

# NETWORKING EUROPE

*Transnational Infrastructures  
and the Shaping of Europe,  
1850–2000*

ERIK VAN DER VLEUTEN

*and*

ARNE KAIJSER

*Editors*

Science History Publications/USA  
Sagamore Beach  
2006

# CONTENTS

ERIK VAN DER VLEUTEN *and* ARNE KAIJSER

*Prologue and Introduction: Transnational Networks  
and the Shaping of Contemporary Europe* 1

## PART I GEOPOLITICS AND IDENTITIES IN THE AGE OF RAILS AND TELEGRAPHS

ARISTOTLE TYMPAS *and* IRENE ANASTASIADOU

1. *Constructing Balkan Europe: The Modern Greek  
Pursuit of an “Iron Egnatia”* 25

ANA PAULA SILVA *and* MARIA PAULA DIOGO

2. *From Host and Hostage: Portugal, Britain,  
and the Atlantic Telegraph Networks* 51

JUDITH SCHUELER

3. *Traveling Towards the “Mountain that has Borne  
a State”: The Swiss Gotthard Railways* 71

**PART II ELECTRICITY AND COMPETING VISIONS  
OF A UNITED EUROPE**

ALEXANDER GALL

4. *Atlantropa: A Technological Vision of  
a United Europe* 99

HELMUT MAIER

5. *Systems Connected: IG Auschwitz, Kaprun,  
and the Building of European Power Grids  
up to 1945* 129

**PART III EUROPE CONNECTED, DISCONNECTED,  
AND RECONNECTED**

PÄR BLOMKVIST

6. *Roads for Flow—Roads for Peace: Lobbying  
for a European Highway System* 161

LÉONARD LABORIE

7. *A Missing Link? Telecommunications Networks  
and European Integration 1945–1970* 187

GEERT VERBONG

8. *Dutch Power Relations: From German Occupation  
to The French Connection* 217

PER HÖGSELIUS

9. *Connecting East and West? Electricity Systems  
in the Baltic Region* 245

**PART IV REFLECTIONS ON INFRASTRUCTURES**

ERIK VAN DER VLEUTEN

*10. Understanding Network Societies: Two Decades  
of Large Technical System Studies* 279

*Notes on Contributors* 315

*Index of Names* 319

# PROLOGUE AND INTRODUCTION

## *Transnational Networks and the Shaping of Contemporary Europe*

ERIK VAN DER VLEUTEN  
AND  
ARNE KAIJSER

### PROLOGUE

In 1986, two of the most colorful and strong-willed politicians in post-war Europe, Margaret Thatcher and François Mitterand, signed a bilateral treaty about the construction of a tunnel under the English Channel. In 1994, the fifty-km-long connection was formally inaugurated and train traffic under the Channel began. Britain was tied directly to Europe for the first time since the end of the last glaciation. John Neerhout, Jr., chief executive of the project, proudly portrayed the Tunnel as “one of the great technological accomplishments and civilization milestones of this era” and as a “symbol of European unity.”<sup>1</sup> The European Commission, the executive body of the European Union, contends that the Channel Tunnel “signals to the citizens of the European Union that European integration is progressing” and illustrates how Trans-European Networks constitute “a key instrument for economic, social and territorial cohesion.”<sup>2</sup> For this reason, the Union’s founding document, the Maastricht Treaty (1992), obliges the Commission to promote such Trans-European Networks for transport, communication and energy supply.<sup>3</sup>

However, there are other, less triumphant sides to the Channel Tunnel story. Neerhout reminds us that the tunnel had “one of the

longest gestation periods in history.” Reformulated, the Channel tunnel was a failure, a missing link or ‘non-link’ in Europe for more than a century. To contemporaries, the non-link between the world’s leading commercial powers, only thirty kilometers apart but practically separated by a long and sometimes dangerous journey, seemed an anachronism in the progress of civilization. The first tunnel proposal dates from 1750, and joint Anglo-French preparations in the early 1800s fell victim to the Napoleonic wars. In the early 1880s, drilling had started on both sides of the Channel when flooding problems and British military protests halted the project. General Wolseley expressed the military concern: “no matter what fortifications and defences . . . there would always be the peril of some Continental enemy seizing the Tunnel exit by surprise, and all the commercial advantage . . . could not outweigh such a risk.”<sup>4</sup> A more recent attempt in the mid-1970s was opposed not by the military but by British trade unions, arguing that the project primarily benefited the well to do. Labour Prime Minister Harold Wilson needed union support for a new economic policy, and sacrificed the tunnel project.

When the missing link in the European transport network was finally built a decade later, the stakes were not primarily “European.” Both Thatcher and Mitterand used the tunnel project to reverse economic decline that marked England and northwestern France in the mid-1980s. Still today it is unclear what its European character entails. While the European Commission appropriates it to promote Trans-European Networks, Eurosceptics completely disconnect the tunnel from the emerging European Union: “if one were to judge by the Commission’s report . . . cross-border transport and free movement of goods in Europe could not exist without the E.U. Needless to say, governments are capable of freely cooperating . . . without needing to surrender their powers to an unelected, supranational authority.”<sup>5</sup>

While enabling rapid passenger and freight traffic, the tunnel also produced some unexpected uses. French mass transit workers on strike blocked the tunnel in 1995 to put pressure on their government, which has the legal obligation to keep the tunnel open. So did French dockers in 1998, protesting against job losses following abolishment of duty-free sales. Two years later, anti-riot police were in place when French farmers tried to block the tunnel, but blocking the Paris-Calais motorway proved just as effective.

Furthermore, unanticipated flows through the tunnel appeared. In March 2001, nine Romanian Gypsies, including a 3-year-old girl and two pregnant women, risked their lives by hiding under a Eurostar train in a freight compartment. In February that year, an Iraqi

refugee died and another broke both legs after jumping 20 feet from a bridge onto a moving train heading for Britain. Between November 2001 and November 2002, no less than 1,733 asylum seekers were taken off trains at the British side. British government and European Commission pressures on France and the Eurotunnel company resulted in double-skin fences, over a hundred guards, heartbeat-monitoring equipment inside the tunnel, and the closing of a Red Cross asylum camp on the French side. Notably, the European Commission interpreted the French failure to stop refugee flows as a breach in European rules concerning the free movement of goods, as it led to the slowdown and canceling of freight services.<sup>6</sup> In the name of Europe, some kinds of trans-border flows are supported at high cost, while others are vigorously prevented.

