized atlas of the development of European transports, a sample of the series of maps we are preparing and an indication of the potential uses of the atlas.

1 Goals

The team presenting this paper proposal is working, based at the European University Institute (Florence), on the making of a computerized atlas of the development of European transport and communication networks (T&CN) since the early nineteenth century until now¹. The project began because of the interest in assessing the effect of (changing) political frontiers on the shaping of transport and communication networks.

Indeed, the ultimate scope of our research project is to study the links between economic growth and T&CN at the European level. Our central hypothesis is that Europe failed, with respect to the United States, in exploiting the economic potential of its T&CN -so sensitive to the scale of operation- because of its increasing political fragmentation. This implied the development of commercial policies reducing the extent of free trade and the implementation of infrastructure development policies aimed at increasing the integration of national markets and at slowing down the scope for transnational linkages.

Within this general framework, mostly oriented toward a better understanding of the historical development of large technical systems², the need immediately arose to build a data base on the development of European T&CN with enough attention paid to the crossing

¹ A previous version, with more space devoted to the technical aspects of the map making was published as Albert Carreras, Andrea Giuntini and Michael Goerke, "Towards a computerized historical Atlas of European Transports and Communications, 19th-20th centuries", in Michael Goerke (ed.), Coordinates for Historical Maps, Max-Planck-Institut für Geschichte in Kommission bei Scripta Mercaturae Verlag, St.Katkarinen, 1994, pp. 121-132.

² A series of conferences on Large Technical Systems has been launched by Thomas P.Hughes since 1987. The first was published as Renate Mayntz & Thomas P.Hughes, eds., The Development of Large Technical Systems, Campus Verlag, Frankfurt am Main/Westview, Boulder, Co., 1988. The third, organized by Stephen Salisbury in Sydney, July, 1991, was on Trans-Border Flows.

of frontiers and to the time development. The lack of an adequate cartographical database triggered our interest to develop one of our own. Some fundamental choices were to be made to operationalize the research.

2 Means

We have built a small computer station at the EUI History Computing Laboratory with the appropriate hardware and software. The software we are using is a Geographical Information System: ATLAS.GIS³, which is simple, extremely flexible and versatile, quite user-friendly (compared to the alternative choices) and allows for sophisticated development and usage of maps, especially with huge data bases. The "Digital Chart of the World" is also extremely helpful in providing the basic cartographical layers⁴.

The information we are currently gathering concerns the dates of opening of the various stretches of the network, their location, their owners and some of the most fundamental physical features. Other data could be added in the future -traffic is the most obvious candidate.

We plan to diffuse our atlas (maps and database) on Internet, on CD-Rom, and also on paper. It will be available for anybody who wants to exploit it and, possibly, to change and improve it. Many categories of scholars might be interested: historians, geographers, economists, teachers, regional planners and others. Such an instrument may be used not only for research purposes but also in teaching and planning.

3 A railway atlas

The T&CN relevant to the project are many: from the preindustrial transport networks such as roads and waterways, to the industrial ones like canals and railways to the more modern energy ones like pipelines and electricity or the newest telecommunications. We decided to start with the railway network because it has highly interesting features. Railways were the first large network that grew in time. Railways structured the space much more than the other networks, providing a sharp impact on the territory and, consequently, on the economy. They represented a new technology, and constituted a closed system which clearly differed from the rest of the networks. Furthermore, and because of its high profile, the information about railways is much more abundant and easily available. Historical maps, railway guides and timetables, official and amateur publications as well as academic monographs provide an enormous amount of information.

Our objective, at this stage of our research is to prepare a map of all European railways from their beginning to c.1880. The choice of the closing date is due to the fact that the growth of the European railway network is concentrated in the period up to around 1880. All the major lines were built by then. From 1880 onwards the expansion of the network was featured by the secondary lines -but in Eastern

³ ATLAS.GIS, Strategic Mapping Inc., 4030 Moorpark Avenue, Suite 250, San José, CA, 95117-1848.

⁴ Digital Chart of the World, Defense Mapping Agency, Combat Support Center, 6001 MacArthur Boulevard, Bethesda, MD, 20816-5001.

Europe⁵.

