

The Nationalization of Scientific Knowledge in the Habsburg Empire, 1848–1918

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The Nationalization of Scientific Knowledge in Nineteenth-Century Central Europe: An Introduction

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Interlinked at first by politics and the common use of the German language for scientific and scholarly communication, Central Europe became in the nineteenth century the site of a scientific system in which a free flow of ideas and to a certain degree of people enabled scientific relations to flourish. This Central European 'republic of letters' began to break apart in the second half of the century, as national disparities and nationalistic politics displaced allegiance to a common scientific community. The shift away from German as the symbolic language of imperial power, the adoption of national languages and the corresponding pressure towards single-language nationhood proved decisive in the end. This nationalization process was highly complex and contradictory.¹ Whether to remain affiliated with German-speaking '*Kultur*', to create national sciences, to internationalize science beyond the German-speaking realm, or to do all of these things, was a lively topic of discussion throughout the post-1848 period. This volume examines interactions between emerging national cultures and cultural institutions, on the one hand, and cultures of science and scholarship, on the other hand, in this region. We ask two questions: how did the nationalization of the sciences work in this region during this period; and did this highly complex political, social and cultural process inevitably lead to a corruption of scientific objectivity, or rather to a transformation of the very definition of science and scholarship?

The volume extends recent discussions of epistemic cultures in the history of science to political entities and inquires into the role of politics in the production and circulation of scientific and scholarly knowledge. By doing so, the authors also hope to contribute to the general historical discussion of nation-building and the emergence of national and nationalistic cultures in nineteenth- and early twentieth-century (Eastern) Central Europe. The specific examples studied range from geology, seismology, physics and chemistry to eugenics and anatomy; humanistic disciplines such as

philosophy, legal theory, language studies and ethnology are also discussed. The volume thus takes seriously the unified ideal of science and scholarship (*Wissenschaft*) shared by the actors themselves and questions stereotyped oppositions between supposedly objective (though corruptible) natural sciences and humanistic fields thought to be inherently nationalistic. The geographical focus on the late Habsburg Monarchy – which in this period was often explicitly described as a multi-ethnic empire (*Vielvölkerreich*) – makes possible the analysis of the emergence of nation and language as cultural values in the natural sciences as well as the humanities in a clearly delimited historical setting. Questions about scientific processes are intertwined here with political tensions, creating a situation in which scientific problems became political, with obvious implications for an understanding of historical as well as current politics and culture in this volatile region.

Nation-building and nationalism in the nineteenth century

The concepts of nation and nationalism have undergone many definitions and redefinitions since the classical works of Gellner, Hobsbawm and Anderson.² Though these works take different approaches, they share a critique of earlier work that had taken existing nation-states as givens and emphasized the cultural construction of entities called nations, each of which developed what Hobsbawm called 'invented traditions' in the course of modernization and industrialization. In such analyses the nation or national idea becomes central to identity formation in an era of secularization,³ a marker of collective security and ideological stability in times of rapid social, economic and cultural change.⁴ Yet at the same time these analyses make clear that nationalism was not only an outcome of this process, but itself a driving force and shaper of change.

Research on nation-formation and nationalism has moved in a number of directions during the past three decades. Without pretending to provide a complete survey, we focus here on four trends that have implications for the topic of this volume: sociocultural differentiation, regional and borderland perspectives, the 'centre-periphery' approach, and post-colonial perspectives.

In the first place, scholars have begun to ask how the idea of the nation as 'imagined community' was appropriated and enacted on different social levels, from elites to the common people. In the course of history the adjective 'national' has been applied to most spheres of human activity and cultural production, replacing local and regional foci through concentration on ethno-linguistically defined areas and spaces.⁵ The process of enlarging or even creating national spaces, and thus imposing and rewriting identities, has proved to be more complex than the still widespread narratives representing nations as perennial and natural entities may suggest. Nationalization has been shown to be not a linear process, but a dialectical

negotiation between elite and popular discourses, each of which is multifaceted and conflict-rich.⁶ These interactions of imposed and negotiated identities have themselves undergone constant change. Polish nationalists, for example, aimed for a time to achieve unity within the geography of the ancient Commonwealth, which had been multicultural and multilingual. Once this project came to be seen as a failure – not only due to competing nationalisms but also due to a rethinking of the importance of language for national identity – the argumentation changed and became more exclusive.⁷ One new focus of historical nationalism studies is thus on the interrelations of national and nationalist identity politics on different social levels and their effects.⁸

Regional studies have proved to be an effective way of opening up these complexities.⁹ The role of conflicting nationalist discourses has been analysed in the south Bohemian town of Budweis (now České Budějovice).¹⁰ In the case of children's education in Bohemia, Tara Zahra has shown how nationalized popular education systems replaced traditional bi- and multilingualism with monolingualism.¹¹ The process of 'making into' (e.g. Budweisers into Czechs) involves not only the assertion and passive acceptance of communities of belief, but also persuading or compelling people to accept one or the other nationalist discourse and thus to abandon their respective regional or mixed identities – a process that did not happen without conflicts, resistance or even failure for the nationalists.¹² Conflicts among ethnic groups in a common territory or region could open spaces for the preservation of non-national groups and even for the creation of new groupings.¹³

For such studies the issue of boundary regions has grown in importance. As 'privileged sites for articulation of national distinction',¹⁴ frontiers offer the possibility of observing the creation of symbolic boundaries, persistent conflicts, cultural hybrids or interrelations between empire-formation and nationalism. Interesting in this respect is the collapse of the Habsburg Empire, the central government of which underestimated and later failed to control the centrifugal forces of nationalist movements.¹⁵ The borderland idea can have multiple connotations, of course. The Polish term for the eastern borderlands of the Interwar Polish state, *Kresy*,¹⁶ denotes not only the relation of these territories to the earlier Commonwealth as a mythologized, paradisiacal space, but also the border between civilization and barbarism; '*Kres*' literally means 'the end'.¹⁶

Thus, in recent years the nearly exclusive primacy of power politics that had once governed discussion of this topic has been decentred, if not displaced, by social and, more recently, cultural perspectives. The move to cultural approaches is eminently justifiable, given that the idea and ideal of a *Kulturnation* (cultural nation) has a history of its own, which in the eyes of the Habsburg Monarchy conflicted with that of the *Staatsnation* (nation-state), meaning in this case the idea of 'Austria' as coterminous with the

lands ruled by the Kaiser, but in many respects was also formative for other *Staatsnationen* (nation-states); in this case Germany and Hungary as well as the Eastern European nation-states after 1918) throughout the region.¹⁷ Of course, the centrality of language is obvious here, and this was emphasized by the actors at the time. It is not accidental that the Slavic vernaculars were codified during this period. However, a cultural perspective also requires focus on institutions – schools, universities, academies of arts and sciences, professional or other associations, and the media – which were sites of national (or nationalistic) cultural creation as well as cultural conflict. Seen in this light, the previously predominant role of the overseas colonial powers in the discussion of nationalism also becomes increasingly complicated, as it becomes clear that France and Germany (and, we might add, Italy) also found themselves enmeshed in processes of internal nationalization during this period, and that even the supposedly single-ethnic nation-states of the twentieth century always incorporated ethnic minorities.¹⁸