## INTRODUCTION

The Channel Tunnel story illustrates two important points this book wants to make. First, transnational links and networks have been political and economic priorities for centuries. Ever since the Enlightenment, politicians, philosophers and engineers have discussed how transport, communication and energy networks may integrate peoples and countries across natural or political borders.<sup>7</sup> Governments, engineers and militaries in the British, German, Ottoman and Soviet empires, and the Third Reich, as well as individual nation states actively built or promoted network technologies to create and strengthen their polities, economies, and societies. And preceding the European Union, international bodies such as the League of Nations, the United Nations Economic Committee for Europe (UNECE), and the Organization for European Cooperation and Development (OECD), cooperating with business and engineering communities, pushed transnational networks to integrate countries into one coherent, prosperous and peaceful Europe, literally by tying them physically together.

This widespread appreciation of the society-shaping role of material networks, unfortunately, contrasts sharply with the scarce attention historians have devoted to the issue. As we shall discuss below, historians have repeatedly observed the pivotal power of network technologies in the shaping of contemporary Europe, but largely failed to actually analyze complex network developments and their entanglements with broader historical changes. This book wants to spotlight exactly these processes as important themes for historical inquiry.

Second, the tunnel example illustrates that network developments and associated historical changes were not straightforward processes,

but were characterized by ambiguities and tensions. Negotiations often failed—the tunnel was a non-link for over two centuries. There were alternatives, such as improving ferry services or building a bridge. When the tunnel was finally constructed, it involved skilful political maneuvering and aligning the agendas of the European Communities, national and local players. Even after its completion, there were tensions regarding the very interpretation of the tunnel as a “European” or a bilateral project. Its uses (and thus its broader historical meaning) were still in the making: the ideology of free circulation of people, goods and information contrasted sharply with a struggle to attract some traffic flows while discouraging others. The Channel Tunnel also proves that transnational connections were created before the European Union started pushing for such links in the early 1990s.

These ambiguities and tensions are not surprising. Historians of technology have amply demonstrated that technical change is not a straightforward, rational process that in turn drives societal change. Rather, these processes are messy, negotiated, often contested, and intertwined with hopes and agendas of many historical actors, negotiations, and conflict-ridden economic or political contexts. Technical change is indeed “full of contradictions, laden with human folly, saved by occasional benign deeds, and rich with unintended consequences,” as Thomas P. Hughes suggests.<sup>8</sup> Such tensions and ambiguities should be included in any historical narrative on the networking of Europe; simplistic accounts of a linear, increasingly integrative network expansion producing a progressively integrating Europe, often held by politicians and engineers themselves, should be dismissed. The chapters in this book, therefore, discuss hope as well as conflict, transnational linking as well as non-linking, de-linking and re-linking—which for instance happened on a massive scale in the Cold War and the post-1989 era.

The task of analyzing the intertwinement of network development and the shaping of contemporary Europe in the 19th and 20th centuries is obviously daunting. This book wants to explore this theme both empirically and conceptually. In this introduction we shall briefly outline our research focus, the literatures we speak to, the studies in this book, and the way in which they add up.

## RESEARCH FOCUS AND KEY TERMS

We decided to limit this explorative volume in two important ways. First, the studies in this book focus particularly on *transnational* link-



ing and delinking processes, that is, network building in Europe that crossed national boundaries or had a transnational meaning. We did consider the other option: to approach the material shaping of Europe by comparing national experiences, to bring out Europe's feature as a mosaïque of nationally different experiences.<sup>9</sup> However, we chose to transcend such rather worn-out national framing of historiography, and instead bring into vogue the hitherto neglected role of networks in shaping transnational polities, economies or societies.<sup>10</sup> The idea of such a transnational history is, of course, not to exclude the national (or the global for that matter), but rather to link the international to the national.<sup>11</sup> We propose that transnational linking and delinking processes were important arena's for shaping transnational polities, economies and societies, and also for negotiating relationships between the international, national, and subnational.

Second, we suggest that the complex shaping of European societies was recorded in material networks, which, due to their obduracy and life span, continued to structure European society building with all its contradictions. "Networking Europe" thus refers to processes of simultaneous transnational network and society building in Europe. However, the current state of research does not permit us to address this interaction in all its many facets. Presently we focus upon processes of transnational network building and selected political, economic and cultural contexts. Future research will have to elaborate also long-term interactions between networks and a wider variety of historical changes on a European scale, as others have begun to do for cities and nation states.<sup>12</sup>

Having narrowed down our research focus, we should point out that our key terms "Europe" and "networks" are not unproblematic. The term "Europe" itself is unstable and contested. Its meaning varies by historical period, nationality, and academic discipline, to mention just a few factors.<sup>13</sup> Even natural geography does not offer a way out; the geographical definition of Europe's natural borders, particularly to the East, has varied through time and by political paradigm. Besides, network technologies were often designed exactly to overcome such natural obstacles as mountain ranges or sea straits, turning borders into passages.

For an exploratory volume like this, it seems unwise to a priori limit the concept of Europe. Instead we shall employ the concept of Europe in a flexible and practical manner, and allow the authors in this book to give meaning to the concept. Some address networks described by historical actors as "European." For others, following transnational networks leads them to regions within Europe, or into

Africa, Asia, and across the Atlantic. To make sure that we avoid the old pitfall of tacitly equating “Europe” with “Western Europe,” we explicitly invited contributions on southwestern, southeastern and northeastern parts of Europe, where borders indeed prove flexible and negotiable.