4 The making of the European railway network: a preliminary report⁶

The set of maps we are presenting (maps 1 to 5) gives a very preliminary indication of the kind of information we have been working on. The railway development of a set of European countries (as defined within 1991 frontiers) - Netherlands, Belgium, France, Portugal, Spain, Italy, Switzerland, Austria, Yugoslavia, Greece, Bulgaria and Rumania (Hungary is not yet completed) - has been reported for a series of benchmark years (1840, 1850, 1860, 1870 and 1880). A quick look at them allows for an easy recognition of the patterns of railway development in nineteenth century Western and Southern Europe.

Railway development began in a very fragmented way. By 1840, it was almost non-existent. Very few stretches were built around a national capital or a large commercial town. The only major exception within the set of countries we are covering was Belgium, that had the skeleton of a national network. Ten years after the situation was not different but for Belgium and France. Both were heavily committed to the building of national networks, although they were still far from having completed it. The Northern part of France and Belgium were connected through two different points. The other countries seemed unable to expand their lines beyond local horizons. By 1860 the situation was substantially changed. Switzerland, the Northern Italian States, Austria, Spain and the Netherlands were also developing networks with a national scope, but they were still suffering of a high degree of fragmentation. Meanwhile France completed the skeleton of her national network while Belgium was achieving a high railway density profile. Generally speaking, the international linkages were still very scanty.

By 1870 the densification of the railway networks of the advanced countries was very evident. The backward countries had just managed to reach the stage of the linking of the various regional networks into a very preliminary national one. Spain was still lacking any western development, and the contacts with the emerging Portuguese network were far from completed. The links with France were limited to one Pyrenees crossing. France and Italy were still completely unconnected. The Austro-Italian link was more an heritage of the Austrian presence in Northern Italy than a clear attempt to cross the Alps. The South East of Europe was not yet serviced by railways. The 1880 map suggests that by then a tremendous contrast existed between the highly densified Western European network and the still backward European periphery.

As we will be entering more information about the building and opening of railway lines all through Europe it will become possible to develop much more comprehensive approaches, relating the existence of frontiers with the delay of railway development, or relating the urban network

⁵ The best introduction to the topic still is Rondo Cameron, France and the Economic Development of Europe, 1800-1914, Princeton U.P., Princeton, 1961.

⁶ Further information in Albert Carreras, Andrea Giuntini & Michèle Merger, eds., European Networks: New Approaches to the Formation of a Transnational System of Transport and Communications (XIXth-XXth Centuries), Università Bocconi-International Economic History Association, Milano, 1994, and Id., European Networks. A Companion Volume, EUI Working Paper HEC No.95/1, EUI, Florence, 1995.

with the provision of railway facilities.

