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INTRODUCTION

Inventing Europe:[1] Technology and the Hidden Integration of Europe

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This article serves as an introduction to this special issue as well as a self-standing contribution. Using the lens of technology, we situate European integration (typically viewed as a political process) as an emergent outcome of a process of linking and delinking of infrastructures, as well as the circulation and appropriation of artefacts, systems and knowledge. These processes carried, shaped, flagged, and helped to maintain a sense of Europeanness, bringing out tensions in Europe and tensions about Europe. We call this 'hidden integration.' Yet the story of integration does not point to a seamless and inevitable process, a grand project with a set agenda. Instead it was a contested process throughout the 20th century leading to fragmentation as well as to integration. Our approach is contrasted with standard interpretations of European integration that treat European integration as an episode in international relations between nation-states.

Keywords: European Integration; European Identity; European Technology

After the fall of the Berlin Wall in 1989, and the unification of Germany, the notion of a 'return to Europe' became popular among intellectuals in Poland, Czechoslovakia, and Hungary. They hoped the end of the Cold War, and the destruction of the physical barrier that had split Europe in two for nearly three decades, would make it possible for their countries to return home and become Central Europe once again. In their view this recentering of Europe would end the Cold War bias that presumed Europe was only Western Europe, sometimes even restricted to just the six countries that had signed the Treaty of Rome in 1957. Already in 1984 the novelist Milan Kundera in his influential essay 'the tragedy of central Europe' warned that Western Europe ignored its own Europeanness by forgetting Prague. Prague, as Derek Sayer reminds us, is nearer to London than Rome is, and closer to Dublin than to Moscow.[2] At the beginning of the

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21st century it seems that many countries in Central and Eastern Europe have succeeded in 'returning' to Europe by joining the European Union (EU). For many people, Europe increasingly represents the space occupied by the EU. Hence, to a significant extent, European and EU identities have merged. From this perspective, the process of European integration marks a profound development in European politics and society.[3] It has lead not only to a new super*state*, in a period of only 40 years and without waging a war, but also to the emergence of a new super*nation*. At the least, a new sense of belonging has been created.[4]

This sweeping cultural and political claim is much contested, however. It can also be argued that the European integration process is not the birthplace of a new state and nation, but has to be understood as a desperate attempt of rebuilding Europe's nation-states after decades of civil war. Scholars reflecting on the eruption of nationalism in Europe following the break-up of the Soviet empire make a similar point. The prospects of a common European Union have hardly killed off nationalism. On the contrary, nationalist rhetoric in most European countries is stronger than ever. Studies of the rising tide of globalization make contrary, but equally strong claims about the essential irrelevance of all nation states, including a putative European one. The past and the future of nation-states and the European integration process has become a pressing analytical issue with a sharp political edge.[5]

With this special issue, we want to direct history of technology toward an exploration of the meaning and significance of European integration. Such a perspective is invaluable because, as these articles show, European integration depended on and was shaped by material networks, technical systems, and the circulation of knowledge and artifacts. This dimension has not been addressed in the existing literature on European integration; this special issue is a beginning. It will mainly generate new perspectives and new research questions. The existing literature fails to take up the necessary transnational perspective to address this topic; almost all studies in the history of technology—like European history generally and, surprisingly enough, like many studies of European integration—have taken the nation-state as a natural unit of analysis. However, we will not only fill a gap: examining these developments through the lens of technology will also recast the existing historical understanding of integration, an immensely complicated political, economic, and cultural process. We offer this issue as an extended case study in how historians of technology might use their knowledge to explore other such inherently transnational processes, such as globalization or climate change, or even to revisit such topics as industrialization, gender and class identity, and modernity.

For a long time, historians have treated European integration as an episode in international relations. Textbooks on the topic focus primarily on the passage of treaties, the formation of EU institutions, and the coordination of policy at varied levels.[6] Most political scientists' analyses of the integration process confirm this view by limiting their investigations to Europe's formal and informal policies and institutions, the dynamics of cooperation between nation-states, and the emerging of European policy networks. Just recently, in the last decade or so, political scientists have taken up the wider issue of the emergence of European identity, aided by anthropologists and social

psychologists. These concerns led to a social constructivist perspective on the integration process within political science as well as an anthropology of 'Europe' focusing on processes of European identity formation.[7]

We aim to situate technology in this broader social and cultural analysis of Europe. Our most important contribution, in this set of articles, is to make visible a 'hidden integration' and also a 'hidden fragmentation' of Europe. We can make these processes visible through attention to the linking and delinking of infrastructures, especially those that have spanned national borders, and to the circulation and appropriation of products, systems, and knowledge. This approach, for which historians of technology are especially well suited, will provide a deeper and richer historical understanding of the formal and political processes that scholars examining Europe have thus far foregrounded. Our attention to these 'hidden' processes shows clearly that the integration of Europe was a historical process that began in the 19th century, that it unfolded unevenly across the 20th century, and that a history of European integration must be placed in a global context, including colonization, decolonization, and transatlantic crossings.

