

Tensions of Europe

Intellectual Agenda¹

Spring 2005

Inventing Europe

Technology and the Making of Europe from 1850 to the Present²

1. Summary

Inventing Europe: Technology and the Making of Europe, 1850-Present, seeks to develop an alternative understanding of European integration. It focuses on the construction and the use of technologies in the making of Europe. The objective is to show that technological change, a largely unexplored topic in this context, was an important arena for constructing Europe on the material, institutional and discursive levels. Examining Europe's technological development opens up a new set of questions about the timing, geographical extent, cultural breadth, and historical dynamics of integration. In doing so, we suggest a fresh starting point for viewing the historical development of Europe.

2. Scientific Rationale and Objectives

Inventing Europe intends both to counter and to complement the existing historiography concerning the integration of Europe. This process marks a profound development in European politics and society. Yet in the current European historiography, the dominant narrative about the twentieth century

¹ By Johan Schot and Ruth Oldenziel, with thanks to many people, especially Karen Freeze, Mikael Hård, Tom Misa, and Helen Tilley. These ideas were originally developed for an ESF grant application.

² Title is an analogy to *Inventing America. A History of the United States* (Norton: 2003), written by Pauline Maier, Merritt Roe Smith, Alexander Keyssar and Daniel J. Kevles. This is an inspiring attempt to integrate science and technology into a

treats European integration merely as an episode in the history of international relations, giving emphasis almost exclusively to the formation of EU institutions, the development of treaties, and policy coordination (see for example Hobsbawm 1994; Davies 1996; Fulbrook; 2001; Palmer, Colton and Kramer 2002, 9th edition; see also Vinen, 2002, who mentions European integration only in passing). Historians of European integration per se typically limit their investigations to Europe's formal policies and institutions, analysing the dynamics of the cooperation between nation-states and the emerging new European state (Gerbet 1984; Urwin 1992; Milward 1992; for political science see Dietz & Wiener 2004).

This research program makes four related claims about European integration: First, that the integration of Europe was a historical process that began in the 19th century and unfolded unevenly across the 20th century. Second, it crucially involved material networks, technical systems, and circulation of knowledge and artefacts—decades prior to the postwar political agreements between nation states. Third, that a history of European integration must be placed in a global context, including colonization, decolonization, and transatlantic crossings. Finally, that examining these developments through the lens of technology will recast the existing historical understanding of integration. It will make visible a bottom-up “hidden integration” and provide a deeper and richer historical understanding of the process. This integration from below created the necessary preconditions for, and had lasting effects on, the formal process of the European integration. We suggest that similar processes outside formal politics may shape the dynamics and prospects of European integration in the future.

State-of-the art

The history of the formal European integration often reads as a storyline in which visionary leaders and forward-looking nation states engaged in the critical adventure of designing a new Europe. These visionaries sought, but failed, to prevent the outbreak of the Second World War, but in the 1950s they took a number of determined steps to create a peaceful political and institutional order. A second element in this narrative concerns the postwar role of the US. While US leaders supported the project of integration in Europe to counter the influence of Russia and communism, European leaders embraced the idea of a common market to compete economically with the US. Lastly, political and economic integration would bind together Germany and France and prevent another devastating European war that would plunge Europe back in the national rivalries of the past. These aspects are well known, but they are only a small part of the broader history of European integration we propose to develop.

Another influential stream of literature traces Europe's integration back to its distant origins in Judeo-Christian religion, Greek-Hellenistic thought, Roman legal views, and Enlightenment ideas of freedom, progress, and science (Hay 1957; Wilson & Dussen 1995; Pagden 2002; see also Rietbergen 1998). The implication here is that the creation of a political superstructure and/or common market could be underpinned by European citizens' growing appreciation of the benefits of integration, natural allegiance to the union, and the creation of a European identity based in a common history. This idea was adopted and advanced by the European Community in the 1970s, when popular support for the "European State" was flagging. To create a European identity, the EC at first revived or recreated its own history. Then in the 1980s it began to invent and introduce symbols for the new state: a European passport, the blue and yellow European flag, a European driving license, even a European anthem—taken from the "Ode to Joy" prelude of Beethoven's Ninth Symphony (Shore 2000).

Critics of this idealistic stance have argued, however, that tracing the origins of European integration back to these lofty intellectual roots is fundamentally to recycle a nineteenth-century elitist project. It ignores the experience of many ordinary people and most migrants in twentieth-century Europe (Nederveen Pieterse 1991). Furthermore, there is little historical evidence supporting the notion that nation states and national identities can easily fit into any transnational political structure. These critics maintain that the formation of a common European identity, let alone a formalized European nation state, lacks key elements, such as political legitimacy, 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. At the end of the twentieth century, nation-states are still as strong as ever. And there are more nation-states in Europe than ever before. The European Union is not a beginning of a new European state; rather, its existence reflects that nation-states in Europe recognize their national economies need a common market. The European Union is mainly an economic project: in the words of a Belgian diplomat, "an economic giant, a political dwarf and a military worm" (cited in Mazower 1998, 409). 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 its citizens the same sense of security and prosperity (Milward 1992, see also Smith 1992; and Gillingham 2003). Other historians object to a grand framing of Europe's integration because of its teleological implications. Laughland (1997) even warns that most of the arguments offered by European integrationists today were first made by the Continent's various fascist movements. Mazower (1998) 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.

This debate is highly relevant for our program. We agree with many of the critics. A history of European integration should 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. Yet, we also would like to point out that some critics underestimate the profound importance of European integration and the various imaginations and experiences of Europe we will focus on.

In most handbooks on European history, the notion of Europe is used in a trivial and unreflexive way, as if it is clear what Europe is. Jacques Le Goff, who is the general editor of the series *The Making of Europe* (many volumes have been published in five languages; for an early and single author handbook see for example Weber 1971), wrote that Europe was a potential reality, the result of an incomplete history. Furthermore he explained that the main purpose of the series was the search for a European cultural identity, assuming that Europe is a cultural community and not a geographical reality. While it is difficult to articulate a fully convincing point of departure, all histories of Europe make implicit choices on their time- and space frame. For example, some authors include Turkey (Ottoman Empire) and/or Russia, while the majority focus on Western Europe only. Also for some authors European history begins with ancient Greek civilisation, while for others it starts when the relatively modern concept of Europe gradually replaced the notion of Western Christendom, somewhere between the fourteenth and eighteenth century. So the notion of Europe, and what it means to write a European history, shifts between authors. It depends on their preferences and historical situation (and their language capacities). After surveying the field, Norman Davies writes in his monumental *Europe: A History* that "in the end, therefore, intellectual definitions raise more questions than they answer. It is the same with European history as with a camel. The practical approach is not to try and define it, but to describe it" (see Davis 1996, 46). We will follow a similar approach.