A third direction of research has focused on the issue of ‘centre–periphery’ relations. Originating in world-system theory, which referred to political-economic power relations and social structures, this conception worked at first from a simple dichotomy of development versus underdevelopment, with ‘development’ limited only to the supposed ‘centre’; at the same time, such dualisms were modified to some extent by pointing to the local dominance of creole elites in the capital cities and provincial capitals of the supposed ‘periphery’.¹⁹ While this model can be justly criticized for being (West) Eurocentric,²⁰ its development from a ‘generalizing’ to a ‘relativizing’ project²¹ shows productive potential. The so-called periphery is no longer seen merely as a region of exploitation, but also as a space with a structure of its own, in interplay with other regions as well as with the ‘centre’. One might agree with the Gallician-born Jewish writer Joseph Roth – albeit without adopting his nostalgic tone – that ‘The essence of Austria [meaning: the Habsburg Empire] is the periphery’.²² Consistent with the emphasis on bottom-up rather than top-down political perspectives, and thus on the role of regions and borderlands, just described, the ‘centre–periphery’ idea has also been modified in studies of the Habsburg Monarchy. Alongside the long established opposition of Vienna and also Budapest as imperial centres and the other imperial territories, attention has turned to ‘centres’ within the alleged ‘periphery’ – for example, regions within Bohemia, Bohemia versus Moravia, or Galicia as a multi-ethnic entity unto itself – as well as migration issues.²³

Originally the ‘centre–periphery’ dichotomy applied mainly to colonial empires and to the successor states of former colonies in relation to their European metropolises. The political situation of Central Europe does not correspond to such a classical colonial setting, but recent research has suggested that models from post-colonial studies might be applied to cultural processes in the region. Ursula Prutsch, for example, calls

the Habsburg Empire ‘soft colonial’ and emphasizes its declining influence in the nineteenth century vis-à-vis territorial overseas empires.²⁴ Combining a post-colonial perspective with the regional focus described above, Robert Donia speaks of Bosnia-Herzegovina as a Habsburg ‘proximate colony’.²⁵ Hans-Christian Maner traces the annexation of Galicia to a colonialist project hidden behind a discourse of cultural transfer and civilizing mission,²⁶ and Philipp Ther proposes a transnational approach to the creation of a German ‘continental empire’.²⁷ The many differences between overseas colonial empires and (East-)Central Europe – including the lack of racial codification (excepting that of the Jews, then widely identified as a ‘race’), the multi-centric rather than exclusively metropolitan administration of the Habsburg Monarchy, and increasing national autonomy within this multi-centric framework – have been cited in support of the rejection of the relevance of post-colonial theory for this region.²⁸ However, the continued use of German as a common language of administration, at least in ‘Gislethania’ after the establishment of the Dual Monarchy in 1867, and the prominence of colonialist discourse in varied forms even in an empire without overseas colonies might suggest a different view. From a wider European perspective, the view of respective ‘others’ by national elites appears to have differed largely according to a geographical codification: while the ‘West’, following imperialist discourse, was perceived as a place of culture and especially of civilization, the ‘East’ was represented as a space of barbarism and chaos.²⁹ Central Europe, on the other hand, was presented as a transmitter of ideas or as a bulwark defending Western civilization from barbarism.³⁰ As some of the chapters in this volume will show, the idea of a ‘civilizing mission’ of the German-speaking centre in Vienna for the rest of the empire was clearly important for the organization of scientific work (see below).

Such post-colonial perspectives can be applied at the regional level also. Though it was long contested, the idea that Central Europe was influenced by regimes with (partially) colonial characteristics has been taken up especially by Polish historians,³¹ and has recently been introduced also to analyse the specific features of cultural productivity under imperial circumstances, and partially extended into the Soviet period.³² This has brought with it a re-evaluation of the dual role of Poland as ‘colonized and colonizer’,³³ not only in the time of statehood and the Polish-Lithuanian Commonwealth, but also in the period of the partitioned state, during which an assumption of cultural hegemony guided a Polish ‘civilizing mission’ against Ruthenians or Lithuanians. The process of ‘othering’ stabilized not only imperial but also local identities, among them national ones, separating Germans from Slavs or Poles from Ruthenians.³⁴ Studies of self-identification as colonized peoples can be placed in this context, ranging from Ludwik Powidaj’s ‘subaltern’ comparisons of Poles and Indians in 1864³⁵ to Slovak literature of the interwar period.³⁶

The idea of 'micro-colonialisms'³⁷ suggests that imperial and nationalistic 'nation-building' strategies in the nineteenth century were not opposed, but may have been interdependent, both on the discursive level and in *Realpolitik*. Examples of such interdependence are the use of images from imperial projects like the *Kronprinzenwerk* (a vast compilation of physiognomies, clothing styles and customs of the empire's ethnic groups initiated by Crown Prince Rudolph and published in eighteen volumes from 1884 to 1902) in nationalist discourse,³⁸ or the intentional undermining of Habsburg imperial history via the delimitation of a national and an imperial past by national scholars.³⁹ The 'colonial gaze' includes, for example, processes of orientalization,⁴⁰ inscriptions of cultural hegemony or translations of racial concepts into ethnic⁴¹ or linguistic⁴² ones. As is well known, Jews were regarded as an internal 'other' from the beginning of the nation-building project, even – perhaps especially – after they were granted citizenship rights in Cisleithania in 1867, and despite – or perhaps because of – the fact that Jewish intellectuals inscribed themselves into the process of nationalization through cultural assimilation.⁴³

It is not our purpose to choose among, let alone to verify or falsify any of, these recent research trends. Rather, we seek here to explore the varied roles of the sciences as cultural enterprises in processes of nationalization. In doing so, we treat scientists and the sciences not only as reactions to or additional exemplars of, but also as co-creators of such processes.

Nationalization, internationalization and the sciences in Central Europe

The role of the sciences and scholarship in nationalization processes has, of course, not been entirely ignored by historians.⁴⁴ General historians, however, when they mention scientists or scholars at all, often tend to focus selectively upon particular groups of academics, whom we might call the usual suspects – literati, philosophers, linguists, historians and, more recently, ethnologists.⁴⁵ In our opinion, the assumption that humanists were the leading actors in the co-construction of science and national identity, though not entirely false, requires a new look and certainly supplementation, perhaps even modification. The now famous (and overly simple) 'two cultures' divide between humanistic disciplines and the natural sciences was only beginning to form at the time; it is therefore inappropriate to presuppose its existence and political or cultural effectiveness in this period. Moreover, both natural scientists and humanists in mid- and late nineteenth-century Central Europe were educated largely in the same elite secondary schools and should thus be regarded as members of a common culture. Thus it would be surprising if natural scientists, as members of the educated elite, had not also participated in the nationalization process.