The term “network,” finally, has several meanings and competitors. We are interested here in human-made, materially integrated structures that cross national boundaries, perhaps best defined by examples like transnational road, rail, telephone, or electricity supply networks. The term networks, originating in lace making and subsequently used to describe the structure of skin tissue, has been used to describe such structures since the 18th and 19th centuries.<sup>14</sup> However, current network society studies have substantially narrowed the concept by an additional connotation of horizontal, non-hierarchical structures, inspired by the image of the Internet. Alternative terms like “infrastructures” and “large technical systems” have likewise been used in broader and narrower senses. Large technical systems, the preferred term in the history of technology since the 1980s, sometimes refer to all kinds of network technologies in a given society; several authors, however, add the extra requirement of centralized management or control.<sup>15</sup> The term infrastructure, finally, originates in the late 19th century and denotes the underpinnings (embankments, cuttings, bridges) of railways (which belonged to the “superstructure”). Only in the 1940s did it gain the meaning of transport and communication structures underlying modern societies, which was subsequently broadened to all sorts of “basic facilities” including schools, health care, and dwellings. For some authors, the term came to carry connotations of a natural monopoly requiring public ownership, making it highly value-laden and contested when the boundary between public and private sectors was renegotiated in the 1980s and 1990s.<sup>16</sup>

For the purposes of this volume, we shall use terms like networks, large technical systems or infrastructures interchangeably to denote all those human-made material links in which we are interested, without apriori limitations on shape (hierarchical, horizontal, web-like), management (centralized or distributed), or financing (public or private).<sup>17</sup>

## BRIDGING EUROPEAN AND TECHNOLOGICAL HISTORY

Spotlighting and exploring the theme of transnational networks and the shaping of Europe, this book speaks to two literatures in particular: The historiography of Europe, and the specialist historiography of network technologies.<sup>18</sup>

The historiography of Europe is overwhelmingly large and diverse, so our conclusions must be tentative.<sup>19</sup> Still, there seems to be a pattern: Historians often *do* observe the pivotal role of transnational networks, but fail to follow up this observation with actual narrative and analysis. “The transport revolution played a major part not only in the economic but in the political history of Europe,” notes one of the first truly multidisciplinary handbooks on European history, a diverse field that claims to study the history of Europe as something more than the sum of histories of individual states.<sup>20</sup> These networks supposedly spurred the standardization of time and the demise of local cultures and markets. Broadening this observation, a currently much-cited handbook observes that inland communications were crucial to the industrial revolution, while locomotives, gasworks, and dynamos were symbols of expanding European prowess and power in the 19th century. Post-war North Sea oil and gas discoveries reduced European dependence on foreign imports; high-speed trains, autobahns, Alpine and Channel tunnels, and large bridges closed “missing links in a unified network.”<sup>21</sup> Still, such 1500-page handbooks spent only a few pages to back up these grandiose claims, primarily mentioning main inventions and dates. Exactly how networks developed, and how this development process intertwined with European history at large, is not explored, but assumed.

These examples aptly illustrate a widespread tendency to uncritically invoke networks as exogenous forces of transnationalism and interconnectedness. The assumption is that “modern means of communication greatly facilitated mutual perceptions and contacts” in Europe and beyond; they made Europe “connected” and directly or indirectly “fueled processes all over Europe such as industrialization, democratization, or the establishment of cultural institutions.”<sup>22</sup>

The same patterns are visible in several closely related fields of study. In the specialized discipline of European integration history, too, there are “solid grounds for pointing out that ‘integration’ is not a set of treaties or organizational frameworks but the degree to which politics, economies and societies of nation states were enmeshed, or integrated, at a more fundamental level” such as transport and communication networks. However, so far this observation has not been followed up by systematic research.<sup>23</sup> In globalization and world history, finally, it is quite revealing that different datings of global integration tend to assume the integrative power of, respectively, 17th century shipping networks, 19th century telegraph and railroad networks, 20th century radio and television networks, or today’s development of the Internet.<sup>24</sup> The task of critically examining transnational

network developments and their role in European (and global) history is long overdue.<sup>25</sup>

The development of networks and their entanglement with wider changes merits more investigation in specialized disciplines, in particular economic history and the history of technology, and to a lesser degree business history and historical geography. Here, the problem is a different one. "Of all the industries developed by Europeans in the century before 1914, none had a more dramatic, yet lasting effect on the growth of a world economy than European improvements in transport and communications," notes the *Fontana Economic History of Europe*. However, "information on land transport has to be sought in the histories of individual countries."<sup>26</sup> Indeed, economic histories of Europe typically offer a full chapter on transport infrastructures, but these merely juxtapose national transport network developments. The majestic *Cambridge Economic History of Europe* spends only a short and disappointing chapter on transcontinentals.<sup>27</sup> Specialized monographs on transport history feature a similar national comparison format.<sup>28</sup> So does econometric and institutional economic work on the history of transport, while a long tradition of artifact-centered transport history focuses upon (mostly British) subnational cases.<sup>29</sup> According to Merger, Carreras and Giuntini, until very recently transnational analysis was prevented by obstacles as widespread perceptions of networks as tools for nation building, national sources and languages, the predominance of national funding, and the lack of historiographies of international organizations involved in transnational linking.<sup>30</sup>

A similar observation can be made for the history of technology. To be sure, this field has produced many fine insights on the intertwinement of networks and societal change that inform the studies in this book. Since the 1980s, Thomas P. Hughes and others have criticized a traditional focus upon artifacts (the machine, the light bulb, the car, the locomotive, the telephone, the computer) that characterized multivolume reference works.<sup>31</sup> They started to investigate the larger "systems" of which such artifacts are integrated parts, and developed a vocabulary to analyze how historical actors shaped "large technical systems" (LTS) in perpetual interaction with the wider environment.<sup>32</sup> Such LTS-research, notes the economic historian Louis Galambos, "humanized" infrastructure studies as carried out in economic history.<sup>33</sup> However, with regard to its geographical focus LTS-research too suffers from a (sub)national bias; there are a number of cross-national comparisons, but transnational networks are largely neglected.<sup>34</sup>

Exploring processes of transnational system building and their entanglement with the shaping of Europe, this book aims to bridge the gap between the historiography of Europe and the historiography of network technologies. It is one of the results of a large pan-European research collaboration of historians of technology called *Tensions of Europe: technology and the making of 20th century Europe*. In a first explorative phase, many themes were investigated, ranging from urban history to colonialism and from business to consumption; one of these themes addressed the networking of Europe, and the present volume is its final product.<sup>35</sup> A second phase of more systematic inquiry has recently begun.<sup>36</sup>

## GEOPOLITICS AND IDENTITIES IN THE AGE OF RAILS AND TELEGRAPHS

Parts I, II and III of this book present different case studies of transnational network building throughout Europe and beyond. Individually, these chapters identify important research themes that may inspire further inquiry. Moreover, they also constitute the bricks of a broader narrative on transnational networks and the shaping of contemporary Europe. We shall here outline such a broad narrative, which we present as a point of departure for further discussion, contestation, and inquiry.