Our approach

Our approach to the issue of European integration rests on two pillars: a particular contextual understanding of technology, and a specific research strategy of how to locate Europe in processes of technological change.

Defining Technology

Technology in our definition comprises machines, artefacts and large technical systems such as

infrastructures, and includes the skills, knowledge, and people that make them work. Recent research by historians of technology offers an array of analytical tools to show that technology is a deeply political and social process involving people and institutions (see for example Staudenmaier 1985; Bijker, Hughes and Pinch 1987; Smith and Marx 1994); They also have begun to explore technology as a crucial agent of change, without positing a simplistic technological determinist account as if technology rolls in from the outside and has one-way impacts on society. An emerging frontier within this field investigates the crucial role of technology in complex economic, political, social and cultural processes, such as industrialization, standardization, globalisation, colonization, national and gender identity formation, the Cold War; and political integration (see for example Hughes 1989; Gugerli 1996; Edwards 1997; Hecht 1998; Oldenziel 1999; Weinberger 2001; Trischler and Lyth 2003; Misa, Brey and Feenberg 2003; Schot et al. 1998-2003; Maier et al. 2003). This agenda will contribute to this new trend by treating technology as an integral part of European history, in particular the history of European integration.

Viewed through the lens of technology, the integration of Europe began long before the formation of a “European state”. During the nineteenth century and first half of the twentieth century, nation states frequently grew in tandem with the building of large-scale technical networks, including railroads, water transport, and electricity networks. In addition, several large-scale attempts were launched to build transnational connections, most notably telegraph cables to the USA and to the colonies. Many political, social, and cultural ties between European nation states were created through the building and use of infrastructures, artefacts, and knowledge systems. Processes of standardization, social reform movements, and numerous professional-technical communities also created consequential links between nation states. In the mid-twentieth century, after two devastating world wars, European institutions (founded on resurrected nation states) developed initiatives for building truly transnational infrastructures. These initiatives depended on existing systems, infrastructures, and connections between nation states. We maintain that these transnational systems were the material and cultural precondition for the formal integration of Europe.

Furthermore, many Europe-building projects in the 1950s were distinctly technological projects. The European Coal and Steel Community (ECSC, 1951)--the first common European organization --is a prime example. The ECSC meant to coordinate prices and industrial relationships, as well as investments, railroad networks, and exchanges of knowledge. A second one is the 1956 plan for a European agency (EURATOM) to coordinate research into the peaceful use of nuclear energy. This plan was a crucial part of Treaty of Rome (signed in 1957) that created the process of European institution building: it meant the start of the European Economic Community (EEC) (Larres 2001;

Weilemann 1983; Bühler 1986; Helmreich 1991; these authors do not focus on the technological aspects, however, but on the negotiations leading to the establishment of new institutions). Many highly visible projects involving European cooperation would follow, such as the reconstruction of the European aircraft industry by the Airbus consortium, and the European space efforts. As the Cold War intensified, these initiatives were limited to Western Europe. The nation-states in Central and Eastern Europe developed similar projects, however, through the through the Moscow-directed Council for Mutual Economic Assistance COMECON/CMEA) (for an overview of various projects in the West and the East see Trischler and Weinberger, 2004). The fall of the Berlin Wall in 1989 ushered a new era in which these disparate infrastructures and knowledge networks were relinked, and when ideas, artefacts, and people circulated in a much broader arena. This relinking of Western and Central and Eastern Europe has inevitably led to challenging new questions about how European integration and fragmentation will evolve following the paths of technical change.

Understanding Europe

We understand Europe foremost as an actor-category. Instead of asking the question ‘what is Europe?’ in an essentialist manner, our program focuses on how Europe is projected, performed, and reproduced in processes of technological change. We also ask, by whom and for what purpose, and why are certain projections more effective than others? (Malmberg and Strath 2002; Brubaker 1996) In this approach “Europe” is a contested category operating in historical relations and through networks of power – it is not a stable, sovereign, autonomous nation nor a proto-nation (Borneman & Fowler 1997). This research strategy for the study of Europe -- by following the actors inventing, developing, and using technology -- will have two certain strengths. First, it will allow us to bring out competing visions about Europe, tensions in Europe and about Europe, made manifest through technologies, and also to examine the countercurrents of disintegration, fragmentation, and segregation. The story of Europe’s “hidden integration” through the linking of infrastructures and the circulation of ideas and artefacts 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. Second, the program will take into account how many different social actors (defined by region, class, gender, ethnicity, sector in society -industry, NGO, university etc.- or professional background) appropriated and/or subverted specific Europe building visions and practices. Using the now classical concept introduced by Andersen (1983), we can investigate Europe as an “imagined community.” However, we should not forget that Europe is not only imagined; it is also a reality, a practice which goes beyond the politics of imagined Europe. Many people experience Europe in their work, travel and leisure time. So following

Billig (1995) who analysed the importance of banal nationalism, we might also speak of banal Europeanism referring to the reproduction of a sense of Europeanness in daily life (see Schot 2004).

Practically, we must decide *which* Europe building practices to include. Our preliminary research includes historical visions and experiences from virtually all parts of the European Peninsula from the Atlantic to the Urals (our network of 150 researchers can cover this immense geographic, cultural and linguistic span). Furthermore, in crucial ways Europe's identity and material practices were also shaped outside these strict geographical borders. We maintain that Europe's colonies formed a constituent element in the definitional politics of 'Europe'. Europeans living outside Europe employed the term to designate all people of European origin, regardless of their national identities, turning it into a rhetorical strategy for distinguishing themselves from people of other races and cultures (Arnold 2004). Ironically enough, this occurred precisely during the decades when European nation states competed with each other for dominance, on the continent and in the colonies, in which technological prowess proved to be crucial yardstick. Equally important for a proper understanding of Europe in the twentieth century is a focus on the Atlantic competition and exchanges with the USA. After all, the twentieth century was not Europe's but the "American century" (Zunz 1998).