Seen in this light, historians' perhaps understandable biases towards word-centred fields and their corresponding aversion to engaging with technical questions of natural scientific knowledge may support a tendency to ignore the potentially significant roles and specific problems of the natural sciences and scientists that are at the centre of this volume. An additional factor might be an uncritical acceptance of the assumption that the natural sciences are per se international by virtue of their 'objectivity'.⁴⁶ However, as recent work in history of science has shown, and as will be shown here as well, the very internationality presupposed to characterize (natural) science was itself a historical invention.⁴⁷ This is also true of the idea of imperial (or supra-personal) 'objectivity'.⁴⁸ Both constructs emerged, along with the institutional foundations that supported them, in the very nineteenth century that is generally characterized as the age of nationalism. Indeed, as the chapters in this volume show, the claim that genuine science is per se international was itself central to intramural debates and struggles for institutional power, both within and among nationalizing scientific communities. This tension-filled, dynamic interaction of cultural nationalism and scientific objectivity is, or should be, central to what is meant by the often stated claim that the nation-state and cultural modernity emerged together.

In a volume of essays on the subject, historians Ralph Jessen and Jakob Vogel open up five related issues for discussion: the institutionalization of the (natural) sciences and the humanistic disciplines in the context of the emerging nation-state; the role of the 'nation' as an argument (or trope) both within the sciences and in their relations with state sponsors; the function of natural sciences (and, we might add, technological achievements) as symbolic resources for nationalistic discourse; contributions of the sciences and scholarship to the 'scientific' construction of nations and national cultures; and the already mentioned dynamic tension between nationalistic/patriotic impulses and transnational or universalist orientations in the sciences.⁴⁹ As Jessen and Vogel make clear, none of these issues can or should be limited to the natural sciences or the humanities alone; rather, all of them are present across the spectrum of disciplines, albeit in different ways.

Historians of science and medicine have themselves taken up this subject only recently, after taking a cultural turn of their own.⁵⁰ Of particular relevance to this volume is an issue of the journal *Studies in History and Philosophy of Biological and Biomedical Sciences* entitled 'Science, medicine and nationalism in the Habsburg Empire from the 1840s to 1918', published in 2007.⁵¹ Drawing upon the vast literature on science and imperialism (discussed further below), the authors provide examples in support of the view that 'it was in the interplay between nationalism and imperial aspirations, regional concerns and "central" impulses as well as international rivalries and internal interests that new forms of disciplinary knowledge and practices were created, to make sense of the empire.'⁵² As a case in point,

Emese Lafferton argues that ethnologists and physical anthropologists scientifically constructed the idea of a Hungarian nation and supported political liberalism by delineating the ethnic diversity of nineteenth-century 'Transleithania' in ways that do not fit the models derived from the British, French or German cases.⁵³ Recent studies have detailed the reception of Darwinism in this region from a multi-centric perspective,⁵⁴ and numerous writings by Marius Turda and others have explored the relationships of eugenics, racism and nationalism in (East-)Central Europe from comparable perspectives.⁵⁵

Given the now accepted fact that natural scientists, along with humanists and social scientists, were also involved in, and indeed were co-creators of, cultural processes of nation-formation in this period, the question arises what, if anything, is specific to their involvement. Reducing somewhat the list of issues proposed by Jessen and Vogel, mentioned above, we discuss this question in an exploratory way with respect to three issues: language and symbolic constructions of nationhood; community loyalties and 'centre-periphery' issues; and imperialist science in an empire without overseas possessions.

The importance of language in the creation of national identities has long been clear. Philologists such as Josef Dobrovský for Czech or Onufry Kopczyński for Polish established guidelines for the (re)invention of national languages; these included their historicization and vernacularization, which were also intended to eliminate or lessen foreign influences on vocabulary and syntax. Their projects were both political and philosophical, and were closely linked to discussions among French and German linguists of the time.⁵⁶ This is a clear example of what Jessen and Vogel call the 'scientific' construction of national cultures. As Jan Surman shows in this volume, however, some of the same linguists were also natural scientists who were engaged in efforts to develop standard scientific terminologies in their several languages.⁵⁷ The tensions and debates between national-linguistic 'purism' and the requirements of scientific communication become especially evident in such cases.

The language issue was complicated in the case of the natural sciences by the codification of scientific terminologies and their expression in the very national languages that were themselves being newly codified in the nineteenth century. Given that these scientific terminologies were often created during the period under discussion, it should be clear that we cannot speak here of fixed, previously established scientific terms that only needed to be translated into (East-)Central European vernaculars. Rather, in many natural sciences, most prominently in chemistry, the international terminologies of the disciplines themselves were being established at the same time that efforts were being made to develop such terminologies in national languages.⁵⁸

Further examples of the impact of language-centred cultural hegemony in the sciences are cases of unequal scientific transfer and priority disputes.

As William H. Brock has shown, the insertion of nationalistic rhetoric into questions of scientific validity was popular already in the eighteenth century; relations between 'German' and 'French' chemistry were complicated by nationalism on both sides. Here the rejection or acceptance of knowledge claims was not an issue of science alone, but rather of community membership and nationalistic alignment.⁵⁹ In the nationalized spaces of Central Europe the linguistic issues just mentioned reinforced this process; as contemporaries realized, scientific papers published in regional languages were not likely to be noticed at all outside the local community. Dual publication of the same results in a national and a widely read language was often seen as a solution,⁶⁰ but this strategy, too, became caught up in discourses of cultural dependency. For example, claims of priority for the discovery of the condensation of oxygen or the creation of the periodic table of chemical elements were often rejected or ignored by scholars who found it difficult to imagine that 'peripheral' scholars were not emulating the work of their 'betters' in the metropolises, but presenting original results.⁶¹

This example points to the evident linkage between cultural creation and 'centre-periphery' issues in the sciences. The recent emphasis on the multiplicity of 'centres' and 'peripheries' in (East-)Central Europe has resulted in a new emphasis on space that is particularly relevant to historical studies of science. The 'centre on the periphery' idea⁶² denotes a particular regional scientific development that was enabled through particular circumstances at the periphery, but was also important for the metropolitan centre, in this case for general science. While the social component of knowledge production is reasserted here, this approach can also provide ironic reassurance that regional innovation on the periphery is only an occasional occurrence. The term 'centre' denotes here a resource-rich spatial congestion, which defines the shape of science. This idea of a normative cultural dichotomy with the metropolises of the 'West' defining what counts as 'science' and other places adapting to such definitions raises questions about the formation of scientific spaces, in which local knowledge production appears condemned to fall behind, whereas the idea of normative and generalized 'science' is ascribed almost entirely to the best work done in the 'West'.