Until the 19th century, roads and waterways were the chief technologies of transnational interconnection. The French philosopher Claude Henri de Saint-Simon saw roads and artificial waterways as important means for integrating Europe. On the occasion of the Vienna Congress (1814) he pleaded for the establishment of a “European Parliament” to end Europe’s “normal condition” of war between competing states; among other tasks, this parliament should take on matters of common European interests such as large trans-border waterway projects.<sup>37</sup>

Saint-Simon’s European parliament did not materialize in the 19th century, but transnational networks did. Traditional road and navigation networks were greatly expanded, and entirely new types of networks appeared. By the 1830s and 1840s, contemporaries were particularly excited by the prospects of railways and electric telegraphy, providing the ultimate means to eliminate distance. While some found this “annihilation of time and space” highly disconcerting, these technologies increasingly carried hopes of an integrated, prosperous Europe and a peaceful world. “Railways have more relation to

the religious spirit than we think,” concluded Saint-Simon’s pupil and future French minister Michel Chevalier in the 1830s; “never has there existed an instrument of such power to link together scattered peoples.”<sup>38</sup>

Part I of this book investigates cases of transnational railway and telegraph building from the mid-19th century. The picture that emerges from these and other studies is that the 19th century states, and private companies allied with states, were the main players. Some international organizations were founded, like the International Telegraph Union (1865), but although their role has to be further investigated, it seems to be of a rather secondary nature: They repaired coordination problems that the vivid activity of states and companies produced.

Transnational network building in this period, accordingly, aimed at securing national and commercial interests rather than creating an integrated Europe per se. Several historians have shown how British companies, in tight cooperation with the British state, constructed global shipping and telegraph networks to integrate the British Empire and secure British economic and military interests worldwide. Other powerful states like the United States, France, Germany and Russia also engaged in massive network building for political, economic and military reasons. The Siberian railway, serving Russian expansion into Asia, and the Baghdad railway, intended to facilitate German-Austrian expansionism towards South-Eastern Europe and beyond, are good examples.<sup>39</sup>

Small states, too, engaged in the game of trans-border network building to mould domestic and international relations. While studies of the big powers reveal the role of networks in global geopolitics, consideration of smaller states shows particularly how the material and political maps of Europe were redrawn. In Northern Europe, Denmark exploited its military insignificance to become a node in international telegraphy as the Great Nordic Telegraph Company’s wires connected Britain, Scandinavia, and Russia, China and Japan, connecting East and West, but bypassing Germany. On the Iberian Peninsula, Spain and Portugal were negotiating a position in the British-dominated telegraph network. On the Channel coast, the Belgian and Dutch states competed for trade flows by connecting their main ports (Antwerp and Amsterdam) by rail to Germany’s industrial Ruhr area in the 1840s. And to attract new traffic flows following the opening of the Suez Canal (1869), Italy and Greece upgraded their harbors and international railway connections, while the Austrian, Swiss and French governments built expensive passages through the Alps.<sup>40</sup>

Studying such processes, this book begins in the southeastern corner of Europe. Here a first complication of the study of transnational networks is revealed: The history of the Balkans, *Aristotle Tympas* and *Irene Anastasiadou* argue, highlights that national borders themselves are not necessarily stable and should not be taken for granted. If you “scratch the sign of a railway station,” the opening quote aptly observes, “we frequently find underneath two or three names written in foreign languages, which remind us of other epochs, of different borders.” The Greek wish to “connect to Europe” as embedded in railroad plans and discussions, reveals how railway thinking and building reflected and affected military and economic fortunes and failures as well as changing political borders. In this process, the southeastern border of Europe itself was negotiated—railways played an important role in quarrels on the Greek-Turkish border. They follow up the story throughout the interwar years, the Cold War, and today’s E.U. expansion, revealing how railway thinking related to changing geopolitical paradigms.

Then we move on to the southwestern tip of Europe. *Ana Paula Silva* and *Maria Paula Diogo* connect Portugal’s domestic, foreign and telecommunications policies with the telegraphic piercing of Europe’s sea borders with Africa and the Atlantic, and the associated negotiation of international relations. The Portuguese government allowed its traditional ally, Britain, to use Portuguese islands and colonies for establishing land-based relay stations, which were critical nodes in the growing British submarine telegraph cable network. In return Portugal, itself lacking the financial and technological resources, obtained telegraphic integration of its Empire and welcome revenues from international telegraph traffic. Things got complicated, however, when French, Italian, German and American companies and governments joined the play. When the game got rough in the years around the First World War, the power asymmetries between the parties involved became increasingly clear.

In addition to these studies of networks and geopolitics, *Judith Schueler* examines how transnational links intertwined with processes of identity formation. Schueler takes an anthropological approach to reveal the multiple meanings of Switzerland’s famous alpine passage—the Gotthard rail tunnel. Since its opening in 1882, the Gotthard tunnel—financed by the German, Italian and Swiss governments—became a vital passage for North-South traffic. But the tunnel also became a hallmark of heroic engineering and dangerous labor and a crucial junction in the Swiss military defense system. Above all, it

intertwined with the role of the Gotthard Massive as a key symbol of collective Swiss identity. Transnational network building and national identity formation, it seems, may entangle in curious ways.