The parallel analytical question—*who* is involved in the representation, production and maintenance of Europe—has led us to define four critical research sites. These sites can be seen as arenas where many actors imagine and experience Europe. The identification of these sites is a result of the work completed in the ESF Network called 'Tensions of Europe: Technology and the Making of 20th Century Europe' (see Schot, Misa and Oldenziel, forthcoming in 2005). These sites are structuring devices for TOE2's intellectual agenda.

3. The Scope of the Program

Following the research strategy described above, this program will examine four Europe-building technological arenas: infrastructures, knowledge networks and projects; consumption and interactions between Europe and other parts of the world. Each arena comprised a range of actors from government, business, professional and citizens' groups who all contributed to the "hidden integration" of Europe. And because these arenas had productive overlaps historically, our four research areas will have productive collaborations in investigating them. We have chosen the following areas for our research:

I. Building Europe on Infrastructures

- II. Negotiating the European Knowledge Society;
- III. Designing Technology and the European Citizen-Consumer
- IV. The Making of Europe's Technology: Colonial and Transatlantic Perspectives

The first research area examines how Europe was shaped by transnational infrastructures—the material links between nation states and regions such as railroads, highways, energy, and communication networks. The second research area examines the ways in which formal and informal technical knowledge was generated, distributed, and transformed into material practices through large-scale European projects and international networks. The third explores consumption by investigating how European citizens, consumer groups, and various professionals creatively reworked material artefacts for specific local, regional or national contexts, and how these in turn became sources of experimentation, innovation, and learning. A fourth arena explores the making of Europe through colonial and Atlantic exchanges. Below, we discuss each research area.

Research Area I: Building Europe on Infrastructures

In *Peasants into Frenchmen* Eugen Weber showed how national transportation systems opened up the French countryside and integrated the rural population into the French nation. He concluded that railroads and roads cemented national unity and forged the profound sensibility of France, above all, its patriotic feelings (Weber 1976, 220). We explore a similar investigation of Europe. European society and identities have been embedded in transnational material infrastructures -- the wires, pipes, canals, cables, highways, railroads, and information networks that span political borders and connect nation states. Over the past century and a half, the building and use of transnational infrastructures created material and institutional links between European nation states, and the resulting circulation of goods, information, services, and people tied European nation states together in unexpected ways. This research area focuses on construction and use of these transnational infrastructures (for a first overview see Kaijser and Van der Vleuten 2004; see also Hugill 1993 and 1999 and Van der Laak 1999; Josephson 1995).

We define “infrastructures” as geographically expansive and materially coupled technical systems: that is, linked networks of artefacts, knowledge, people, organizations, and institutions. The railroad infrastructure, for instance, consisted of tracks, trains, railway companies, governmental agencies, railway engineers, and varied users of the railroads. Such infrastructures resemble what Thomas Hughes (1983) called large technical systems, but without strong central controls or articulated system

goals. Transnational infrastructures connect nation states, and researchers in this area are examining a diverse set of them. Many were actually built, such as highways, railroad systems, telecommunication and energy networks. Some were extensively discussed before building, such as the Channel Tunnel (Rogers 1998; Darian-Smith 1999). Certain influential projects were never built, such as the Atlantropa project to dam the Straits of Gibraltar (Gall 1998).

The boundaries and internal structure of Europe were shaped by emerging transnational infrastructures and the resulting flows of people, ideas, and artefacts -- long before Europe was an explicit political project. To study this process, our research starts deep in the second half of the nineteenth century. At this time, the building of transnational railroads and telegraph systems embodied mostly national interests. These infrastructures constituted crucial arenas in the competition for new markets and for military supremacy. Beginning around 1900 new transnational networks emerged in electricity, water and road transport, raising the pressing question of how to connect nation states. Several international conferences discussed numerous initiatives and plans. Smaller countries such as Belgium, The Netherlands, and Switzerland often took the lead. Switzerland, for example, connected its electricity network to neighbouring regions in Germany, France and Italy (Gugerli 1996). The construction of these infrastructures was often promoted as the material bearer of the integration of people. Already in the mid-nineteenth century French Minister Michel Chevalier (cited in Mattelart 1996: 103) declared “railways have more relations to the religious spirit than we think. Never has there existed an instrument of such power to link together scattered peoples.”

In World War I infrastructures turned out to be of decisive importance for another reason; they allowed for movements of troops and supplies. Shaken profoundly by the Great War, European politicians and intellectuals in the interwar period promoted dazzling, if mostly still-born, visions of a united Europe, such as Friedrich Nauman’s ‘Mitteleuropa’, Masaryk’s ‘New Europe’, Count Coundenhove-Kalergi’s ‘Paneuropa’ and Aristide. French premiers proposed a federal link between European nations (see overview in Bugge 1993; Passerini 1999). Again, engineers, politicians, and technological visionaries offered several transnational networks -- notably, highways, electricity networks, and radio broadcasting -- as promising carriers of the integration process.

Several plans for uniting Europe through infrastructure building captured the public imagination. These included plans for a European highway network (by engineers such as Puricelli, Kaftan, Lainé and Pigelet) and a pan-European electricity network fed by the hydropower sources of Norway, Switzerland, and Austria (Kaijser 1997). Other plans for electrifying Europe were developed by the Swiss engineer Ernst Schönholzer, the French engineer George Viel, and the German Oskar Oliven

(Fridland and Maier 1996). These plans were connected to proposals for political integration that inspired the work of the League of Nations, in particular their general conference on communication and transit. Electricity and highways figured prominently (based on PhD research in the League of Nations archive by Vincent Lagendijk [on electricity plans] and Frank Schippper [on highway plans]). From the 1920s onward the new totalitarian states also developed a number of initiatives. The Soviet Union, through its international arm, the Communist International (Comintern), built a radio network that Lenin called “a newspaper without paper or borders,” employing the world’s most powerful transmitter (1922) and broadcasting in many European languages. In the Second World War the Nazis built a trans-European radio network (Rundfunkbetreuungsstelle) to broadcast Hitler’s speeches. The Nazi version of a United Europe implied that Europe would accept German leadership and the construction of a *Grossraumwirtschaft* through *Grossraumtechnik*. (Mattelart 2000)