3 A motorway atlas⁷

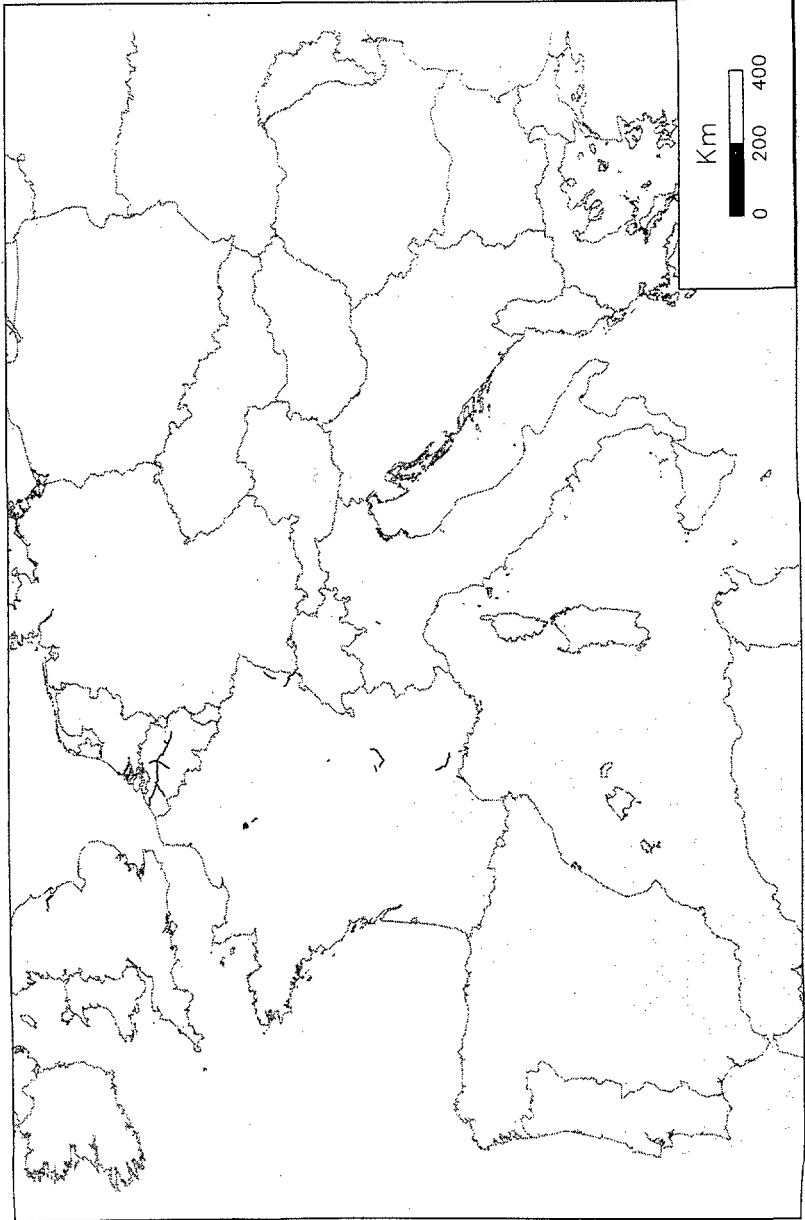
As we mentioned before, we plan to consider the whole range of T&C networks. The motorway system is the second kind of network we have been working on. It represents a development quite similar to the railways but located much later in time. Map 6 testify our first steps in this field. We have begun with Italy as data was easier for us to gather on her. Although we only provide here for two benchmarks (1960 & 1980), it is enough to realize some interesting comparisons with the railway developments more than one century earlier -see map 5.

The Italian railway network grew out of a series of pre-unitarian networks and policies. The different level of development and the differences in railway policy explain the origins of railways in the Upper Po Valley (Piedmont, mainly), and the emergence of smaller but compact networks in Tuscany or in the Lower Po Valley (Austrian ruled). The Italian motorway network, on the contrary, was a public, national, affair since its beginning. The network that has been built is much more evenly spread over the territory than the railway one of 1880. Wherever there is low demand for transportation, as in the Center and the South, the motorways have been layed down in such a way as to compensate for some of the limitations of the railway-network.