### ELECTRICITY AND COMPETING VISIONS OF A UNITED EUROPE

States, large and small, remained key actors in building transnational networks in the 20th century. However, in the first half of this century new players and visions entered the game. The First World War triggered political visions of a United Europe, and again new and exciting network technologies were seen as possible carriers of this process. By the 1930s, engineers discussed how transborder motorway, air transport, and telephone and above all electric power networks could tie European nations together on a pan-continental scale. Their initiatives gained some degree of political support, and certainly inspired many post-Second World War efforts for a material integration of Europe. The chapters in Part II critically examine transnational network thinking up to 1945.

To start with, *Alexander Gall* analyses the ideological make-up of technological visions of a United Europe in the interwar years. He examines the so-called Atlantropa project, which aimed at modifying geography on a particularly ambitious scale: Africa and Europe were to be forged together into the new continent Atlantropa, to counter the increasing economic and military power of Asia and the United States of America. A 35-km dam across the Strait of Gibraltar would materially tie Africa to Europe. An extensive electric power grid, fed by the new dam's hydropower plants (which had a projected capacity equaling that of all European power plants combined in 1930) would tie European countries together and extend into North Africa as well. Gall identifies several streams of thought that combined in this vision. First, it was inspired by nascent ideas of European political integration as a means to counter threats to the Old World's global dominance, articulated in particular by Count Richard Coudenhove-Kalergi's Pan-European Union (1923). Second, contrary to the Pan-European Union, the Atlantropa project also drew on the new technocracy movement, which doubted the political road towards European integration and proposed a material one instead. Finally, the world crisis contributed a perception of infrastructural works as giant unemployment relief projects. The project was not realized, but its fusion of ideas was typical for the period and would inspire postwar European integration efforts.



Before that happened, however, the notion of an infrastructural shaping of Europe was given a morbid twist in Nazi Germany. *Helmut Maier* shows how in the wake of the 1930s technological enthusiasm, Nazi engineers, economists and politicians developed a conception of large-territory technology—*Grossraumtechnik*—to tie together their version of a New Europe, *Neuropa*. During the Second World War, several transborder power, highway, and broad-gauge railway systems were built, although Nazi policy was never univocal: For instance, competing concerns on nature conservation gravely complicated and delayed efforts to build a Reich power grid. Moreover, the actual design and use of such networks indicate that these networks primarily served to extract energy, raw materials and labor from the annexed countries to support the German war economy. Zooming in on the infamous case of Auschwitz, Maier shows how transnational rail and electricity networks, the German war economy, and the lager system of concentrations camps and its associated extermination facilities became intertwined.

### EUROPE CONNECTED, DISCONNECTED, AND RECONNECTED

After the Second World War, transnational network building continued to reflect and affect wider historical change. The chapters in Part III examine how renewed visions of integrating Europe through technology clashed with Cold War tensions, regional and national self-interest, and the complexities of the post-1989 reforms.

One important new network builder setting out to forge ties between *all* countries of Europe was the United Nations Economic Committee for Europe (UNECE, 1947). In the words of Gunnar Myrdal, its first executive secretary, this organization stood for “strengthening the links between countries on both sides of the divide, which must be preserved and strengthened if we want to build a sounder Europe and a peaceful world.”<sup>41</sup> The UNECE worked hard to integrate motorway, railway, and electricity networks. The negotiation and design of an all-European motorway network, the so-called E-road network, counts as one of its largest successes. Analyzing this particular case, however, *Pär Blomkvist* reveals the pivotal role of another organization. The International Road Federation (IRF) was created by oil, rubber, road and car industries in the USA in 1948, and actively lobbied for road planning in postwar Europe. It had a dual strategy: Its European office managed to get the E-road plan on the agenda of the

UNECE. Simultaneously, the IRF set up national branches in Sweden and many other countries to affect national road planning, thus promoting E-road planning from above as well as from below.

This strategy meant, implicitly, that motorway building became biased towards the more resourceful countries in Western Europe. The UNECE vision to integrate *all* of Europe was further challenged by the emergence of highly successful “subregional organizations” which, Myrdal regretted, “bypassed” UNECE work.<sup>42</sup> These include broad organizations like the OEEC, EEC and COMECON, but also specialized network organizations. While many existing links across the Iron Curtain were delinked, these subregional organizations built transnational networks on opposite sides of the Iron Curtain, producing a “Western” and “Eastern” European space. Of course some connections remained, and some new ones were even built, but these might be highly contested: NATO’s in vain protest regarding the Western European purchase of Russian gas in the 1970s is a case in point.

Specialized network organizations focusing their activity on Western Europe included the Conference of European Ministers of Transport (ECMT, 1953), the Conference of European Post and Telecommunications (CEPT, 1957), and the Union for the Coordination of Production and Transport of Electricity (UCPTE, 1951). While such organizations stimulated a Western European material integration, their role was not unambiguous. *Léonard Laborie* shows how the high politics of European integration time and again failed in the realm of telecommunications. Rather than the desired supranational body, the CEPT became an organization in which national post and telecom managers cooperated, without surrendering any autonomy to higher authorities or to politicians. National telephone networks were interconnected, but slower and weaker than in the United States for example; national networks remained the gravity points of the system.

*Geert Verbong* makes a similar point for transnational electricity flows between the Dutch, Belgian and German networks. A Western European power grid linked Northern Scandinavia to Southern Italy by 1965, and the largest coordinating organization, UCPTE, strove to run electricity supply “as if there were no borders.”<sup>43</sup> In practice, however, such borders remained crucial in the system’s construction and functioning. Except for emergency cases, autonomy resided with state-owned and private electric utilities. These prioritized self-sufficiency in their own national or provincial supply areas, and only used the UCPTE grid incidentally for supplementary and emergency

supply. As a result, transnational electricity flows remained marginal compared to national or even provincial flows until the current era of liberalization.