After the Second World War, newly emerging European institutions proposed a host of new initiatives for building truly transnational infrastructures. For example the United Nations Economic Committee for Europe (UNECE), created in 1947, identified the integration of European infrastructures as a promising means of organizing the rebuilding of Europe and creating a peaceful post-war Europe. The UNECE aimed at all-European networks, including Eastern European states, but these ambitions soon wilted under pressure from the emerging Cold War (Irwin 1991). In the Cold War decades, numerous transnational infrastructures -- among them rail, road, gas, electricity -- created two separate networks and reified the political divide. In the 1990s the unification of infrastructures, or in some cases their re-unification between West and East Europe, raised numerous practical questions about the scope and definition of Europe (for example Fleischer 2002).

Our long-term comparative perspective will allow us to analyse different infrastructures as well as the vicissitudes of their construction and use. Colleagues working in this area include historians specializing in transport (water, land and air), communication (telegraph, telephone, radio, television and internet) and energy networks (gas, electricity and oil). A long-term perspective is also particularly relevant because some of these infrastructures (for example the Channel Tunnel and Øresund bridge) were debated over many decades while others remained critical “missing links” (e.g. a second bridge over the Danube between Bulgarian and Romania). Our research will contrast an early period, in which nation states were emerging and creating a certain bias and commitment to infrastructure development, with a later period in which an explicit European project created new directions for infrastructure development. New “European” projects were rarely developed from

scratch. They were grounded in the existing infrastructures of the earlier phase, and their scope and definition were crucially dependent on these earlier infrastructures.

The area embraces the study of the construction of transnational infrastructures as a Europe-building practice and follow actors who are involved in the construction process—engineers, government officials, companies, and user organizations. This construction process includes the networks but also the standards and necessary regulations to make the networks work. The actors to be studied often imagined different infrastructures for a very different Europe. These differences might be revealed in preferences for specific connections, excluding certain regions, users, or nation states, or for a certain centre of the network (and not another). Researchers will analyse these differences and subsequent discussions, negotiations, and controversies. Our assumption is that transnational infrastructures, and the Europe that they helped shape, could have been constructed in many different ways. It does not suffice, however, to study the construction phase only. The implications of the infrastructures will crucially depend on how they were actually taken up by a range of users. The construction of Europe cannot be reduced to the politics of “imagined Europe” materialized in transnational infrastructures; the research will also take into account how a range of users appropriated them and for what purposes. Here, appropriation refers to the process in which users signify, reproduce, communicate, explore, and integrate these infrastructures in their lives. We will look at several user practices, including tourism and migration. Doing so will make visible how users create living communities of trading and travelling while building new identities, experiences and relationships across Europe.

Research Area II: Negotiating the European Knowledge Society

This research area focuses on the creation, transfer, standardization, and appropriation of technical knowledge within networks and projects operating within Europe. Among the networks we will study are professional associations of European traffic engineers, agricultural scientists, civil engineers, urban planners, and women scientists, as well as knowledge organizations such as universities and technical museums. A second focus will be explicit European projects such as the creation of EUROATOM, the development of a European airplane (Airbus) and the European Space efforts. Many of these large projects had “dual” origins and consequences, both military and civilian (for an overview see Trischler and Weinberger 2004).

Area II considers both formal and tacit forms of knowledge. Researchers will examine formal knowledge that circulates in standardization agreements and rules, in patents and licenses, in books, journals, manuals and other texts. Researchers will also explore the tacit knowledge deeply embedded

in artefacts and people, and thus include the issue of migration. The objective is to understand what it meant to “think European” in various technical fields and projects where individuals came together and were forced to *think about* these technological projects in new ways that defied national frames.

The networks and projects to be studied were important arenas for various international exchanges from the late 19th century onward. They harboured diverse visions of Europe, again long before the explicit postwar European project, and facilitated the flow of people and ideas across the continent (and indeed beyond). The creation, transfer, and appropriation of knowledge took place as these organizations and their members participated in international research, applied or practical projects, study tours, and numerous meetings (conferences, symposia, etc.). Special conferences associated with industrial exhibitions and world’s fairs typically gathered experts from across Europe. Since the mid-nineteenth and early twentieth centuries these activities were usually initiated as projects of national pride, yet they often also took place under the mantle of “internationalism” and fostered a sense of European awareness, if not identity.

In the interwar years but particularly after the Second World War, the networks and projects worked more explicitly on defining European standards or specific technologies or artefacts. For example, as roads linking European countries were built, traffic engineers addressed safety issues resulting from very different national rules, signs, and signals. Meteorology is another field where collaboration over borders contributed to the emergence of a European system for measurement and monitoring in weather forecasting (Edwards, ongoing research). Professional associations were frequently at the center of these standardization activities (electrical and electronic engineers for example debated European telephone, radio, television standards for decades) (Kammerer 2004). An important issue, hotly debated, has been the development of a European patent (Kranakis 2004). Gathering together from various parts of Europe, these engineers had to figure out how to integrate their systems, and develop European standards. An important issue to include in the study of the emergence of European standards, is the question of access and opportunity. Who were involved in building up European knowledge structures and who were excluded. This question will also be researched along several dimensions, gender, ethnicity, and class. For example, in the twentieth century, transnational associations of women engineers and scientists began to challenge issues of access to education, professional appointments, and the notion of gender neutral knowledge. How did these women influence European definitions and notions of scientific and technical standards and problem definitions?

Transnational projects like the West European civilian airplanes Airbus (Thorton 1995; Bugos 1993) and Concorde (Owen 1982); military projects Tornado and Eurofighter; space exploration (e.g. the

European Space Research Organization, ESRO) (MacDougall 1985; Krige, Russo and Sebesta 2000) and the European agency for nuclear power, EURATOM also exemplified the technological foundations of the making of Europe but also had enormous symbolic value (Weileman 1983). The Soviet Bloc had its own projects during the Cold War, including Sputnik (1957-), a spectacular example of identity building within communist Eastern Europe (Bulkeley 2000). The Soviets also built several long-distance Tupalev aircraft that were to answer the European Airbus and American Boeing . Within their respective spheres these projects created new expertise and served as educational platforms on an international level, stimulating the creation of transnational networks of scientists, engineers, officers, industrialists, and politicians (albeit in two zones), all of whom have been responsible for the circulation of knowledge and skills needed to carry them out.