One can see such schemata at work also in studies of the transmission and reception of science, most of which ask how certain ideas originating in the metropolises became globalized, locally received and appropriated elsewhere.⁶³ Current historiography, revolving largely around English, French and German research centres, thus overshadows local knowledge production and circulation systems. While this relative imbalance is partially caused by language and communication constraints,⁶⁴ concentration on 'global' developments so defined certainly limits the visibility of cultural variability and thus the broader base of science.

The idea of 'periphery' has also grown in popularity and has acquired more positive connotations in the process. The working group 'Science and

Technology in the European Periphery', for example, aims to encourage research on spaces that are not part of a historiographical canon of science 'still shaped by a central focus on French, British, German, and increasingly US national narratives ("the big four").⁶⁵ Clearly, the authors of this website believe that being seen on the 'periphery' of the 'World System' of science is better than not being seen at all; but by writing in this way, they reinforce the classic dualism of 'centre' and 'periphery' that they claim to oppose. This development, although it certainly multiplies perspectives on science, thus follows the predominant inscriptions of global science and helps to secure their hegemonic position.

As stated above, such cultural perspectives cannot and should not be separated from institutionalization issues. An oft cited case of radical conflict is the division of Prague University in 1882 into the German-speaking Charles University and a Czech counterpart.⁶⁶ Though plainly spectacular, this case may not be typical; more frequent were conflicts over the use of national languages in teaching and research within existing institutions, which led to serious divisions and often to the migration of affected individual scholars and scientists to other places, but did not necessarily lead to institutional break-up. Equally important as 'centres on the periphery' are the national academies of sciences founded in this period. The Hungarian Academy of Sciences (established in 1845), the Academy of Sciences and Arts in Cracow (established in 1872 and renamed 'Polska Akademia Umiejętności' in 1918), the Shevchenko Scientific Society (established in 1873 and regarded by its members as a Ukrainian academy of sciences even before achieving official status as such in 1893), and the Czech Academy of Sciences and Arts (founded in 1890) can all be regarded as cultural symbols and active constituents of national identity in (East-)Central Europe, and also as 'national' institutions established long before there were nation-states in these places.⁶⁷ Since they were also sites of philological research on the history, semantics and general structure of vernacular languages, they are clearly examples of the interaction of cultural history and '*Gelienmpolitik*'.

Central here is the tension between national (or 'patriotic') loyalties and membership in international scientific communities.⁶⁸ Of course, this tension was by no means limited to Central Europe. Yet the predominant version of this discourse, which not coincidentally became established in the nineteenth century, acknowledged no such tension or contradiction. Rather, scientific and technological achievements, suitably certified by international acceptance or economic success, were regarded as cultural resources in a competition for prestige, respect and cultural power. As the great German physiologist and physicist Hermann Helmholtz put it in 1862,

every nation is interested in the progress of knowledge on the simple ground of self-preservation, even were there no higher desires of an ideal

character to be satisfied; and [this is true] not merely in the development of the physical sciences, and their technical application, but also in the progress of legal, political, and moral sciences, and of the necessary historical and philological studies. No nation which would be independent and influential can afford to be left behind in the race.⁶⁹

Such statements clearly exemplify what Ralph Jessen and Jakob Vogel call the idea of 'nation' as argument. Notable in the text by Helmholtz just cited – and widely noticed at the time – are the statement that 'knowledge is power' and his use of military metaphors in this context.⁷⁰ Not until the breakdown of international scientific and scholarly communication and the self-mobilization of scientists, scholars and other intellectuals during the First World War did this internal contradiction within the cultures of science become too obvious to ignore.⁷¹ Nonetheless, as many of the chapters in this volume show, such tensions became visible much earlier precisely in the emerging national cultures of (East-)Central Europe. Institutional affiliations, political commitments and knowledge claims were all involved; we are speaking here of a subtle blending of community membership and epistemic commitments.

It cannot be ignored, however, that while the use of 'nation' as argument grew more visible in the nineteenth century, this did not hinder the practice of cultural exchange and contacts. Quite the contrary: international experience and contacts remained crucial for academic careers, and became more vital as the century went on.⁷² Cultural entanglement was facilitated by imperial circumstances but increasingly went beyond the boundaries of the Habsburg Monarchy towards centres in Berlin, Naples, Paris and, increasingly, Great Britain. In this regard 'German culture' remained both appealing on account of its scientific connotations and distressing through its imperial connotations; Julian Dybiec called the Germans in Polish culture of the late nineteenth century at once 'oppressors and teachers'.⁷³

As a major European power without colonial possessions overseas, the Habsburg Monarchy clearly occupies an unusual, and often ignored, position within the much studied complex 'science and empire'.⁷⁴ Austrian scientists and scholars participated in the far-flung expansion of the 'empire of science' in the nineteenth century, and thus in the attempts at symbolic capital acquisition that these entailed. Studies of colonialism and the sciences in (East-)Central Europe have focused on Bosnia⁷⁵ and overseas exploration.⁷⁶ Examples of the latter from the period discussed in this volume include the round-the-world voyage of the frigate 'Novara' (1857–59) and the polar expedition of the 'Admiral Tegetthof' (1872–74).⁷⁷ These spectacular and well-publicized events may have compensated in some ways for the empire's lack of overseas colonial territories. At the same time they focused public discussion of and political credit for these enterprises on the

Habsburg Monarchy and the Austrian Academy of Sciences, in effect identifying imperial institutions with the Austrian 'nation' per se.

Of still greater importance for the topic of nationalization are cases of 'internal' colonization in a largely landlocked empire.⁷⁸ As earlier literature and chapters in this volume all show, organized, large-scale cartographic, survey and data-gathering projects in the sciences played central roles in the neo-absolutist project of establishing unity in the monarchy after the revolutions of 1848. Examples include the foundation of the central agency for meteorology, climate research, and seismology in Vienna in 1851, and the Imperial Geological Survey in 1849.⁷⁹ The extended networks of actors in such projects were all carefully coordinated and staffed from Vienna; the aim was to achieve nothing less than the science-based construction of 'Austria' as a naturalized empire, despite the fact that it largely lacked natural borders. Similarly, the departments of the Imperial Museum of Natural History in Vienna, housed in an elaborate historicist building constructed on the Ringstrasse in precisely this period, served as gathering points for research collections in botany, mineralogy and many other sciences, while the museum's public exhibition rooms were (and to some extent still are) decorated with landscapes of the Kaiser's territories from which the exhibited objects had come.⁸⁰ At the same time, 'centres' in the 'periphery', such as regional and so-called national museums, served as forums for 'national' cultural display and self-creation outside the Viennese 'centre'.⁸¹

Such examples show that the special case of Central Europe is a highly relevant focal point both for general history and the history of science in relation with one another. Of course, 'Central Europe' has itself been a contested concept since the early twentieth century. We focus here on the Habsburg Monarchy but include German developments in so far as they impinged on the region, and also discuss trends in Polish-speaking regions not incorporated into the monarchy. It was precisely during this period that a self-defined multi-ethnic entity (*Wielvölkerstaat*) increasingly became a multinational one. In this vast territory nationalization was not pursued in a top-down manner, as in Russia or the US, but in opposition to central authority. Nonetheless, German remained the language of central administration, and a major language in the sciences, even after the establishment of the Dual Monarchy and, as chapters in this volume show, aspects of what might be called a colonial perspective, including the rhetoric of science in service to a 'civilizing mission', are visible in the attitudes of state officials and Viennese scientists.