In Eastern Europe, new “subregional” transnational networks emerged as well. For instance, the COMECON set up the Central Dispatching Organization of the Interconnected Power System (CDO, 1962) to facilitate Soviet electricity exports to COMECON member states. We conclude part III still further East. *Per Högselius* examines how after the Second World War the former Baltic States Estonia, Latvia and Lithuania were integrated politically, economically, and materially into the Soviet Union. Railway and telegraph lines dating from the Tsarist times were already centered on Moscow and needed little revision. Transnational telephone lines, by contrast, had been built in the 1930s to connect the Baltic countries Westward and Northward to Finland. They were cut and replaced by new connections to Moscow, which remained an obligatory passage point for international calls until the 1980s. In the realm of electric power, the Baltic region was tied into the Soviet empire via the Soviet system’s Northwestern Ring, including also Kaliningrad and Belorussia. Huge new power stations, such as the infamous Ignalina nuclear power plant and several shale-oil power plants were situated in the Baltic region to provide the bulk of electricity consumed in the Northwestern Soviet Union.

During and after the dramatic events of 1989, transnational networks again constituted key arenas for shaping transnational alliances. The European Union prioritized East-West links and currently promotes Trans European Networks to link up the new EU countries in what is today called Central Eastern Europe. The CDO countries disconnected from the Russian power grid and relinked to the UCPTE grid. But in the Baltic, Högselius shows, the coevolution of networks and politics was less clear-cut. The Baltic independence movement of the late 1980s had chosen electrical independence from Russia and connection to the West as one of its key themes. Environmentalism, especially opposition to nuclear power and to dirty shale oil plants, was part of this rhetoric. However, when the Baltic States achieved independence, nationalistic considerations took over. The large power plants as well as power exports to Russia now represented important economic assets that were not easily discarded. Much to the surprise of Western politicians and environmentalists, the previous Baltic interests in “clean Western power” vanished. Environmentalism turned out to be little more than a tool for political independence.

## REFLECTIONS ON INFRASTRUCTURES

The case studies in this book thus allow the articulation of this first and tentative narrative on transnational networks and the shaping of Europe. They suggest that transnational network building indeed was intimately tied up with broader historical changes, albeit not in a simple and straightforward way that many engineers and politicians envisioned. The individual chapters also reveal that the important history of linking polities, economies, and societies was accompanied by a history of non-linking, de-linking, and re-linking.

In the last chapter, *Erik van der Vleuten* complements the empirical observations in this book with a conceptual exploration of the entanglement of network technologies and societal change. He searches the research field of Large Technical Systems for concepts, perspectives, and approaches and that may inspire further inquiry of the networking of Europe. As we briefly observed above, this historical and sociological specialization on network technologies has much to say about the intertwinement of network development and societal change on national and subnational levels. The chapter systematically maps relevant insights and references. However, it argues that much conceptual work, too, still needs to be done to mobilize and modify LTS insights for the task at hand. By way of example, it discusses how LTS insights can be used to develop a concept of “Europe’s system builders,” the purpose of which is to spotlight the important ideological, sociotechnical, and contested character of simultaneous transnational network and society building in 19th and 20th century Europe.

## EPILOGUE

A journalist visiting Riga, Latvia in 2003 found that the Riga international airport was recently enlarged and rebuilt: It looked like modern airports anywhere in the rich world. The departure board announced flights westward, to foreign cities like Copenhagen, Frankfurt, Stockholm, Brussels, Warsaw and Prague. Riga’s main railway station, by contrast, was still firmly rooted in the past, even though it had been handsomely renovated. The few long-distance trains headed for Moscow and St. Petersburg in Russia, Odessa and Lviv in Ukraine, and Gomel in Belarus. No direct trains ran from Riga to Tallinn or Vilnius, the capitals of the neighbouring Baltic countries. The Soviet legacy is clearly evident in the railway system, while the flexible avia-

tion system has been adapted quickly to new political and economic possibilities.<sup>44</sup>

Network technologies, then, may reflect the present or the past; they express historical continuity and change. And, as the narrative presented above suggests, quite often they were carriers of such change themselves. This is an important insight in an age where politicians, engineers, and business representatives all over Europe see the “networking of the continent” as a major challenge. The European Union enlargement of 2004 has spurred lots of plans and projects to increase the capacity and standards of transnational infrastructures. But the shaping of networks and its associated societal implications are not univocal: Critics contend that Central Eastern European countries should rather be connected mutually than to the West; environmentalist groups mobilize opposition to new transnational highway and railway projects throughout Europe. Some Western European engineers and politicians call for more pipelines to secure Russian natural gas exports to Western Europe; others are horrified, fearing a new energy dependence. Transnational network building, in short, is as alive and contested as ever.

The challenge for historians is to trace how such complexities played out in the shaping of contemporary Europe. This very ambitious and difficult task involves appreciation of the complex entanglement of network technologies and societal change, as well as a nuanced understanding of European history; in short, a dialogue between the historiography of Europe and the historiography of (network) technology. Certainly, this would help avoid narratives that falsely portray the Networking of Europe as a linear, politically or technologically inevitable success story of ever-increasing integration. Above all, we find the networking of Europe a topic far too important to be excluded from the European history canon.

## ACKNOWLEDGMENTS

The development of this book was a six-year process, in which many people and institutions played an important role. First of all we want to thank the participants in the Networking Europe research theme. Our joint workshops in Caparica, Portugal in 2001 and Amsterdam, the Netherlands in 2002 were stimulating scholarly experiences. More than once we witnessed the “national framing of historiography” in action, and we learned that doing transnational history is a challenging yet rewarding enterprise.

Over the years we received welcome inputs from many colleagues. These include Angel Calvo, Olivier Coutard, Paul Edwards, Tineke Egeydi, Tom Hughes, Robert McWilliam, Tom Misa, Ruth Oldenziel, Johan Schot, Phil Scranton, Lars Thue, and Martijn Wit. In the early stages of the project, we had the opportunity to discuss our research agenda at workshops with Swedish historians of technology (Stockholm, 2000), the STS group at MIT (Boston, 2001), and, repeatedly, with the Tensions of Europe coordinating committee. Later, we benefited from discussions with the Transnational Infrastructures group in Eindhoven.

Organizing this theme and making this book was possible because of the financial support from the European Science Foundation, the Netherlands Organisation of Scientific Research, the Bank of Sweden Tercentenary Fund, and the Foundation for the History of Technology. Anna Kaijser helped out in preparing the manuscript. Finally, we are indebted to Taylor & Francis for allowing the use of revised text fragments in this introduction from Erik van der Vleuten and Arne Kaijser, "Networking Europe," *History and Technology* 21, no. 1 (2005), see [www.tandf.co.uk](http://www.tandf.co.uk).