While historians have studied such these networks at the national level, we are aware of no effort to examine in depth the transnational features of these technical knowledge networks (in diverse disciplinary fields and across varied regions of Europe) and to appraise their influence on European integration.

European knowledge networks and projects were heavily shattered by the catastrophes of the twentieth century: two World Wars and the Cold War. Their very constituent parts were divided as the new map of Europe was drawn. Yet these dramatic ruptures also led key leaders from across the continent to come together in efforts to cooperate in rebuilding a European knowledge society, and also forced them to articulate their thinking about what constituted a European knowledge base.

After the First World War more than a dozen new “successor” states came into being. Poles now represented Polish institutions, not Russian, German, or Austrian, and they had to position themselves again on the European map. Also the migration of thousands of Jews and others who were forced to flee Nazi Germany profoundly reshuffled the European technical knowledge infrastructure in the 1930s. For one, these émigré scientists and engineers brought their knowledge to the receiving states, including the US, where they reconstituted their networks and applied their knowledge to large, prestigious, and historically critical military and civilian projects. The Second World War dealt another blow to many international knowledge networks, but others were formed as scientists, engineers, and other technical specialists from all over Europe came together, within the rival blocs, for the war effort. Even famed British code-breakers needed collaborators from various European states, both Allies and enemy defectors.

After World War II, “intellectual reparations” contributed to the circulation of knowledge as some 5000 scientists and engineers along with thousands of scientific and technical documents, including patents, were “removed” from Germany and sent mainly to the Soviet Union, Britain, and the U.S (Gimbel 1990; Judt and Ciesla 1996; Mick 2000). European knowledge networks suffered another kind of split after the war, as Western and Eastern Europe were divided and the ensuing Cold War prevented substantial exchange. “Internationalism” in science, and all technical fields that desired its prestige, merged with an explicit set of projects designed to build a new Europe—or, in reality, two new Europes—led by NATO in the West and the Warsaw Pact under Moscow in the East. Both the West (through the various European organizations aiming at integration, such as the Europe Economic Community) and the East (through the COMECON/CMEA) introduced massive reform and investment in their educational and research infrastructures. In explicit attempts to coordinate knowledge production in their respective regions, they developed separate sets of knowledge networks and exchanges. Yet the Iron Curtain was not impermeable. Certain surviving pan-European knowledge networks were able to maintain limited contact across it. At the height of the Cold War there were Czech technicians in Britain, repairing textile machines and training British maintenance people (Freeze 2004); Western agronomists aiding Hungary’s agricultural development (Varga, ongoing research) ; Soviet computer experts adopting outdated Western military computer systems to the challenges of central planning (Gerovitch, ongoing research); polymer engineers from Czechoslovakia training licensees in the West how to manufacture soft contact lenses. During the entire century, albeit slowed by the limits of the Iron Curtain, biochemists in several Western and Eastern countries collaborated in developing processes of continuous fermentation, critical to the modern food and pharmaceutical industries (Strbanova, 2004). Indeed, many Eastern European scientists felt they “experienced Europe” through their participation in these networks.

Research Area III: Designing Technology and the European Citizen-Consumer

Although consumer and design culture literature is abundant, historians have given surprisingly little attention to European consumption beyond the separate national histories or the generalized narratives of the Anglo-Saxon experience (Carter 1997; Siegrist et al. 1997; Koenig 2000). Recent historiography shows that the Americanisation of Western Europe was a hotly contested project, with historically contingent characteristics (mass consumption, mass production, systematic management, corporate structure, antitrust policy), that needs further detailed exploration (Pells 1997; Strasser, McGovern, Judt 1998; Herrigel and Zeitlin 2000). Emerging research also shows the need to investigate the complexities of production and consumption in Eastern Europe and the Soviet Union (Reid 2000, Zachmann 2002). These twin literatures suggest a larger conceptual point: technological

development cannot be understood in terms of easy transfer and diffusion of production models where users passively await to adopt ideas and products. Rather, technological innovation is a process of ongoing negotiation, reworking, and cross-fertilization of ideas and practice between designers and users or producers and users (Cowan 1987; Oudshoorn and Pinch 2004).

With this in mind, researchers will focus on the way non-expert, professional, and corporate users in Europe have creatively reworked technology to fit local uses, sometimes defying, at other times firming up, Europe's national and regional boundaries. Long before there was a European Community and even before multinational corporations tried to abolish national boundaries for their products, a host of women's, labour, consumer, and engineering organizations created transatlantic and European networks of voluntary and professional associations (Furlough and Strikwerda 1999). Inspired by their American counterparts, European consumer leagues and cooperatives actively engaged in the politics and ideology of consumption, accumulating knowledge and expertise, building networks, and launching legislative campaigns. They helped rehearse the widespread use and acceptance of a large number of commodities decades before the "consumer age" of the 1960s.

Spokespersons of many intermediary and non-governmental organizations articulated and negotiated the design of novel products such as cars, kitchens, snacks, radios, televisions, and houses, creating positive sources of experimentation, innovation, and learning. The move towards standardization and internationalisation also reinforced distinct national identities. Nation states, for example, pursued different tax and consumer credit regimes to firm up national boundaries. Even multinational firms, who had a vested interest in one European common market, were also in the business of building national experiences into their products. They helped industrialize 'authentic' experiences, national identities, and sometimes even distinct European responses.

New transportation and refrigeration technologies in an increasingly European market made both food and tourism available to more people, profoundly rearranging spatial arrangements between the city and the countryside as well as distinctions between industrial and artisanal food. Nevertheless, or because of these profound changes, Europeans felt an urgent need for authentic experiences and *colour locale* that were possible only because of innovations in food processing and transportation in an increasingly integrated European market: Swiss cheese, Parma ham, or the Tour d'Eifel transformed into national anchor points for what were essentially transnational European practices.