This special issue is an outcome of the first phase of the Tensions of Europe project.[8] The articles collected here are reviews of the existing literature and at the same time programmatic essays looking to the future. Our ultimate aim is to develop a new set of well-framed research questions to investigate the co-construction of technology and Europe. Therefore, in this essay we first survey the standard interpretations of European integration. We then discuss, based on the results and insights generated in the Tensions of Europe project, how history of technology can contribute to a better understanding of this immensely complex historical process. Other essays in this issue exemplify our approach in different sectors and domains.

Histories of European Integration

The standard account of European integration, developed mainly by political scientists, is a story in which visionary leaders and forward-looking nation states engaged in the critical adventure of designing a new Europe. While in the 1930s these prophets sought, but failed, to prevent the outbreak of the Second World War, in the 1950s such visionaries as Jean Monnet and Robert Schuman took determined steps to create a peaceful political and institutional order. In this view, Europe is principally a political entity that took form through treaties and the resulting international organizations. The key markers for this political process are the initialing in 1951 of the Treaty of Paris, and the subsequent creation of the European Coal and Steel Community; the re-launching of Europe with the Treaty of Rome (1957) that created the European Economic Community; and finally the very difficult process of deepening the co-operation among the members states as well as the entering of new member states. The culminating Treaty of Maastricht on the European Union (1992) brought further institutional reforms and steps toward a single currency. A second element in this narrative concerns the two-sided role of the USA. From Harry Truman onward US leaders supported the post-war project of integrating the countries of Western Europe to

counter the influence of Soviet communism, a goal shared by many western European leaders. For their part, these leaders embraced European integration mostly to create the continent-spanning common market they believed was necessary to compete economically with the USA. Here the USA was a political ally but an economic threat. Last but not least, political and economic integration promised to bind Germany and France together and thereby prevent another devastating war that might plunge Europe back to the nationalist rivalries of the past. These elements form the standard narrative in many current history textbooks on European history. These textbooks present a political history of nation states and their relationships, highlighting the political reconstruction of Europe after the Second World War.[9]

Compared with the extensive analysis of politics and economics, attention to European 'culture' emerged only in the 1980s. In part the new attention to culture reflected trends within history, as the new cultural history came to the fore. An idealistic EU historiography took form in which the origins of Europe were traced back to Judeo–Christian religion, Greek–Hellenistic thought, Roman legal views, the Renaissance, and Enlightenment ideas of freedom, progress, and science.[10] At the same time, we underscore that culture and identity were also at the root of a worrisome problem confronting Europe's leaders: the so-called democratic deficit. Just when the common market was gaining momentum, and the institutions of European politics were growing in importance and scale, it turned out that ordinary citizens were losing interest in Europe. The well-organized campaigns to create new European symbols—the 12-star European flag, a standardized European passport, many festivals and awards, even a European anthem, Beethoven's 'Ode to Joy' movement from the Ninth Symphony, to be played at official events—seemed to be a good start. Nonetheless, instead of being 'engaged' or 'enmeshed' in Europe, as the earlier theories predicted, citizens of Europe paid little attention to the state of Europe. Voter participation in European elections sagged to troublesome levels. A decided low point came in 1992 when French voters accepted the landmark Maastricht Treaty by a razor-thin approval of just 51.05%. Europe seemed to be succeeding economically and politically, but failing culturally.

Bureaucrats in Brussels reacted to the 'democratic deficit' with alarm. Armed with a provision of the Maastricht Treaty (Title IX, article 128) that declared the EU would 'contribute to the flowering of the cultures of the Member States … bringing the common cultural heritage to the fore,' they embarked on a wide-ranging set of initiatives. As Cris Shore documents, the EU vigorously entered the cultural field in the mid 1990s with new funded programs for generating and disseminating knowledge about the common heritage of the European peoples, conserving and preserving the cultural heritage of significance to Europe, and proposing all manner of non-commercial, artistic, and literary exchanges. Certified European citizenship was granted to all newborn babies, and innumerable educational initiatives, with the goal of accenting 'the European dimension' at all levels, were launched with great fanfare. 'For all the diversity and conflict in our history, we share today, as Europeans, these freedoms … and an intellectual and cultural unity in Europe that has evolved from this past,' declared the European Commission's 1995 film, 'The Passion to be Free.'[11] Within the EU, specific policies aimed at reviving and indeed developing a history of Europe that could

Figure 1 To celebrate the creation of the European Coal and Steel Community, a train decorated with flags and carrying coal crosses the French–Luxembourg border on 10 February 1953. This event exemplifies the intimate relationships between technology and European integration.
Source: ⟨europa.eu.int/comm/mediatheque/photo/select/ecsc/h-382h.jpg⟩ accessed 13 December 2004.