## NOTES

1. John Neerhout, Jr., "The making of the Channel Tunnel: A modern day wonder." Gould distinguished lecture on Technology and the Quality of Life 1995. [www.lib.utah.edu/gould/1995/lecture95.html](http://www.lib.utah.edu/gould/1995/lecture95.html)
2. Commission of the European Communities, "Proposal for a decision of the European parliament and of the Council amending decision no. 1692/96/EC" (Brussels 2001), p. 5.
3. Francis McGowan, "Trans-European networks: utilities as infrastructures. Editor's introduction," *Utilities Policy* 3, no.3 (1993): 179–186.
4. Donald Hunt, *The Tunnel: The Story of the Channel Tunnel 1802–1994* (Upton-Upon Severn: Images Publishing, 1994), p. 45.
5. Jeffrey Titford (EDD), Debates of the European Parliament May 30 2002.
6. Various articles on [news.bbc.co.uk](http://news.bbc.co.uk) and [www.cnn.com](http://www.cnn.com).
7. Armand Mattelart, *The invention of communication* (Minneapolis: University of Minnesota Press, 1996); Mattelart, *Networking the world 1784–2000* (Minneapolis: University of Minnesota Press, 2000).
8. Thomas P. Hughes, *Human-built world. How to think about technology and culture* (Chicago: University of Chicago Press, 2004), p. 1. For similar observations see Thomas Misa, "The compelling tangle of modernity and technology," in *Modernity and technology*, ed. Thomas Misa et al. (Cambridge: MIT Press, 2003), p. 9.

9. As proposed by e.g. Kristine Bruland, "Comparative studies in European history of technology," *European historiography of technology*, ed. Dan Christensen (Odense: Odense University Press, 1993), pp. 226–234.
10. Key problems in the national framing of history and the comparative method are discussed in e.g. Philipp Ther, "Beyond the nation: The relational basis of a comparative history of Germany and Europe," *Central European History* 36, no. 1 (2003): 45–73.
11. *Ibid.* and Akira Iriye, "Transnational history," *Contemporary European History* 13, no. 2 (2004): 211–222; Patricia Clavin, "Defining Transnationalism," *Contemporary European History* 14, no. 4 (2005): 421–439.
12. For cities see Olivier Coutard, Richard Hanley and Rae Zimmerman, eds., *Sustaining urban networks. The social diffusion of large technical systems* (London: Routledge, 2005). For nation states see Erik van der Vleuten, "In search of the Networked Nation: Transforming technology, society and nature in the Netherlands in the 20th century," *European Review of History* 10, no.1 (2003): 59–78; Erik van der Vleuten and Geert Verbong, eds., *Networked Nation: Technology, Society, and Nature in the Netherlands in the 20th century*. Special issue of *History and Technology* 20, no. 3 (2004): 195–333. For research perspectives on network-related societal change see Erik van der Vleuten, "Infrastructures and societal change," *Technology analysis and strategic management* 16, no. (2004): 395–414.
13. Kevin Wilson and Jan van der Dussen, eds., *The history of the idea of Europe*, Second Edition (London: Routledge 1995); Mikael af Malmberg and Bo Stråth, eds., *The meaning of Europe* (Oxford: Berg, 2002); Norman Davies, *A modern history of Europe*, Second Edition (London: Pimlico, 1997).
14. Mattelart, *The invention*; Mattelart, *Networking the world*.
15. For references see Van der Vleuten, this volume.
16. Dirk van Laak, "Der Begriff 'Infrastruktur' und was er vor seiner Erfindung besagte," *Archiv für Begriffsgeschichte* 41 (1999): 280–299; Milton Mueller, "Telecommunications as infrastructure: A skeptical view," *Journal of Communication* 43, no. 2 (1993): 147–159.
17. For a comprehensive typology of network technologies see Arne Kaijser, *I fädrens spår: Den svenske infrastrukturens historiska utveckling och framtida utmaningar* (Stockholm: Carlssons, 1994). In English see Arne Kaijser, "Redirecting infrasystems towards sustainability. What can we learn from history?" in *Individual and Structural Determinants of Environmental Practice*, ed. A. Biel, B. Hansson and M. Mårtensson (Ashgate, 2003), pp. 152–179.
18. For detailed discussion and references see Erik van der Vleuten and Arne Kaijser, "Networking Europe," *History and Technology* 21, no. 1 (2005): 21–48 and Johan Schot and Erik van der Vleuten, "Infrastructures, globalisation, and European integration: A historiographical and conceptual exploration," TIE working document no. 8 ([www.TIE-project.nl](http://www.TIE-project.nl)), August 2005.