After the Second World War, European consumption became a source of tension between East and West, creating regional differences on the continent in which states were actively engaged. In

political and institutional terms the Marshall Plan provided an important technical framework in the circulation of people and knowledge throughout Western Europe during the 1950s. Yet European expert groups, building societies, business associations, and consumer organizations frequently resisted the American economic and cultural diplomacy. The building of the Berlin Wall in 1961 completed the isolation of Soviet Bloc consumers from the burgeoning consumption in the West; consumer politics under Moscow developed in another direction altogether. By the 1980s, considerable differences in consumption levels had emerged within the Soviet Bloc, not to mention the communist countries adjacent to it, Albania and Yugoslavia.

In short, a European consumer regime emerged on different and often overlapping levels: European, sometimes even pan-European, national, and regional. Researchers will examine each of these levels.

Transatlantic and European Consumer Networks and Regimes

Moving beyond the nation state, researchers will focus first on the role of non-governmental consumer organisations in the making of Europe. International consumer and user-oriented organizations created transnational, at times pan-European regimes of consumption, contributing, again, to a “hidden integration” of Europe long before the formal initiatives of the 1950s.

Our research into late nineteenth and early twentieth-century women’s associations, consumer groups, labour organizations, cooperatives, housing associations, and home economic professionals will reveal how professional and non-expert users shaped new technologies by contesting them or appropriating them into daily routines. Our preliminary results are quite suggestive. For example, such organizations as the French Ligue Social d'Acheteurs (1902), the German Kaufersbund Deutschland and Reichsverband der Hausfrauenvereine (1915), the Dutch Vereniging voor Huisvrouwen (1912) and Instituut voor Huishoudelijk Advies (1927) helped organize women and workers into social activists, responsible citizens, and critical consumers of new technologies such as electricity, gas, industrially processed food, and even housing. Several women’s electrical associations in the 1930s sought to carve out career opportunities for women in this new technological domain.

National and international standardization committees became active during the interbellum period, sometimes allied with these already existing consumer organisations. Together they actively participated in standardization movements, testing institutions, and alternative designs, and they supervised the production of consumer goods by exchanging information about product designs and testing protocols. Under governmental auspices and driven by engineering professionals, these

standardization committees sought to mediate fierce business competition, government safety concerns, and consumer pressures for labour standards, fair pricing and user-friendly designs of products. During the 1960s the International Organisation of Consumer Unions and the Bureau Européen des Unions des Consommateurs took up the European cause. Researchers intend to examine how these organizations differed in their various national contexts; what international exchange took place during the interwar period; and finally, how nation states, Marshall Aid policies, and multinational corporations sought to incorporate these groups during the cold-war period, turning citizens into consumers. Finally, we examine how a European consumer regime has come into being.

Designing National Consumers

The push towards standardization was always contested. Debates on the standardization of products and life itself fuelled a well-articulated resistance in Western Europe against the emerging mass-consumer society widely associated with the United States. When popular unrest and political instability threatened the very fabric of the economy, governments recognized consumer concerns as a legitimate concern for state action, for the first time during the 1930s. Nazi-Germany encouraged standards in occupied countries as part of its expansionist ambitions, and later, the Soviet Union sought alternative standards as a strategic weapon against the West. While focusing on international networks, social movements, and collaborative efforts, colleagues will also examine the juxtaposition of national identities and international infrastructures in the making of European consumer goods and consumers.

Food and tourism offer a particularly clear window through which to examine the construction of European and national identities in response to the process of international exchange. The image of fast food as the conduit of Americanization generated specific responses in various European countries, such as the promoting of non-industrial food, and even a veritable ‘slow’ food movement. Recently, José Bové’s campaign in France against McDonald’s, for example, evoked the return to local, ‘natural’, authentic French food. It was a campaign that had roots in the 1940s when winery owners, fruit-juice and mineral water manufactures, and the Communist Party joined to protest the building of a Coca-Cola plant in Marseilles.

The lens of technological systems reveals intriguing questions through which to consider a different, integrated Europe. For instance, Silvio Berlusconi’s insistence on the Italian-ness of the Parma ham is problematic if we consider that Dutch pigs shipped daily across various European borders provide the raw materials for this Italian delicacy. At which point in the technologically linked

infrastructures—from agriculture to market—does a Dutch pig become naturalized into, certified as, and consumed as an Italian Parma Ham? When may the Italian Ministry of Agriculture issue an “authenticity” label to Italian restaurants outside of Italy? Preliminary research into the contested and naturalized histories of cows, milk, cheese, bananas, and chickens shows how intertwined the manufacturing of products and identities are. Similarly, ‘authentic’ experiences of vacation spots like the Cote d’Azur and the Black Sea or tourist cruises on the Rhine and Danube rivers have been technological mediated since the late nineteenth century. From the 1930s onwards standardized travel and lodging infrastructures—such as trains, roads, cars, and hotels, the preservation and packaging of nature and landscapes such as the Deutsche Alpenstrasse, and the framing of such technological triumphs as the Eiffel tower as must sees—all helped manufacture ‘true’ European experiences. Researchers will analyze the ways the production of national foods and tourist experiences serve as important vehicles of national identity, authenticity, and exoticism, by looking at their technological trajectories and more complicated stories of border crossings.

Consumption in a Divided Europe

In the twentieth century, not only international and national institutions shaped Europe. Regional tensions did as well. The infamous Nixon-Khrushchev kitchen debate brought the issue of regional differences on the world stage in stark ideological terms. The underlying material practices and European responses show a vastly different reality, however. Eastern, Central, and South-Eastern Europe under communism and Western Europe during times of wars and depression provide excellent opportunities for examining issues of creative response to shortage in which technological developments played a role. Because of systemic shortages, individual consumers, professional users, and government agencies creatively ‘re-designed’ machines and artefacts for other than their original uses. For example ‘housewives’ (non-identities in the former Soviet Bloc, where every citizen was supposed to have a job or would be considered a parasite, but “heroines” during in Nazi Germany, where every woman was suppose to make babies or be considered an enemy) had to learn the art of substituting ingredients, recycling, and reuse. Professional users, too, developed novel innovation strategies when faced with poor distribution and shortages. The elaborate system for substitution and recycling--and the technologies developed to support them—is the final focus of this research area.