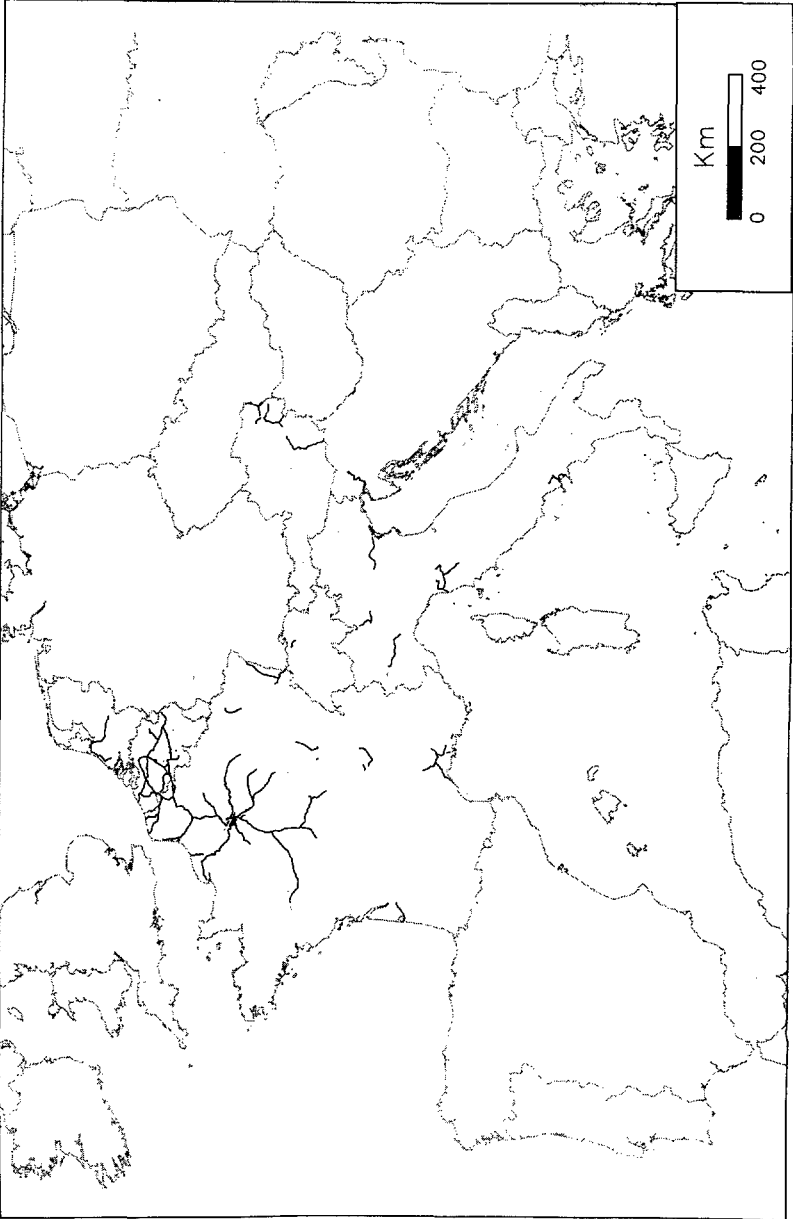
We can produce maps for every year. Maps 7 and 8 give a cursory indication of one of the potential uses of a yearly data base. We highlight the building of new stretches (those completed during two particular years: 1960 and 1964). As it emerges from the map, at first glance we can realize how intense were the motorway building investments by then. During 1960 the linkages from Milano to Genova and from Bologna to Firenze were completed: the very core of the Northern network. Four years later the Florence-Rome motorway was finished. It was a critical addition to the Rome-Naples-Salerno piece. The main cross of the Italian transport system (Torino-Venezia and Milano-Napoli plus the Milano-Genova connection) was on service. A national network came into being that was progressively developed during the next three decades.

⁷ Elena Cefis and Albert Carreras, The Historical Development of the Italian Highway Network, EUI Working Paper, EUI, Florence, forthcoming.