strengthen the relationship between the newly emerging European state and its people.[12] Finally, the EU became increasingly aware of the important role of new communication technologies in fostering a pan-European identity. They put considerable effort into the construction of a European audiovisual area, with the aim of

improving knowledge and understanding of the life and destiny European people share in common.[13]

This clearly instrumental attempt to engineer a cultural consensus supporting a certain vision of Europe led to a sharp critical response from historians and anthropologists. Slavery, colonialism, and anti-Semitism, for instance, are notably absent from the selectively honored roots purportedly springing from ancient Greece and Rome. Moreover, these critics argue that tracing the origins of European integration back to those lofty intellectual roots is fundamentally to recycle a 19th-century elitist project. It ignores the experience of many ordinary people and most migrants in 20th-century Europe. This approach is dangerous because it leads to new boundaries within Europe, new forms of Euro-racism, and the construction of a Fortress Europe, all of which create barriers for people who do not share the officially defined European cultural heritage. Europe might be evoked to keep out everything from American culture to Japanese products, Ukrainian corn, or Arab immigrants.[14]

Furthermore, there is little historical evidence supporting the hope that nation states and national identities can easily fit into any transnational political structure. These critics maintain that a common European identity, let alone a formalized European nation state, lacks key elements—a robust concept of democracy that might generate political legitimacy as well as a shared language, symbols, and a sense of history and memory. Instead, they suggest that the history of European integration is still principally a history of nation-states and their mutual relationships.[15] At the end of the 20th century, despite many predictions of their demise, nation-states are as strong as ever, and there are more nation-states in Europe than ever before. The EU is not a beginning of a new European state; rather, its existence reflects the simple fact that nation states in Europe recognize their national economies need a common market. In the words of a Belgian diplomat, the EU is 'an economic giant, a political dwarf and a military worm.'[16] Alan Milward even argued that the evolution of the European Community since 1945 has been an integral part of the reassertion of the nation state. Without it, the western European nation-states could not have offered their citizens the same sense of security and prosperity.[17] Mazower points out that the ideal to create a new Europe has been part and parcel of the set of ideas driving Fascist, Communist as well as democratic nation-states into war. The rise of a European Union, in this view, cannot be presented as a gradual convergence of ideals; instead it is the child of a series of violent clashes between antagonistic nation states.[18]

Anthropologists and political scientists working within a social constructivist paradigm observe that the existence of the EU increasingly defines state identity in Europe, although the importance of nation-states and nationalism cannot be denied. States are either 'in' or 'out,' and this divide has become a very important issue for citizens across Europe. EU membership has become a constitutive feature of states, defining a space in which they can move. These anthropologists and political scientists also maintain that the continuing importance of nation-states should not be opposed against the emergence of a European identity. People can have multiple identities, and a national identity may not be in conflict with a European one. It is a mistake to conceptualize identity in zero-sum terms. Case studies and opinion surveys suggest that many people

who strongly identify with their nation-state also feel a sense of belonging to Europe. People say 'country first, but Europe too.' This research also shows that conflict between these identities does surface, especially for people working on the interface between the EU and the nation-states. Journalists working in Brussels and reporting to their national media frequently experience such divided loyalties.[19]

The mutual co-existence of national and European identities can also be conceptualized in another way. National identities have often integrated ideas about Europe, and various meanings of Europe have been mobilized in the process of building nation-states. For example, the German identity after the Second World War has integrated the idea of Europe to overcome the country's nationalist and militarist past. Within France, Europe has been constructed as the opportunity to export French values of republicanism, enlightenment, and the civilizing mission. For many British people, Europe has been constructed in opposition to their understanding of what is authentically British. Clearly there are many diverging narratives of Europe invented by the various nation-states.[20]

What do we conclude from this overview? Clearly, it makes sense to study the emergence of Europe in the 20th century, on both the national level as well as the transnational level, and there is a great deal of work to do in integrating technology into the dominant accounts of politics, economics, and culture. Such a history of European integration must be open-ended: it should focus not only on integration but also on fragmentation, segregation, disintegration, conflict, and exclusion; and it should never underestimate the power of nationalism and the role of nation-states. A history of European integration should set aside the essentialist question 'what is Europe?' Instead we think it is more fruitful to see European integration as a category of practice; the key questions center on how Europe, and in particular the varied attempts at European integration, have been experienced, projected, performed, exported, imported, appropriated, and reproduced in a range of contexts. The question we now turn to is how the history of technology could contribute to such a study of European integration.