Research Area IV: The Making of Europe’s Technology: Colonial and Transatlantic Perspectives

Europe’s economic, political, and technological developments across the twentieth century were

inseparable from global transfers and exchanges. Indeed, much of what we think of as innately ‘European’ was to varying degrees made in, or shaped by, the world beyond Europe. Britain’s industrial revolution of the 18th and 19th centuries was initially fuelled by the profits and technological incentives of the Atlantic slave trade, overseas plantation economies, and the exploitation of India. Likewise, the emergence of powerful chemical and pharmaceutical industries in Germany, France, and Britain in the mid-19th century depended on materials and expertise gleaned from South Asia and the Americas. Attempts to use technologies to bridge massive distances, furthermore, were never confined to Europe alone; the Suez canal (1869) exemplifies an imperial technological project with far-reaching ramifications – economic, political, and even cultural – for the European continent itself. Numerous late nineteenth century technological developments simultaneously affected communication, transport, surveillance, urban planning, and public health, and provided European states with the “tools of empire” so fundamental to further territorial acquisition, most notably in Africa (Headrick, 1981, 1988; Arnold 1993, 2000). Surprisingly, however, few historians of technology and empire have examined the ways in which this dialectical exchange continued into the twentieth century (Rabinow 1995; Tyabji 1995; Storey 1997; Redfield 2000). Researchers will document the role of extra-European peoples, places, and technologies in constituting twentieth-century European political and cultural processes.

Europe has long looked overseas for opportunities for technological development that were not possible to achieve within Europe itself. In fact, officials and financiers often justified their late nineteenth century drive to colonise on the grounds that the tropical territories, unlike temperate Europe, remained in a ‘backward’ state and needed to be modernized (Adas, 1989; Livingstone, 1999; Drayton, 2000). A vast technological enterprise thus took form. Colonies and their successor states in Africa, Asia and the Caribbean provided career opportunities for engineers, agronomists, doctors and technicians (including well-qualified women and men of lesser means); they also offered new sites for technological experimentation. In this way, many technological experts, on their return to Europe, shared the benefits of their overseas experience with professional associations and incorporated new insights into their scientific and technical publications, helping to transform simultaneously both their disciplines and experts’ perceptions of colonial territories themselves (Livingstone, 1993; Cooper and Packard, 1997). Although historians increasingly acknowledge that colonies and ex-colonies often proved “safe” testing grounds for politically charged scientific and technological projects, such as controversial nuclear detonations or reproductive technologies, they rarely explore the longer-standing conceptual and technological exchanges that provided the foundations for such experiments. It is the purpose of this research area to do just that, enabling scholars to understand the continuities and

disjunctions between technological trials that took place within Europe and those that occurred in its empires. After all, Europe too had its own peripheries in which debates about ‘backwardness’, development, and ‘modernisation’ played equally important roles. Documenting how these trends dovetailed and diverged will reveal a great deal about the kinds of technological interventions considered appropriate for European versus colonial lands.

The story of technological transfer and economic development in 20th century European empires is to a great extent one of mixed results and failures, even if evaluated only on the grounds of actors’ stated goals. In fact, critiques of ‘underdevelopment’ and large-scale technological disasters frequently served as a rallying cry in burgeoning anti-colonial movements and set the stage for decolonisation in the middle of the century (Bonneuil, 2000). Yet, paradoxically, even ‘failed’ colonial ventures occasionally generated novel conceptual and technical approaches, which sometimes found their way back to Europe as ‘alternative’ models in the realms of agriculture, disease control, energy generation, urban planning, and even engineering (Arnold, 1996; Chambers and Gillespie, 2000). These historical patterns are still not well understood and deserve much closer scrutiny. Among other things, scholars working in this area will explore the extent to which European imperial powers experienced these development failures in similar ways. Such a comparative approach will likely identify significant national differences that could shed light on broader trends relating to technological expertise, economic strength (or weakness), and the factors that played a role in decolonisation.

No project could adequately address the history of colonialism, development, and decolonisation without attending to the rise of the United States and the USSR as world powers in the 20th century. This emphasis forces attention to transatlantic exchanges and rivalries as well as to intra-European patterns of territorial and imperial expansion. Following World War II, Soviet Russia, long an imperial power in the East, established its own “colonies” in East and Central Europe, parts of which had only recently (as late as 1918) achieved independence from Ottoman, Russian, Prussian, or Habsburg colonizers. By including experts on Central and East European history alongside experts on the history of European territories in Asia and Africa, this research area investigate their respective experiences of technical planning and industrialization. (Bailes 1978; Scanlan, 1992) We will also consider the technological impact of two competing economic philosophies – capitalism and communism – and their effects on practices in the colonial (and later, newly independent) world. (Stokes, 2000, Graham, 1998)

Situating the history of Europe in this wider context has a number of benefits. First, it focuses attention on the complex ways in which national and imperial processes have historically constituted one

another. By making visible the legal, economic, material, and technological connections to other regions, this researchers will place in sharp relief those patterns that can legitimately be considered unique to Europe. Second, it encourages scholars to pay closer attention to the role of technology in identity formation and the function of empires in these patterns. The 20th century witnessed atrocities in the name of ‘race’ unparalleled in human history. It also saw the gradual decline of racial science as a respectable pursuit (Barkan, 1992). While considerable work has been done on this history within Europe and in several colonial contexts, separately, few studies have explored the ways in which these developments were inter-related. Researchers will continue to remind European historians of the fundamental scientific and political instability of the categories ‘European’, ‘Caucasian’, and ‘white’. These instabilities generate tensions that challenge European integration.

Finally, our approach highlights the increasing vulnerabilities many Europeans experienced in the face of U.S. and Soviet hegemony. As Europe’s own empires crumbled and as the Cold War introduced a whole new set of geopolitical variables, the fear grew that Europe itself might become a colonial outpost. England responded by embracing the “white heat” of high technology as an alternative source of national pride and identity, while France adopted an aggressive nuclear program and strived for independence in military technology (Bud & Gummett 1999; Hecht 1998). As historians of the Cold War have reminded us, technological supremacy was at the root of these rivalries. Factoring empires into the equation and examining the role they played in the wider fortunes of European states will be a significant contribution for scholars who wish to understand the forces that have gone into giving Europe both a coherent and a fractured identity.