Whatever viewpoint is chosen, all of the volume's authors maintain a strict historical stance. The monarchy ultimately collapsed – and many thought with some justification that it had already become ungovernable by the early 1900s – but this outcome should not be seen as inescapable, nor distract us from recognizing the positive potential that many scholars and

scientists saw in national self-assertion in earlier periods. We are well aware of the dangers of positing a negative teleology here.

The chapters in outline⁸²

The first two chapters of this volume pursue some of the wider issues raised in this introduction from parallel viewpoints. In a chapter entitled 'Science and its Publics: Internationality and National Languages in Central Europe', Jan Surman focuses on the factor generally considered central to the process of nationalization – the emergence of and insistence upon vernacular languages. If 'imagining community' means creating particular interpretations of regional identities and imposing cultural definitions that create boundaries with other communities, its scope includes all spheres of public life. This highly disputed process of impoverished emancipation included the scientific landscape of the Habsburg monarchy; universities, which became important scientific research institutions at just this time, and newly founded scientific societies were favoured battlefields. This chapter examines the nationalization of the sciences and scholarship across a wide range of disciplines through the long nineteenth century. Many of the conflicts described here can also be seen as conflicts among 'imagined communities' – of nationalistic language 'purists', for example – trying to mark their territories, but Surman shows that they also involved struggles over the articulation of scientific knowledge. Language worked at the meta-level, defining by whom and how knowledge was to be presented, and to a certain extent influencing what was researched as well. Science and its practices thus played a not inconsiderable role in processes of cultural boundary creation and maintenance: the importance of language for styles of research became an acknowledged argument in broader cultural debates, and in this way the sciences entered public discourse.

While the nineteenth century is usually described as a time when nationalism and internationalism fell apart, Surman's analysis of the language issue in the scientific communities of the Habsburg Monarchy presents them as highly interdependent. In both the creation and the use of scientific languages, a turn from nationalism to internationalism can be observed by the 1890s, but this internationalism was quite different from the structure of the 'republic of letters' in pre-national times. While both science and scholarship became increasingly international, scientists and scholars also represented the national communities into which they inscribed themselves. At the very same time that impersonal objectivity was coming to be accepted as a core value of science, alleged peculiarities of 'national styles' grew in importance. From this perspective language played a pivotal role, linking nationalistic ideology with the allegedly international character of the scientific community. Surman argues that a process of co-creation occurred: academic communities supported nationalization processes, creating and

at the same being formed by nationalistic discourse, and yet precisely this internationalization, once achieved, became the basis for later moves towards international standing.

In "Staatsnation", "Kulturnation", "Nationalstaat": The role of National Politics in the Advancement of Science and Scholarship in Austria from 1848 to 1938', Johannes Feichtinger argues that when historians consider national styles of science, it is appropriate to treat the Habsburg Monarchy as a special case. In Austria modern scholarship has confronted both the concept of the nation-state (*Staatsnation*) and that of a culturally defined nation (*Kulturnation*). If science and scholarship used political resources to establish themselves scientifically, they ran the risk of becoming engaged in diametrically opposed political projects. For advocates of 'Staatsnation', identity and commitment were primarily based on the principle of dynastic rule over the Habsburg territory. Proponents of the 'Kulturnation' constructed their specific national understanding by using cultural difference as a means of demarcation. Those subscribing to the 'Gesamtstaat' (meaning loyalty to the Monarchy as a whole and especially to the person of the Emperor) usually attacked the adherents of the 'Kulturnation' as nationalists, or language nationalists, but in fact both positions strove for nationhood, though conceived in opposite terms. The chapter uses numerous examples from the humanities, especially philosophy and legal theory, and also alludes to cases from the natural sciences to show how the Austrian academic community of the nineteenth and early twentieth centuries tried to meet this challenge, while at the same time dealing in various ways with the need to establish and maintain some form of scientific autonomy.

The following chapters focus on interactions of institutional and epistemic perspectives. In her chapter, 'National Agreement as Style of Thinking? The Geological Survey of the Habsburg Empire (1849–67)', Marianne Klennun discusses the way in which geology contributed to the symbolic construction and practical maintenance of a multinational Habsburg Monarchy and formed the basis of the project of political harmonization after the failed revolution of 1848. The quintessential task of the Imperial Geological Survey in Vienna, founded in 1849, was clearly defined as the comprehensive incorporation of geological knowledge from all of the nations under the Habsburg crown. Within fourteen years this project produced the desired consistent geological mapping covering an enormous, geologically diverse territory extending from Lombardy to Bukovina and from Dalmatia to the gorge of the Elbe. The result, the *Geological Survey Map of the Austrian-Hungarian Monarchy*, published in 1867, was achieved by means of an elaborate set of negotiated relationships for the fieldwork in which many geologists took part; this involved a practical culture of 'mixing' or 'agreeing'. Consensual relations of unity gained strength in this context; the goal was a uniform transformation of these countries into a geologically coherent supranational territory, modelled as a unified entity and also scientifically defined.

Stratigraphy gave the map an abstract temporal dimension that was both naturally determined and at the same time profoundly political.

In his essay, 'Scientific Nationalism: A Historical Approach to Nature in Late Nineteenth-Century Hungary', Gábor Palló reinforces the volume's central claim that the cultural fertility of the Austro-Hungarian Dual Monarchy extended to the natural sciences. Following Ernest Gellner's three criteria typology of nationalism – the existence of a centralized power, education, and shared (high) culture – he argues that it is sensible to look for nationalist features in Hungarian science in the same way as it is sensible to look for nationalist features in Hungarian literature or dance. Since nationalism is a political principle, Palló argues, nationalist science should be considered to be a political actor in realizing the goal of constructing a (linguistically) homogenous high culture. In both parts of the Dual Monarchy, a number of important results were achieved and scientists achieved influence within and beyond their borders. However, according to Palló, the political power positions of the two parts, Cisleithanien and Transleithanien, 'Austria' and Hungary, were not symmetrical. This asymmetry was reflected in the continuation of Hungarian nationalism, born in the late eighteenth century. Nationalism was a characteristic feature of Hungarian culture, literature, music and science. Compared with Austrian universalism, however, Palló maintains, Hungarian scientific thinking was local, practical and historical. The scientific controversies at the Hungarian Academy of Sciences argued for the importance of national science. In addition to sociological, political and linguistic endeavours, nationalism influenced the content of scientific research through its traditional natural historical approach. The chapter details the peculiar natural historical approach and its manifestations in chemistry, biology and physics in Hungary in the late nineteenth and early twentieth centuries.