European Integration Through the Lens of Technology

The history of technology can deliver major contributions to the debate on Europe because it has begun to explore technology as a crucial *agent of change*, without reverting to any simplistic technological determinist account. For 20 years or more, historians of technology battled against simplistic accounts that posited technology as a unilinear causal force in historical change: the familiar billiard-ball model where technology rolls in from the outside and has one-way impacts on society. In focusing our attention, cases, concepts, and literature on instances of the social construction of technology, however, we did not develop a complementary understanding of the technological shaping of society. No one wants to go back to the bad old days where steam engines 'caused' the industrial revolution. Yet, increasingly, historians of technology recognize that to contribute to the vigorous on-going debates on technology, we need ways of analyzing, understanding, and communicating our views to citizens,

scholars, and policy makers who are concerned to understand how technology changes the world. This is a challenging question to address. An emerging frontier in our field investigates the role of technology in complex economic, political, social and cultural processes, such as industrialization, standardization, nation state formation, globalization, colonization, nation and gender identity formation, and the Cold War.[21] This special issue extends this frontier by exploring the role of technology in the making of Europe. To integrate technology into this multidimensional, fiendishly complex social, political and economic formation, we deploy a varied set of research strategies.

First, we treat Europe not so much as a fixed geographical entity, but rather as an actor category. Here our focus is on how actors *design and use* technologies to constitute and enact European integration (or fragmentation). This is an instance of what Gabrielle Hecht has labeled techno-politics.[22] Second, we examine Europe as an *emergent outcome* of a set of practices that involve linking and delinking of infrastructures, and the circulation and appropriation of knowledge and artifacts. In this way we are able to show the role of various technologies in constituting, maintaining, and fragmenting communities and thus identities through time and space; these communities and identities exist at the local, national, and European levels. Finally, we maintain that Europe can only be understood when the technopolitics and the processes of linking, circulation, and appropriation are placed in a *global perspective*. In this way we accent an externally generated vision of Europe alongside Europe's vision of itself. These research strategies not only orient our treatment of technology but also ground our approach to the boundaries and structure of 'Europe.' We do not need to know precisely where Europe ends; the goal is rather to explore the construction of a new landscape and the development of a new symbolic geography no longer determined by natural limits.

The notion of Europe is too often used in an unreflexive way, as if it is clear what Europe is. Handbooks on European history rarely reflect on the assumptions implicated in the word 'Europe', understandably enough since it is difficult to articulate a totally convincing point of departure. This lack of reflection is unfortunate, however, because many histories make implicit choices to focus on Western Europe only and/or to exclude other parts of Europe. They also often focus on nation states, consequently producing a European history that is little more than a sum of national histories.[23] From the middle of the 19th century onwards, the idea of 'Europe from the Atlantic to the Urals' gained general acceptance among geographers and among some historians, too, even though it was doubtful whether the frontier of the Urals really mattered, and it remained unclear whether or not Turkey belonged to Europe.[24] These issues were hard to resolve, which resulted in a loose formulation of a 'tidal Europe' whose frontiers have ebbed and flowed. We believe it is necessary to cast the geographical net as wide as possible, including specifically Russia and Turkey, in order to avoid a history that is unduly biased on Western Europe. Yet, at the same time, we contend that geography alone should not define Europe, because in this case the notion of Europe stays empty: it is only a stage for the unfolding of a specific history. With a rigid geographical definition of Europe, furthermore, the lens of technology will at best provide a history of the social shaping of a range of technologies *in* Europe, while it will be difficult to write a history of the technological shaping *of* Europe.

Conceptualizing Europe as an actor category offers a more promising entry point for investigating the technological shaping of Europe. Using the now classical concept introduced by Andersen we can investigate how Europe has been imagined by actors and thus has become an 'imagined community.'[25] Obviously, we must take into account a wide range of actors: governmental and business leaders who were inscribing Europe in a new material reality of railroads, highways, energy systems, communication networks, and varied consumer products, but also workers, consumers, professionals, and citizens who confronted this reality in their daily lives and mounted various responses, positive and negative. We propose viewing selected technology developments, then, as a set of Europe-building practices in which specific concepts and visions of Europe became embedded in particular designs for artifacts and systems. We think it is equally important to investigate the varied means of appropriating and/or subverting such designs and thus contesting the embedded concepts and visions of Europe.[26]

Given our goal of exploring the technological shaping of Europe, we should explain that we do *not* take up a traditional 'comparative history' perspective. Historians of technology have mostly used comparative studies to demonstrate how social, cultural, and political forces have shaped the development of technology. Comparative studies are a well-established method in the contextual history of technology. Indeed, comparative history is invaluable for certain purposes, such as showing how different nation states and/or regions developed distinct technological paths. A traditional comparative approach—e.g. an analysis of electrification in France and Germany—is an entirely appropriate method to explore national differences within Europe and to analyze the factors shaping those patterns.[27]

Instead, to highlight the European dimension of technology, we use the concepts of linking, circulation, and appropriation. *Linking* refers to the regional and national linking of infrastructures, railroads, highways, energy systems and communication networks. As Erik van der Vleuten and Arne Kaijser show in 'Networking Europe,' such infrastructures include the physical couplings, regulatory and institutional structures, and standardization practices needed to make the couplings work and to facilitate the flow of information, goods, people, and energy. Linking, while sometimes creating structures of long duration, can be followed by de-linking; we interpret the Cold War as a massive de-linking and relinking of transport, energy, and communication infrastructures in the very middle of Europe. In fact, when you think about it, any linking process between *some* countries assumes that *other* countries are not linked. Transnational infrastructure development is therefore always a process shot through with tensions and struggles about inclusion and exclusion.