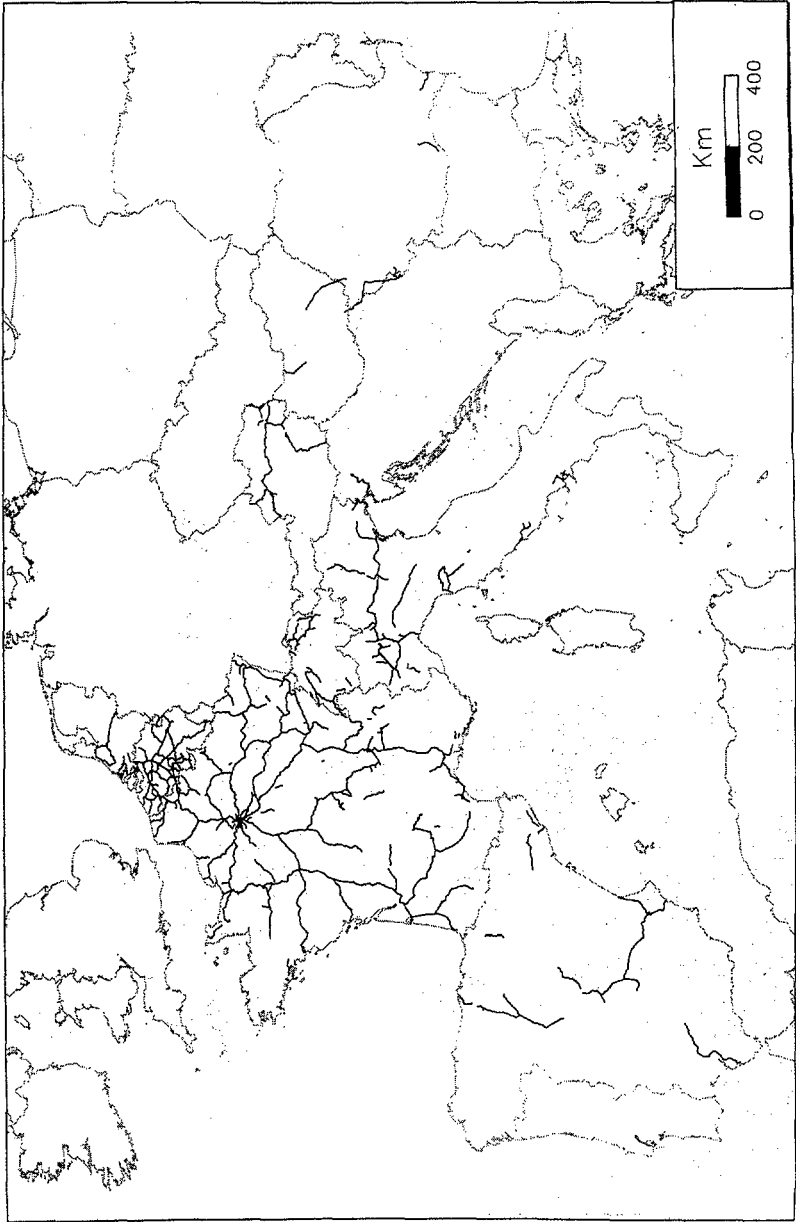
European Railways in 1840



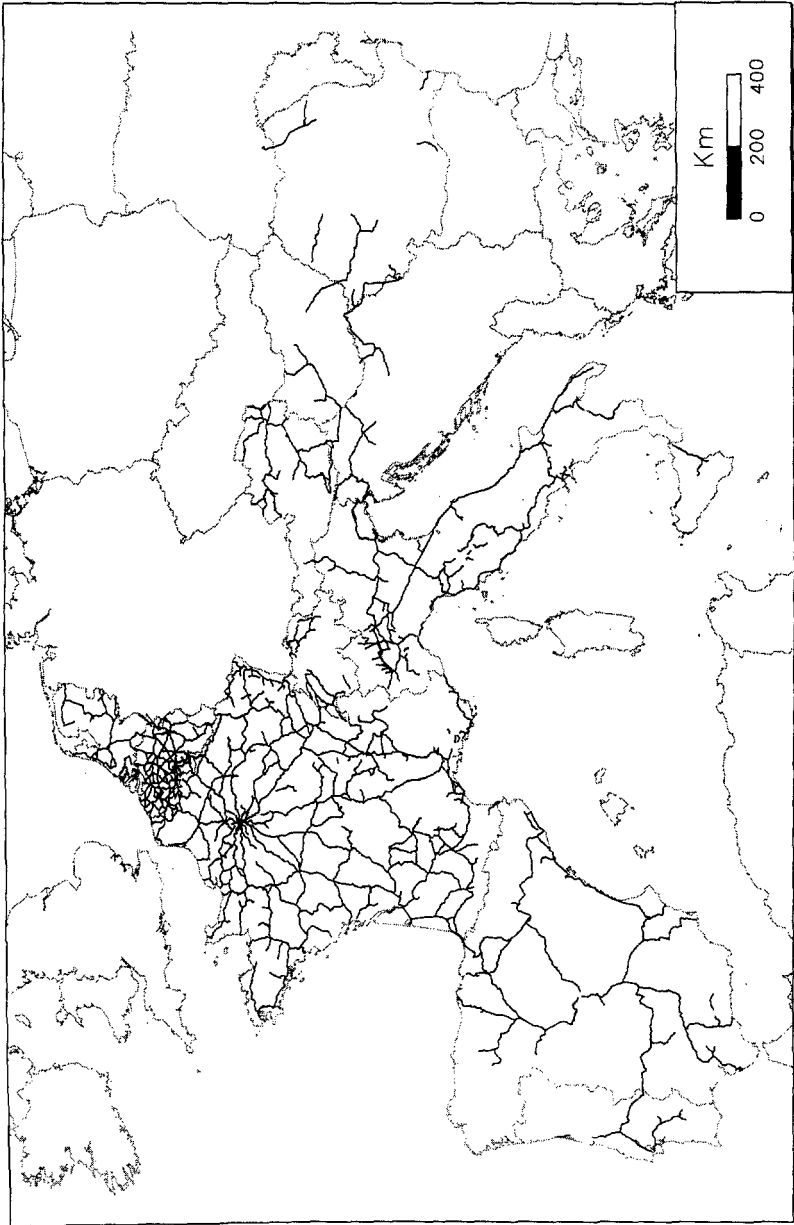
European Railways in 1850