19. Stuart Woolf, "Europe and its historians," *Contemporary European History* 12 (3) (2003): 323–337.
20. Eugen Weber, *A modern history of Europe* (New York: W.W. Norton & Company, 1971). For an assessment of European history handbook writing we rely on Davies, *A modern history of Europe*, introduction.
21. Davies, *A modern history*, e.g. 681–82, 759–68 and 1081.
22. Ther, "Beyond the nation," 68.
23. Quoted from R.T. Griffiths, ed., *The Netherlands and the Integration of Europe 1945–1957* (Amsterdam: NEHA, 1990), p. ix. A recent exception is Christian Franke, "Das Post- und Fernmeldewesen im europäischen Integrationsprozess der 1950/60er Jahre," *Journal of European integration history* 10, no. 2 (2004): 93–114. For further discussion and references see Schot and Van der Vleuten, "Infrastructures, globalization, and European integration."
24. Compare e.g. Immanuel Wallerstein, *The modern world system Vol. 1* (New York: Academic Press, 1974), p. 349; M. Geyer and C. Bright, "World history in a global age," *American Historical Review* 100, no. 40 (1995): 1034–1060; and Manuel Castells, *The information age: Economy, society, culture*. 3 vols. (Oxford: Blackwell, 1996–98).
25. The lack of attention for networks is reflected in leading European (integration) history journals. Compare the online indexes of the *European History Quarterly* (SAGE, 1970–), *Contemporary European History* (Cambridge University Press, 1991–), the *European Review of History* (Routledge, 1994–), and the *Journal of European Integration History* (Nomos, 1995–). There are some notable exceptions, however: A so-called "integral history" of Europe around 1900 includes a chapter on geopolitics through the lens of the Berlin-Baghdad railway and telegraph projects. Jan Romein, *The watershed of two eras: Europe in 1900* (Middletown: Wesleyan University Press, 1978). Several books elaborate the role of networks in geopolitics. Peter Hugill, *World trade since 1431: Geography, technology, capitalism* (Baltimore: Johns Hopkins, 1993); Peter Hugill, *Global communications since 1844: Geopolitics and technology* (Baltimore: Johns Hopkins, 1999); and Daniel Headrick, *The invisible weapon. Telecommunications and international politics, 1851–1945* (Oxford: Oxford University Press, 1991).
26. William Woodruff, "The emergence of an international economy 1700–1914," *The Fontana economic history of Europe*, ed. Carlo Cipolla (Fontana/Collins, 1973): 656–737 on 688 and 735. Compare Derek Aldcroft and Simon Ville, eds, *The European economy 1750–1914: a thematic approach* (Manchester: Manchester University Press, 1994); Shepard Clough, *European economic history: The economic development of Western civilization*, Second Edition (New York: McGraw-Hill, 1968); Arthur Birnie, *An economic history of Europe 1760–1939* (London: Methuen, 1962); Herbert Heaton, *Economic history of Europe* (New York: Harper International, 1948).



27. L. Girard, "Transport," *The Cambridge economic history of Europe Vol. 6: The industrial revolution and after*, ed. H.J. Habbakuk and M. Postan (Cambridge: Cambridge University Press, 1965): 212–273.
28. Arnulf Grübler, *The rise and fall of infrastructures: Dynamics of evolution and technological change in Transport* (Laxenburg, Austria: IIASA, 1999); Simon P. Ville, *Transport and the development of the European economy 1750–1918* (Basingstoke: MacMillan, 1990); Andreas Kunz and John Armstrong, *Inland navigation and economic development in nineteenth-century Europe* (Mainz: Philip von Zabern, 1995).
29. For critical reviews see Michèle Merger, Albert Carreras, and Andrea Giuntini, eds., *Les réseaux européens transnationaux: XIXe et XXe siècles: Quels enjeux?* (Nantes: Ouest Éditions, 1995), introduction; and Gijs Mom, "What kind of transport history did we get? Half a century of *JTH* and the future of the field," *Journal of transport history*, 3rd series, 24, no. 2 (2003): 121–138. Compare Lena Andersson-Skog and Olle Kranz, eds., *Institutions in the transport and communication industries* (Canton: Science History Publications, 1999).
30. Economic historians have recently started to call for a transnational networks approach in economic history, and produced several conference proceedings with case studies, mainly in French. We join their call for further research. The main publications include Merger et al., *Les réseaux Européens* and Hans-Liudger Dienel, ed., *Unconnected transport networks: European intermodal traffic junctions 1800–2000*, (Frankfurt: Campus, 2004).
31. Trevor Williams, ed., *A history of technology. 8 Vols.* (Oxford: Clarendon Press, 1954–1984); Maurice Daumas ed. *A history of technology and invention: Progress through the ages. 3 Vols.* (New York: Crown, 1969).
32. For an extensive review see Van der Vleuten, this volume.
33. Louis Galambos, "A view from economic history," in *Social responses to large technical systems*, ed. Todd R. La Porte (Dordrecht: Kluwer, 1991), pp. 177–181 on 177.
34. Important exceptions include Arne Kaijser, "Trans-border integration of electricity and gas in the Nordic countries, 1915–1992," *Polhem* 15 (1997): 4–43.; Pascal Griset, "Technical systems and strategy: intercontinental telecommunications in the first quarter of the 20th century," in *The Governance of Large Technical Systems*, ed. Olivier Coutard (London: Routledge, 1999): pp. 58–72; Jane Summerton, "Power plays: the politics of interlinking systems," *Ibid.*, 93–111; Francis McGowan, "The internationalisation of large technical systems," *Ibid.*, 130–148.
35. Johan Schot, Thomas Misa and Ruth Oldenziel, eds., *Tensions of Europe: The role of technology in the making of Europe*. Special issue of *History and Technology* 21, no. 1 (2005): 1–139.
36. [www.histech.nl/tensions](http://www.histech.nl/tensions); [www.tie.nl](http://www.tie.nl)
37. St. Simon and A. Thierry, "The reorganisation of the European community or the necessity and the means of uniting the peoples of Europe in a single

- body politic while preserving for each their national independence,” in *Henri Comte de Saint-Simon, 1760–1825: Selected Writings*, ed. F.M.H. Markham (London: Hyperion Press, 1991), pp. 28–68. Original publication in 1814. Mattelart, *The invention of communication*.
38. Mattelart, *The invention of communication*, 103. On the annihilation of space and time see Wolfgang Schivelbusch, *Geschichte der Eisenbahnreise: Zur Industrialisierung von Raum und Zeit im 19. Jahrhundert* (München: Carl Hanser, 1977).
  39. Hugill, *World trade*; Hugill, *Global communications*; Headrick, *The invisible weapon*; Romein, *The watershed*.
  40. Compare Paul Thestrup and Hans Chr. Johansen, “Le Danemark, un point nodal du réseau télégraphique international dans les années 1870” and other studies in Merger et al., *Les Réseaux Européens Transnationaux*, as well as the studies in this volume.
  41. Gunnar Myrdal, “Twenty years of the United Nations Economic Commission for Europe,” *International Organization* 22, no. 3 (1968): 617–628.
  42. *Ibid.*
  43. *UCPTE 1951–1976: 25 années UCPTE* (Arnhem: UCPTE, 1996), p. 161.
  44. “Europe’s building site,” *The Economist* November 22, 2003.