Circulation refers to the movement of people, knowledge, and artifacts between cities, companies, and nation states. Circulation is a natural concept for technology, which is comparatively mobile and often travels easily.[28] To fully grasp the notion of circulation, and to avoid the trap of assuming that circulation is free-floating, it is necessary to adopt the concept of *appropriation* as well. Here, appropriation refers to the process in which users—including governments, companies, organizations, and citizens—variously explore, signify, reproduce, communicate, and integrate knowledge

Figure 2 A plan for a European highway network developed by Piero Puricelli. His plan, influenced by a visit in the United States, ignored existing roads and projected a complete new network. His plans were presented and discussed at two European Road Conferences in the early 1930s. Puricelli is considered the founding father of the first highway in north Italy.
Source: Lando Bortolotti, 'Les Premières Propositions d'un Système Européen d'Autoroutes, 1926–1937,' 57.

and artifacts into their daily life and business. Many people experience Europe in their work, travel, and leisure time while they use, confront, or ignore particular technologies. The technological underpinnings of tourism provide an especially appealing research topic because the role of travel is particularly salient and currently underexamined in the reworking of the relationships between European identity and national and local identities.[29] Thus, the hypothesis is that the movement of goods, information, services, and people brought about by the circulation and appropriation processes created new ties and new relationships among users and citizens. It created living communities (not merely imagined ones) and helped to construct new identities, experiences and relationships across Europe. Following Billig who analyzed the importance of banal nationalism, we might also speak of banal Europeanism to underscore the reproduction of a sense of Europeanness (and non-Europeanness) in daily life.[30] The use of concepts like circulation and appropriation leads us to focus on international junctions (or sites) in circulation and appropriation processes. Such Europe-building junctions are an explicit concern in the big technological projects discussed by Helmuth Trischler and Hans Weinberger in their contribution 'Engineering Europe' and the focus on transnational consumer organizations introduced by Oldenziel, Bruheze, and de Wit in 'Technology and the Rise of a European Consumer Society.'

The third research strategy places Europe in a proper global perspective. Circulation and linking processes rarely halt at borders, European or otherwise; exchanges with colonies and with the USA shaped Europe, in many different ways, across the 20th

century. Most obviously, the Iron Curtain reshaped Europe during the Cold War.[31] Equally important, the encounter with people and practices outside Europe lead to the following practical definition: Europe became Europe by comparing itself with its colonies and with the USA. (Europeans did not always like what they saw abroad: they often defined themselves as not colonial or not American.) The comparison could lead to an excentric, colonially generated picture of Europe, but also to the contextualization or even decentering of Europe.[32] As David Arnold argues in 'Europe, Technology and Colonialism,' it is productive to study how much the concept of Europe was shaped in relation to the extra-European world. Equally important for a proper understanding of 20th century Europe is a focus on the Atlantic competition and exchanges with the USA. After all, the 20th century was not the European but the 'American century.'[33] Whereas Europe once stood for civilization and progress, it had become focused on retrenchment and containment. 'And now it is about Europeanisation, not of the rest of the world, but … of Europe itself,' as Susan Sontag put it.[34] This element is present in all four articles.

Deploying these three research strategies—linking and de-linking, circulation and appropriation, and a global perspective—makes visible how European integration and the construction and use of multiple technologies have mutually shaped each other. This process is invisible in the standard literature on European integration because it focuses on the political, legal and institutional processes. Instead, our history of technology perspective will make visible how the linking, and delinking, of infrastructures, and the circulation and particular ways of appropriation of artifacts, systems and knowledge helped to integrate and also to fragment Europe. These processes carried, shaped, flagged, and helped to maintain a sense of Europeanness—and by definition also a sense of non-Europeanness—since identity formation is always a process of boundary work. Besides, European identities have always been constructed against something else: the colonies, the USA, the Orient, or the Muslim World. Finally, this research strategy for the study of Europe will also accent competing visions about Europe: tensions *in* Europe and tensions *about* Europe made manifest through technologies. The story of Europe's 'hidden integration' in our terms does not point to a seamless and inevitable process, a grand project with a set agenda. Indeed, European integration was a contested process throughout the 20th century.

This special issue will consider four contested arenas where these hidden integration and fragmentation processes can be clearly appreciated: transnational infrastructures, big technological projects, the colonial relationship, and European patterns of consumption. We introduce each article in the next section.