In his chapter, 'Acts of Creation: The Eötvös Family and the Rise of Science Education in Hungary', Tibor Frank approaches the case of Hungary by examining the political biographies of and the science education policies advocated and instituted by Baron József Eötvös and his physicist son Baron Loránd Eötvös; also discussed is Agoston Trefort, brother of the elder and uncle of the younger Eötvös. Both father and son were ministers of education and religious affairs in Hungary at least briefly – the elder Eötvös held that post twice – while Trefort served in the position from 1872 to 1888. In addition, both Trefort and the younger Eötvös were elected President of the Hungarian Academy of Sciences. This family network was thus in a position to articulate its ideas on nationality and science and put them into practice. Frank's discussion is set against the panorama of Hungarian history from 1848 through the establishment of the Dual Monarchy in 1867 to the period of unparalleled prosperity and cultural-intellectual creativity that followed a generation later. He notes that Mór Kármán (father of the

world-famous aerodynamicist Theodor Kármán) introduced a secondary education reform inspired by the German Gymnasium in the 1870s at the instigation of the elder Eötvös, and presents the thesis that for the elder Eötvös, his German-trained scientist son, and many others at that time German culture remained paradigmatic for their thinking. For these three men there was apparently no contradiction in principle between loyalty to German *Kultur* and Hungarian patriotism.⁸³

At the same time, however, Hungarian became the language of secondary-school instruction after 1848 and gradually became pre-eminent also in university instruction after the 'Compromise' of 1867. Loránd Eötvös appears to have seen no difficulty in establishing circles for elite mathematical discussion and supporting a mathematics achievement contest for high-school students that was eventually named after him, all conducted in Hungarian, while publishing his most important physics research in German. Frank acknowledges that this ideal of bi- or even multilingual nationality was not universal at the time. Nonetheless, for him the Eötvös family personifies a model of Hungarian creativity combined with political liberalism that was exemplified to a greater or lesser degree by many other outstanding scholars, scientists and cultural leaders of this period and afterwards.

Soňa Štrbáňová discusses epistemic and institutional dimensions in her chapter, 'Patriotism, Nationalism and Internationalism in Czech Science: Chemists in the Czech National Revival'. She describes the dilemma faced by her subjects in stark terms: 'To be a good son of one's nation or to become involved in supranational scientific networks?'. These choices were only apparently in opposition to one another. The notion of 'national style' was widespread in European science of the second half of the nineteenth century, and some of its characteristic features acquired distinct form in the multinational and multi-ethnic Habsburg Monarchy. With respect to the Czech Lands, science tended to be both 'patriotic science' (with nationalistic attributes) and 'internationalist science'; however, these directions were not inevitably divergent. The 'provincial patriotism' (*Landespartriotismus*) of the first half of the nineteenth century turned into fierce national or ethnic patriotism in the second half. Peculiar to the Czech Lands was the parallel manifestation of such attitudes in Czech and German linguistic environments. At the same time, the rapid development of European science made international cooperation attractive for Czech scientists. All these tendencies were reflected in the attitudes and actions of individual scientists or scientific institutions in the Czech Lands.

What did it mean to be a patriotic Czech scientist in the Czech Lands, and how did patriotism shape the involvement of Czech scientists in European science? As Štrbáňová shows (as does Surman more broadly in his chapter), patriotism in science played a positive role in promoting the formation of a Czech scientific terminology, as well as Czech research and educational

institutions and communication bases. It also enabled Czech scientists to participate in international cooperation among Slavic scientists. However, in the 1880s and 1890s patriotism in science started to shift into nationalism and chauvinism, marked by a sharp demarcation from German science. These tendencies, along with an effort to abuse science for political ends, created barriers obstructing participation by Czech scientists in international networks. Chemists, however, soon became aware of this threat; in response they and other natural scientists nurtured international ties and attempted to counteract nationalism. Developments in the humanities were different, as demonstrated by the example of history.⁸⁴ However, both scientists and humanists found appropriate ways of communicating with international scholarship, and this led to methodologically and thematically fruitful dialogue.

In her chapter, 'Fault Lines and Borderlands: Earthquake Science in Imperial Austria', Deborah Coen returns to institutional and epistemic issues raised by Marianne Klemun while focusing on a later period. The catastrophic Ljubljana earthquake of 1895 spurred the Imperial Academy of Sciences in Vienna to initiate a macroseismological observation network of lay volunteers, on the Swiss model. The question was how to organize such a network for the multinational empire: how to coordinate expert-lay communication in a state driven by linguistic and cultural divides, and how to impose a uniform observation system in a territory ranging from the seismically active lands of Southern Europe to the steppes of Galicia and Bukovina, where earthquakes were virtually unknown. The chapter examines the network's decentralized structure. It draws on the reflections of both Austrian and foreign scientists on the advantages and disadvantages of decentralization, as well as on archival letters, telegrams and questionnaires that reveal the texture of communication within the network. Coen is interested in the ways that the perceived geography of a continental empire – non-natural borders, 'hybrid' frontiers, ambiguities of centre and periphery – affected the construction and mapping of seismological knowledge.

In his chapter on eugenics in Hungary, Marius Turda focuses tightly on the public debate on eugenics that took place between 1910 and 1911. As he shows, the debate is important, first of all, because it created an auspicious environment for the nationalization of eugenic knowledge that was to occur in early twentieth-century Hungary. Although they used the internationally recognizable language of evolutionary science, Hungarian eugenicists expressed specifically local imperatives. In doing so, they became co-creators of the national context, enabling Hungarian academic knowledge about evolution and heredity to be expressed publicly. Eugenics, in this context, was seen as a mechanism capable of decoding particular social and national predicaments, an expression of the ideal of a healthy nation in the face of dramatic demographic and social changes. In addition, however, Turda

shows that the debate had an international dimension, illustrating the level of scientific sophistication achieved by Hungarian eugenicists at the time: in other words, their scholarly engagement with emerging European trends in heredity. Finally, Turda suggests that the Hungarian debate also had regional importance, because it was the first public debate on eugenics in Austria-Hungary. Its particulars may thus help us to understand other national eugenic movements in this region.