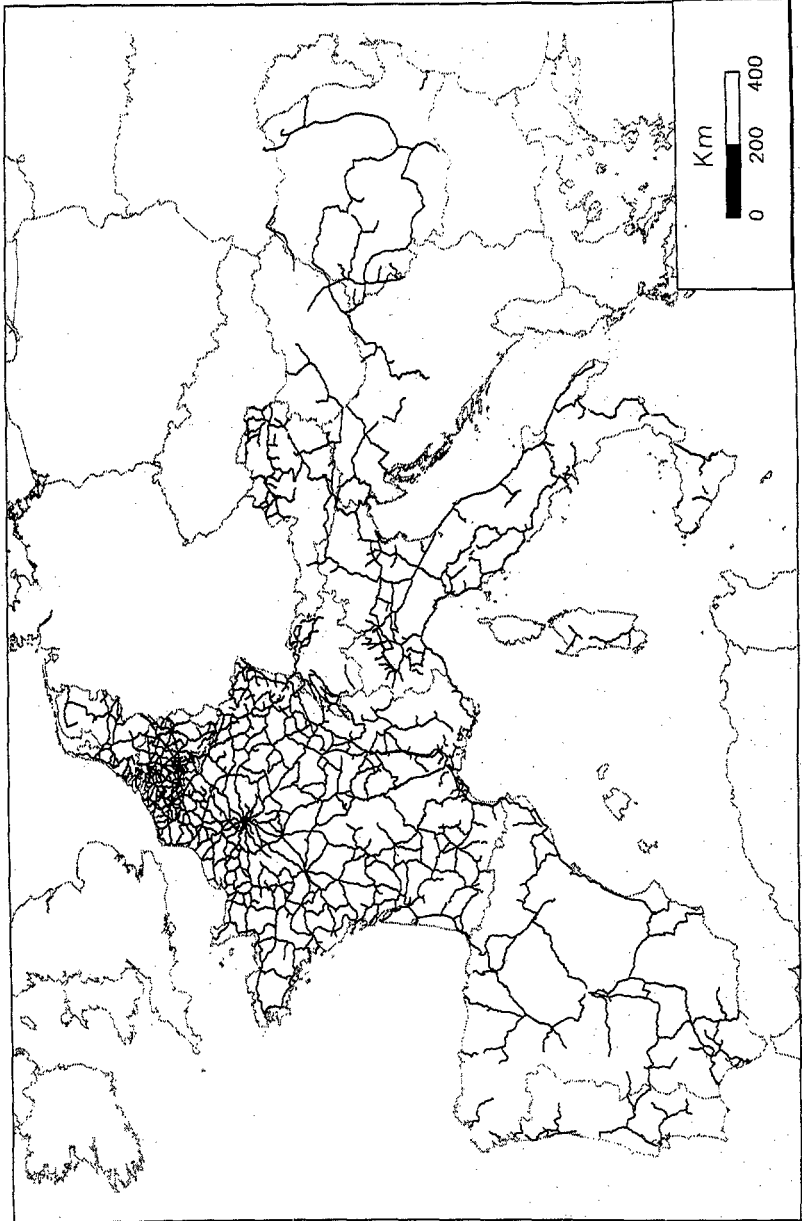
European Railways in 1860



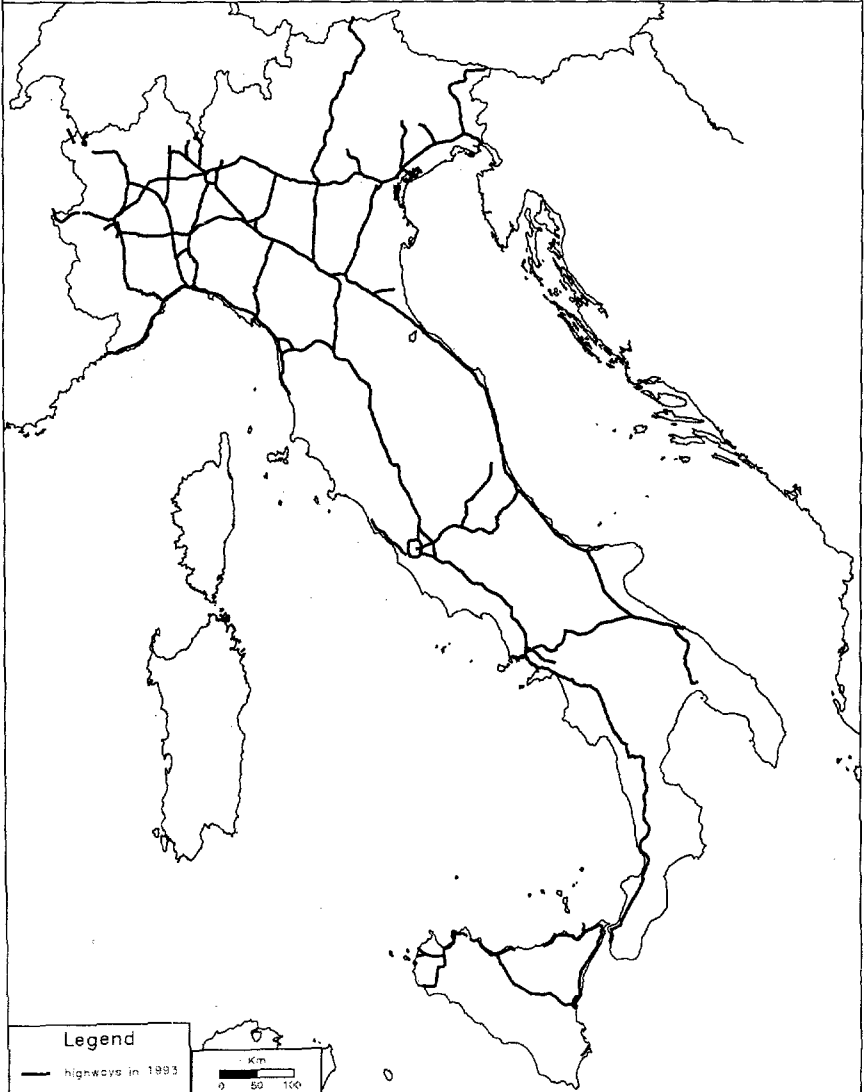
European Railways in 1870