The European Technological Landscape

In their contribution 'Networking Europe,' Erik van der Vleuten and Arne Kaijser focus on the construction and use of transnational infrastructures: the material links between nation states that took form in railroads, highways, energy systems, and telecommunication networks. These networks have been explicitly used to build nation states, continental and overseas empires, and also an integrated Europe. In the interwar

Figure 3 Consumption is an important avenue for the reproduction of a sense of Europeanness in daily life. Apparently, this particular Euro-themed snack was not successful, since it is no longer available.
Source: ⟨www.vanoerssnacks.nl/eurosnack.html⟩ accessed 15 December 2004.

years, the League of Nations included the building of transnational networks in its plan for a democratic and peaceful Europe. The League set up a high profile Committee for Communication and Transit, which also worked on electricity; this committee proposed a range of plans for transnational technology connections. Meanwhile, other plans outside the League were developed by engineers who believed in a non-political, technocratic road towards some kind of European union. For example, to defend Europe against US hegemony and Soviet power in the 1920s, Hermann Sörgel proposed unifying Europe through constructing a pan-European electricity network. Although these varied plans were not realized before the Second World War, in 1947 the United Nations Economic Committee for Europe (UNECE) focused again on creating transnational road, railroad, and electricity networks, and this time with some notable success. The executive secretary of the UNECE, Gunnar Myrdal, preferred to bypass political processes by using technological means to work toward integration. He wanted to exploit the hidden nature of these processes for his own political agenda. UNECE could not work on networks spanning Western and Eastern Europe because of the Cold War, and so the Iron Curtain resulted in delinking and the development of

separate East and West networks.[35] In the 1990s, after the fall of the Berlin Wall, the European Commission developed ambitious plans for improving the infrastructural connections between Western and Eastern Europe. Thus, one can see the linking, de-linking, and re-linking of technical infrastructures to be a constitutive part of creating (and recreating) Europe in the 20th century.

On the basis of Van der Vleuten and Kaijser's findings one can argue that infrastructures have in effect created a specific European landscape or space. This process started deep in the 19th century with the rise of transnational telegraph and railroad networks. It led to new 'deep structures' that had many (yet-unexplored) impacts on political, economic, and cultural processes in Europe. Another contribution of their article to European integration history is in showing that infrastructure development indeed strengthened the nation-states; thus, transnational infrastructure development also fits Milward's picture of the rescue of the nation-states. Yet, at the same time, various new systems and organizations connected and spanned these national entities. Perhaps this ability to find ways to connect and transcend the nation-state is a typical European experience. In their opening paragraph Van der Vleuten and Kaijser show the potential for an approach that focuses on the *use* of infrastructures. They evoke how a missing link between the Continent and Great Britain became the Channel Tunnel and a symbol of European unity, but also a forbidden passage for many refugees.

In 'Engineering Europe' Helmuth Trischler and Hans Weinberger show how large technological projects strengthened the political process of unification. The Great War in Europe (1914–18) was instrumental in creating the first military–industry complex, which gained momentum during the interwar years and came to full fruition after the Second World War. Cold War conditions were favorable for creating a protected, and well-funded niche for large technological projects, many of which would never have taken off absent NATO or Warsaw Pact support. Furthermore, many European citizens have their most direct experience of Europe by using new border-crossing transport technologies.

After the Second World War the creation of large projects became a preferred route for integration. For example the establishment of the European Organization for Nuclear Research (CERN) was a concrete vision of how nation states in Europe could pool resources. Also the creation of EURATOM in the mid 1950s made nuclear energy a designated area of European unification. During the 1960s scientific and technical cooperation among national states in Europe proved to be a catalyst for political integration, and a compensation for setbacks in the political area (the so-called dark age of unification). Such cooperation was also an answer to the threat of Soviet and US dominance. Trischler and Weinberger's discussion of European space efforts shows how the joining of a European organization can become binding and make it very difficult for nation states to cancel their participation. Such European organizations can become new actors that are hard to ignore. Trischler and Weinberger also illustrate the daily European experience of having to negotiate constantly with a range of stronger and weaker nation-states. Compromises were not only political arrangements, but also existed in a material sense of the combinations of various national 'nuts and bolts,' and

they did not always work well. The European Launch Development Organization (ELDO) struggled for a decade after its founding in 1964 to cobble together rocket components from various collaborating countries with a divided management structure. In 1975 ELDO was merged with a sister organization, the European Space Research Organization (ESRO), to form the European Space Agency (ESA). ESA became a striking success story of European scientific and technological co-operation due in large measure to a workable transnational management scheme. These large technological projects generated a practical sense of what Europe was about, while producing highly visible outcomes such as Ariane and Airbus that served as symbols for European power and might.