In the volume's final chapter, 'The Politics of Anatomy in Late Nineteenth-century Vienna', Tatjana Buklijas returns to the Habsburg capital. Around 1900 Viennese anatomy was internationally famous as a result of the elegant specimens displayed at world exhibitions, widely read textbooks and innovative atlases, as well as the easy access to dissectible bodies that attracted students from countries as far away as the US. But it was also a discipline divided among politically, educationally and scientifically opposed professors. In her chapter, Buklijas details the lives and careers of anatomists who held the two normal anatomy chairs at the University of Vienna at that time, Emil Zuckerkandl and Carl Toldt, demonstrating the differences between the two anatomical disciplinary orientations practised in fin-de-siècle Vienna and their close links with the political views and social networks with which the two anatomists were allied. In doing so she shows how anatomical divergences can be understood only if we put them back into the contemporary Austrian political and social context, in terms of the growing middle-class rift along ethnic and religious lines. Thus, Buklijas presents a fine example of the nationalization of scientific knowledge at the centre of the Monarchy itself.

Science and historical memory – nationalism unfinished?

The idea that the sciences ceased to be an issue in nationalisation – or re-nationalization – processes after the fall of Communism is obviously wrong. Intensive sponsorship programs by national research organizations, by aiming to strengthen national representation in 'international' science, reinforce long-standing policies of the kind described in this volume. Among the most generously endowed scholarships are homecoming/reintegration scholarships, offered both at the level of the European Union⁸⁵ and at national level.⁸⁶ Their aim is either to enable research stays in participating countries with a compulsory return phase, or to reintegrate internationally active scholars into the sciences in their countries of origin (in some cases in countries where they have acquired residency status). It will be interesting to follow the impact of such policies (and many other EU-financed networking programmes) at a time when it is finally being acknowledged throughout Europe and elsewhere that more than a century of enforced monolingualism has been severely damaging to science and scholarship, particularly in (East-)Central Europe but also in former scientific power centres like France and Germany.

At least as important as such programmes is the use of the scientific past in the memory politics of (East-)Central Europe. Already in the nineteenth century, 'great men of science' – scientists then always being male – were mobilized as resources for national commemoration and in this way contributed to stabilizing the historical identity of their nations.⁸⁷ From then until now, scientists and scholars have continued to be emblematic figures in this sense. National, or rather nationalistic, attributions assigned to Renaissance figures such as the astronomer Yuriy Drobnych in Ukraine, Copernicus in Poland or Comenius in the Czech Republic help to locate the nation in a historical continuum, and at the same time to place it favourably in the context of international scientific development. In recent versions of this cultural game, in a nod to multiculturalism, the peripatetic scholarly careers and varied education of these famous scholars is acknowledged. Yet in the end language remains decisive as a demarcation criterion of nationality attributions, despite long-standing debates on whether the scholar in question ever actually spoke the national language in question (e.g. whether Copernicus spoke Polish) or which version of that language the scholar employed (Drobnych).

The politics of historical memory is by no means limited to such issues, of course, but enters everyday cultural life in many forms. Commemorative celebrations strengthen (national) identity communities by providing support for cultural self-esteem. In this regard university jubilees, or commemorations of famous scholars' or scientists' birth or death dates, continue to take pivotal representational roles.⁸⁸ In contemporary (East-)Central Europe, such cultural strategies appear to provide symbolic compensation for these countries' relatively weak international scientific standing – an ironically inverted version of the invocations of science-based technology in support of national power politics that became common in the nineteenth century. We cannot go into detail about this here, but surely it is not out of place to mention examples of the visibility of science and scientists as cultural symbols in prominent and visible places – even as mundane as banknotes or brand names. Copernicus, for example, was on the 1000 zloty note, and his name once also graced a well-known gingerbread factory in Toruń. In the summer of 2010, the first modern science museum in Poland – called, of course, the Copernicus Science Centre – opened with an extraordinary outdoor multimedia show, 'Big Bang', by Peter Greenaway and Saskia Boddeke, which gained extensive media coverage.⁸⁹ Comparable examples exist throughout (East-)Central Europe, wherever the euro – with architectural rather than portrait imagery on its banknotes – has not yet been introduced.⁹⁰ The pictorial invocations of glorious national scientific pasts in everyday currency instruments has much the same functions as already described; this too creates an illusion of timeless national continuity (invented tradition) and assigns national identities to scientists and scholars (at least in local eyes), even though Copernicus (as mentioned above),

Marie Skłodowska Curie (= Curie Skłodowska), Grigori Savvich Skovoroda/Hryhorii Savvch Skovoroda and Johann Weichard Freiherr von Valvasor/Janez Vajkard Valvasor were (and still are) nationally contested figures.

Of course, it is not possible to survey all aspects of this vast and complex topic in a single short volume. Our purpose is, rather, to open up lines of inquiry, and in doing so to cross academic boundaries between general history and the history of science on the one hand, and between the history of natural science or medicine and that of the humanities on the other. The many specific differences among the national histories and fields of knowledge discussed here are obvious; and yet it appears clear to us that there are overriding common patterns – not least the ambivalence between the drive to establish national identities and the equally powerful need to gain standing in transnational scientific cultures – that become visible when studies from varied locations are brought together.

Notes

1. For discussion of the shift from multi- to monolingualism see Jan Fellerer (2005) *Mehrsprachigkeit im galizischen Verwaltungswesen (1772–1914). Eine historisch-soziologische Studie zum Polnischen und Ruthenischen (Ukrainischen)* (Cologne, Weimar: Böhlau), especially 279–80; Tomasz Kamusella (2001) 'Language as an instrument of nationalism in Central Europe', *Nations and Nationalism*, 7/2, 235–51; idem (2009) *The Politics of Language and Nationalism in Modern Central Europe* (Basingstoke: Palgrave Macmillan).
2. Ernest Gellner (1983) *Nations and Nationalism* (Ithaca, NY: Cornell University Press); Eric J. Hobsbawm (1990) *Nations and Nationalism since 1780: Programme, Myth, Reality* (Cambridge: Cambridge University Press); Benedict Anderson (1991) *Imagined Communities: Reflections on the Origin and Spread of Nationalism*, rev. ed. (London: Verso). For a more traditional approach, see also John Breuilly (1982) *Nationalism and the State* (Manchester: Manchester University Press).
3. For studies of nationalism as secular religion, see, for example, George L. Mosse (1975) *The Nationalisation of the Masses: Political Symbolism and Mass Movements from the Napoleonic Wars through the Third Reich* (New York: Howard Fertig); Norbert Elias (1996) *The Germans: Power Struggles and the Development of Habitus in the Nineteenth and Twentieth Centuries* (Cambridge: Polity Press); Anthony D. Smith (2010 [2001]) *Nationalism: Theory, Ideology, History*, 2nd ed. (Cambridge: Polity Press).
4. Miroslav Hroch (2007) 'National Romanticism', in *Discourses of Collective Identity in Central and Southeast Europe 1770–1945 vol. 2. National Romanticism: The formation of National Movements*, eds. Balázs Trencsenyi and Michal Kopčák (Budapest, New York: Central European University Press), 4–18.
5. On the spatial dimension of nationalism in central Europe see, for example, Parice M. Dabrowski (2008) 'Constructing a Polish landscape: The example of the Carpathian frontier', *Austrian History Yearbook*, 39, 46–65.
6. Partha Chatterjee (1993) *The Nation and its Fragments: Colonial and Postcolonial Histories* (Princeton, NJ: Princeton University Press), 159.
7. This process was analysed in the nineteenth century, for example, by sociologist Ludwik Gumplowicz. For a recent analysis see Brian Porter (2000)