4. Goals

The key targets of the proposed research program can be defined as follows:

- To coordinate a group of historians of technology and their institutions across Europe that will integrate their research capacities, orient their new research, and coordinate their fundraising efforts (submission to national research councils, foundations etc.) on topics defined in this program proposal. The program will build upon the ESF network, *Tensions of Europe*, solidly established over the past four years.
- To create a workshop and conference program for exchanging and communicating research results. If funding is available, researchers in these areas will organize workshops; ideally, they will organize crosscutting workshops to explore specific themes that are present in two or more research arenas. At this time, one plenary conference, scheduled for Finland in 2006, will be

organized to bring together the entire Program. The workshop and conference program will be supported by a web-based communication platform, including data exchange, a newsletter, research papers, and commentaries.

- To develop a training program for Ph.D. students and an exchange program for participating researchers.
- To publish a five-volume book series. These will be books firmly based in research, but written for a wider audience. Four books will incorporate research results from the four research areas and a fifth, synthetic volume will examine crosscutting themes developed over the years;
- To publish a series of scientific articles, monographs and working papers published on the website on various aspects discussed within the proposed research program. These publications will result from the coordinated national research projects of involved researchers.

5. Available facilities and expertise

This proposed agenda builds on the ESF scientific network *Tensions of Europe: Technology and the Making of Twentieth Century Europe* (2000-2003). This ESF network succeeded in bringing together, for the first time, scholars from over 20 countries interested in looking at the role of technology in the making of Europe. New institutional connections have been firmly established with Southern Europe (Portugal, Spain, Italy, Greece). Also, from the start, close ties have been developed with a number of US scholars, who were funded through the US National Science Foundation; they contributed to the Program development and participated in the various workshops. In this Network over 150 scholars have exchanged ideas in approximately 21 thematic and 5 integrative workshops. Co-funding for workshops has been awarded at the national level. (For more information we refer to the Network Final Report submitted to ESF and available on www.histech.nl/tensions). By appointing a special coordinator for Central and Eastern Europe (Karen Freeze) and organizing a final plenary conference in Budapest, March 18-20, 2004, the Network initiated important collaboration with scholars from several Central and Eastern European countries. Through our present network we expect to develop more contacts and bring in even more people in the coming years. The network has been an open community and the proposed program would also have this same quality.

The ESF network has been important in helping members to orient their research on how the history of the construction of Europe and the history of technology have been intimately connected. Network scholars have discussed and explored the common conceptual framework developed in this proposal

through a series of meetings, in particular Stockholm 2003, Amsterdam 2002, Paris 2003, and Budapest 2004.

After the Budapest conference, scholars involved in Tensions of Europe were invited to submit letters of intent profiling their research interests. They responded to a first draft of this agenda that contained the four research areas identified here. Of the 99 letters received, many came from individual researchers; however, 28 institutions and small groups of researchers (3-4 people) submitted sets of projects to become integrated in this proposed research agenda.

6. In the summer of 2004 a **Transition Committee** was formed to discuss this agenda and make recommendations as to the next steps. A small Working Group has been analyzing the Letters of Interests and is preparing a Report for the Transition Committee, which will meet in April 2005. The current members of the Transition Committee are:

Andersen	Håkon With	NO	Norwegian University of Science and Technology
Bogaard, van den	Adrienne	NL	TU Delft
Bosch	Mineke	NL	University Maastricht
Bruhèze de la	Adri Albert	NL	University of Twente
Bud	Robert	UK	The Science Museun
Diogo	Maria Paula	PT	Universidade nova de Lisboa
Freeze	Karen J.	USA	University of Washington
Germuska	Pal	HU	Institute for the History of the 1956 Revolution
Gugerli	David	CH	Swiss Federal Institute of Technology, Zürich
Hall	Karl	HU	Central European University
Hård	Mikael	DE	TU Darmstadt
Hecht	Gabrielle	USA	University of Michigan
Heide	Lars	DK	Copenhagen Business School
Jajesniak-Quast	Dagmara	DE	Europa-Universität Germany
Kaijser	Arne	SE	Royal Institute of Technology Sweden
Kaufmann	Stefan	CH	ETH (Swiss Federal Institute of Technology) Zürich
Kipping	Matthias	SP	Universitat Pompeu Fabra
Krige	John	USA	Georgia Institute of Technology
Maat	Harro	NL	Wageningen University
Mali	Franc	SI	University of Ljubljana
Michelsen	Karl-Erik	FI	South Karelian Institute

Misa	Tom	USA	Illinois Institute of Technology
Mom	Gijs	NL	Eindhoven University of Technology
Oldenziel	Ruth	NL	Eindhoven University of Technology/ University of Amsterdam
Parusheva	Dobrinka	BG	Bulgarian Academy of Sciences
Rentetzi	Maria	GR	Technical University Athens
Schot	Johan	NL	Eindhoven University of Technology
Scranton	Phil	USA	Rutgers University
Sebasta	Lorenza	IT	University of Bologna
Štrbáňová	Soňa	CZ	Czech Academy of Sciences
Tchalakov	Ivan	BG	Bulgarian Academy of Sciences
Trischler	Helmuth	DE	Deutsches Museum
Tympas	Aristotle	GR	National and Kapodistrian University of Athens
Vámos	Éva	HU	Hungarian Museum for Science and Technology
Vleuten, van der	Eric	NL	Eindhoven University of Technology
Zachmann	Karin	DE	Munich Center for the History of Science and Technology

7. European added value

For several reasons *Inventing Europe* is by its very nature the kind of program that can be accomplished only through international collaboration and, preferably, European funding. First, the questions addressed need to be answered in a pan-European research environment. This will bring the necessary variety of perspectives, language capabilities, experiences and empirical research to bear. Second, no other funding mechanisms exist for this kind of program in the humanities. The planned intensive cooperation, networking and communication will lead to a deep and rich contact among participating institutes, and will create a cohort of young scholars (including PhD candidates and post-docs) networked all over Europe, including the north, the west, the east and the south.

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