David Arnold's 'Europe, Technology and Colonialism' forcefully argues that the history of Europe and its technology cannot adequately be understood without seriously considering the world beyond Europe. Europe took form through the colonial relationship, he maintains, because the colonies provided Europeans with a clear need to define who they were. Tellingly, the term 'European' referred to people who shared a European racial origin, regardless of their nationality, but in opposition to other races. The Dutch and English saw themselves as Europeans, and they typically connected Europeanness with technical superiority. Europe meant high-tech while colonies meant low-tech. For this very reason, it was so hard for European nation states to endure the growing technological gap with the USA, the Soviet Union, and even Japan during the 20th century. Arnold shows how much the relationship with the colonies has been one of exchange, circulation of knowledge, people and artifacts. The result has been one of technological dialogue, hybridization, and the development of alternative paths. Colonialism suggests a model for looking at the relationship with the USA, and it can be applied within Europe where the circulation of artifacts and knowledge led to the development of alternative modernization paths.

The question about the range of identities that might be possible in a European space cannot be answered without considering the everyday processes of consumption. In 'Technology and the Rise of the European Consumer Society' Ruth Oldenziel, Adri Albert de la Bruhèze, and Onno de Wit show the richness and diversity of consumption patterns in 20th century Europe. Various collective, bourgeois, and individual consumption models emerged simultaneously, with the state, the market, and the civil society involved in varying coalitions. Consumption in Europe has been heavily influenced by Soviet and American examples, especially during the Cold War decades. Still, the authors show that new consumption patterns in Europe were far from a simple adoption of the American or Russian examples. Because of the presence of strong nation states, Europe had to come to terms with diversity, and the way this has been negotiated might be seen as a unique European experience. The authors suggest the eclectic mix of various consumption models might be Europe's true contribution to 20th-century consumer society.

Consumption is sometimes treated as a process directed and managed instrumentally by large corporations. In response, other scholars have demonstrated the surprisingly large room available for consumers and users to design their own

lifestyles and appropriate technologies toward ends wholly unseen by their designers. The authors argue that both approaches must be considered. With new research on the way production and consumption were brought together through emerging mediation practices and institutions where users and producers met. These mediation practices will be rich research sites for seeing how various actors negotiated the local, national and European nature of production and consumption. A particularly rewarding line of research will focus on the international and European consumer organizations and multinational marketing efforts that negotiated European standards, often in explicit pan-European terms, and in so doing shaped the adoption of a range of products.

Afterword

The four articles in this special issue are review articles. They discuss the central issue of the co-construction of Europe and technology in their own area, as well as provide an overview of the relevant literatures. These reviews indicate that the existing literature within the history of technology (and even the study of European integration) has focused on national developments. Transnational developments have rarely been studied. The articles suggest how much can be gained from taking up a transnational approach. They outline an exciting new field for study. In that sense these essays are programmatic as well as descriptive. If their research agendas are taken up, a new kind of history of European integration will emerge as well as a new kind of history of technology. It will not be a history of international relationships of European states, nor a history of the building of European institutions. It will be a third genre that focuses on the multiple societal processes captured in the construction and use of technology that have led to integration—and fragmentation—in Europe.

Such a history will also be highly relevant for the future of Europe. Many critics have blasted the European integration process for its technocratic quality and for its lack of democracy. Gillingham, for example, bluntly questions the entire project: 'a demos thus did not develop and … has little chance of doing so.'[36] This negative assessment is certainly strengthened by analysis of how various actors used infrastructures and big technological projects to construct integration paths outside the realm of formal politics. However, the picture might become a bit different if our historical analysis includes not merely the top–down planning of big projects but also their use, their appropriation, and the struggles conducted around them. This new history will make visible how much citizens have engaged themselves with Europe through the construction and use of technologies. Europe might be more alive for people than the official statistics from Eurobarometer suggest. One might even suggest an alternative to the official Euro credo of unity, integration and European identity. It could be one of complexity, hybridity, and mediation, providing resources for living with a variety of identities. To what extent this engagement has had democratic qualities remains to be seen; yet, if these preliminary results are any guide, it seems clear that Europe across the 20th century has meant a lot to many diverse people. In this special issue we make a very modest start on this wider task by exploring the emerging relationship between technology and Europe.

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Notes

[1] Our title 'Inventing Europe' is an analogy to Maier *et al.*, *Inventing America*. This volume is an inspiring attempt to integrate science and technology into American history. See also Shore, *Building Europe*, 13, who focussed on the way in which people working inside the Commission experienced Europe and ways in which the Commission has sought to invent a positive image of Europe.

[2] Wilson and Van der Dussen, *The History of the Idea*, 178–80; Sayer, *The Coasts of Bohemia*, 11.

[3] European integration has been defined—by one of its first and most influential theorists—as the process 'whereby political actors in several distinct national settings are persuaded to shift their loyalties, expectations, and political activities toward a new centre, whose institutions process or demand jurisdiction over the pre-existing national states'; see Haas, *The Uniting of Europe*, 16. We like this definition because it foregrounds the emergence of a new state as well as a nation. Many other definitions of European integration focus only on the political process and take nation formation for granted.