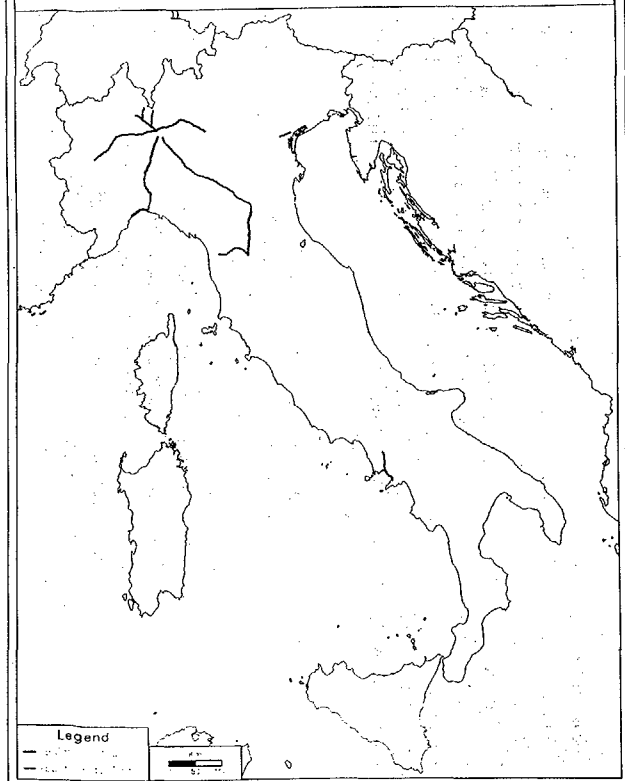
European Railways in 1880



Italian highway network, 1993.



Italian highway network, 1960.



Italian highway network, 1964.