[4] See for example Risse, 'European Institutions and Identity Change.'

[5] Globalization and nationalism are much studied topics. Here we only refer to Held *et al.*, *Global Transformations*; and Smith, *Nations and Nationalism*. See also Brubaker, *Nationalism Reframed*, on the nationalism in Central and Eastern Europe.

[6] See for example Fulbrook, *Europe since 1945*. An exception is Klausen and Tilly, *European Integration in Social and Historical Perspective*.

[7] For an overview see Wiener and Diez, *European Integration Theory*; for an introduction to this anthropology we refer to Goddard *et al.*, *The Anthropology of Europe*.

[8] For an overview, see www.histech.nl/tensions and see also the Acknowledgement.

[9] See for example the textbook by George and Bache, *Politics in the European Union*. For another history of European integration, highlighting the role of market integration as opposed to political integration, see Gillingham, *European Integration*.
[10] See Wilson and Dussen, *The History of the Idea*; Pagden, *The Idea of Europe*; see also Rietbergen, *Europe: A Cultural History*.
[11] Shore, *Building Europe*, 59.
[12] In parallel, the Council of Europe launched a project to introduce a contemporary European dimension in history teaching throughout Europe; see Stradling, *Teaching 20th-Century*.
[13] Morley and Robins, *Spaces of Identity*, 2–5.
[14] See Shore, 'Citizens' Europe and the Construction,' 297; Morley and Robins, *Spaces of Identity*, in particular Chap. 1; and Nederveen Pieterse, 'Fictions of Europe.'
[15] Smith, *Nations and Nationalism*.
[16] Cited in Mazower, *Dark Continent*, 409.
[17] Milward, *The European Rescue*, see in particular Chap. 1.
[18] Mazower, *Dark Continent*. See also Laughland, *The Tainted Source*, who provides evidence that most of the arguments offered by European integrationists today were first made by the Continent's various fascist movements.
[19] See essays in Hermann *et al.*, *Transnational Identities*, in particular essay by Risse, 'European Institutions and Identity Change.'
[20] For an exploration of the meanings of Europe in various national settings, see Malborg and Stråth, *The Meaning of Europe*. For a first attempt to produce a typology of various kinds of Europe, see Marcussen *et al.*, 'Constructing Europe.'
[21] See for example Hughes, *American Genesis*; Nye, *Electrifying America*; Misa, *A Nation of Steel*; Hecht, *The Radiance of France*; Edwards, *The Closed World*; Oldenziel, *Making Technology Masculine*; Alder, *Engineering the Revolution*; Van der Vleuten and Verbong, 'Networked Nation'; Schot *et al.*, *Techniek in Nederland in de Twintigste Eeuw*, in particular Vol. VII.
[22] Hecht, *Radiance of France*, 15.
[23] For a brief overview of European histories see Van der Vleuten and Kaijser, 'Networking Europe' (this issue).
[24] Davies, *Europe*, Chap. 1.
[25] Anderson, *Imagined Communities*.
[26] Our approach extends Andrew Feenberg's suggestion (in his *Questioning Technology*, pp. 115–19) to symmetrically investigate dominant actors' 'programs' alongside non-dominant actors' 'anti-programs.' Feenberg seems to limit significant 'anti-programs' only to 'those cases where the anti-program is taken up by actors able to build a new system around it.' By contrast, our emphasis on appropriation makes clear that non-dominant actors can and often do shape technical developments, even though they may not have access to the resources necessary to initiate technical changes or build new systems, at least as traditionally understood.
[27] Misa, 'Countercurrents in Comparative Studies.'
[28] We are fully aware of the venerable tradition that exalts 'local knowledge;' we observe, however, that in the 20th century various institutional mechanisms—international congresses, internationalism within science and engineering, multinational corporations and NGOs, and the evolution of patent laws—have made technology able to cross many different kinds of borders.
[29] Urry, *Consuming Places*, 163–72.
[30] Billig, *Banal Nationalism*; see Schot, 'Imagining and Living Europe,' for discussion of the concepts 'living communities' and 'banal Europeanness.'
[31] See for example Karen Freeze, 'A Czech–British Connection.' See also Van der Vleuten and Kaijser, 'Networking Europe.'
[32] Decentering Europe is a strong emphasis within post-colonial studies. See, for instance, Chakrabarty, *Provincializing Europe*.
[33] Zunz, *Why the American Century?*

[34] Sunsan Sontag, 'L' idée d'Europe', *Les Temps Modernes* (1989), cited in Morley and Robins, *Spaces of Identity*, 21.
[35] In *Constructing Socialism*, Stokes shows that East Germany followed the Western standards (DIN and ISO) until 1961 when it inclined to the Soviet standards and norms (GOST).
[36] Gillingham, *European Integration*, 483.

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