- When Nationalism Began to Hate: Imagining Modern Politics in Nineteenth-century Poland* (New York: Oxford University Press).
8. Of course, none of this was limited to (East-)Central Europe. See, for example, the classic study by Eugen Weber (1979) *Peasants into Frenchmen: The Modernisation of Rural France* (London: Chatto and Windus).
 9. For the German case, see Siegfried Weichlein (2004) *Nation und Region: Integrationsprozesse im Bismarck-Reich* (Düsseldorf: Droste).
 10. Jeremy King (2005) *Budweisers into Czechs and Germans: A Local History of Bohemian Politics 1848–1948* (Princeton, NJ: Princeton University Press).
 11. Tara Zahra (2008) *Kidnapped Souls: National Indifference and the Battle for Children in the Bohemian Lands, 1900–1948* (Ithaca, NY: Cornell University Press).
 12. See, for example, James E. Bjork (2008) *Neither German nor Pole: Catholicism and National Indifference in a Central European Borderland* (Ann Arbor: University of Michigan Press).
 13. Tomasz Kamusella (2007) *Silesia and Central European Nationalism: The Emergence of National and Ethnic Groups in Prussian Silesia and Austrian Silesia, 1848–1918* (West Lafayette, IN: Purdue University Press).
 14. Peter Sahlin (1989) *Boundaries: The Making of France and Spain in the Pyrenees* (Berkeley, 1989), 271.
 15. On this issue see Hans-Christian Maner (ed.) (2005) *Grenzregionen der Habsburgermonarchie im 18. und 19. Jahrhundert: Ihre Bedeutung und Funktion aus der Perspektive Wiens* (Münster: LIT Verlag).
 16. For an earlier critique of the concept, which preceded the intensification of the debate by at least a decade, see Daniel Beauvois (1994) 'Mit "kresów wschodnich" czyli tak mu potoczny kres' [The Myth of "Eastern Borderlands" and how to end it], in Wojciech Wrzesiński (ed.), *Polskie mity polityczne XIX i XX wieku* [Polish political myths of the nineteenth and twentieth centuries] (Wrocław: Wydawnictwo Uniwersytetu Wrocławskiego), 93–105. Recently, critiques of this terminology have brought about a post-colonial turn in Polish self-reflection on its political position and cultural identity politics. See, for example, Bogusław Bakula (2006) 'Kolonialne i postkolonialne aspekty polskiego dyskursu kresoznawczego (zarys problematyki)' [Colonial and postcolonial aspects of Polish borderland-science discourse: an outline], *Teksty Drugie*, 6, 11–33.
 17. For an extended discussion of these complex relationships, see the chapter by Johannes Fechtlinger in this volume.
 18. See, for example, Holm Sundermann (2007) 'Die Ethnisierung von Staat, Nation and Gerechtigkeit: Zu den Anfängen nationaler "Homogenisierung" im Balkanraum', in Matthias Beer (ed.), *Auf dem Weg zum ethnisch reinen Nationalstaat? Europa in Geschichte und Gegenwart*, 2nd ed. (Tübingen: atempto), 69–90.
 19. Immanuel M. Wallerstein (2011) *The Modern World System*, 4 vols. (Berkeley, CA: University of California Press). First published 3 vols., 1976–1988; André Gunder Frank (1970) *Latin America: Underdevelopment or Revolution. Essays on the Development of Underdevelopment and the Immediate Enemy* (New York: Monthly Review Press). See also Immanuel M. Wallerstein (1998) 'The Construction of peoples: Racism, nationalism, ethnicity', Chap. 4, in Etiene Balibar, Immanuel M. Wallerstein (eds.) *Race, Nation, Class: Ambiguous Identities* (London: Verso).
 20. For an indirect critique of this model, see Dipesh Chakrabarty (2000) *Provincializing Europe: Postcolonial Thought and Historical Difference* (Princeton: Princeton University Press).

21. For this distinction see Richard Handler (ed.) (2006) *Central Sites, Peripheral Visions: Cultural and Institutional Crossings in the History of Anthropology* (*History of Anthropology, Volume 11*) (Madison, WI: University of Wisconsin Press).
22. 'Das Wesen Österreichs ist die Peripherie', Joseph Roth (1987 [1938]) *Die Kapuzinergruft* (Cologne: Kiepenheuer & Witsch), 17.
23. Pieter M. Judson and Marsha L. Rozenblit (eds.) (2005) *Constructing Nationalities in East Central Europe* (Austrian and Habsburg Studies, 6) (Oxford and New York: Berghahn Books); Pieter M. Judson (2006) *Guardians of the Nation: Activists on the Language Frontiers in Imperial Austria* (Cambridge, MA: Harvard University Press); Marius Turda (2005) *The Idea of National Superiority in Central Europe, 1880–1918* (New York: Edwin Mellen Press).
24. Ursula Prutsch (2003) 'Habsburg postcolonial', in Ursula Prutsch, Moritz Csáky and Johannes Feichtinger (eds.), *Habsburg Postcolonial: Machtstrukturen und kollektives Gedächtnis* (Innsbruck: Studien-Verlag), 33–43, here 36.
25. Robert Doria (2007) 'The Proximate Colony. Bosnia-Herzegovina under Austro-Hungarian Rule', <http://www.kakanien.ac.at/betr/fallstudie/RDonal.pdf>.
26. Hans-Christian Maner (2007) *Galizien. Eine Grenzregion im Kalik der Donaumonarchie im 18. und 19. Jahrhundert* (Munich: IKGS-Verlag), 49.
27. Philipp Ther (2004), 'Deutsche Geschichte als transnationale Geschichte: Polen, slawophone Minderheiten und das Kaiserreich als kontinentales Empire', in Sebastian Conrad (ed.) *Das Kaiserreich transnational. Deutschland in der Welt 1871–1914* (Göttingen: Vandenhoeck & Ruprecht), 129–48.
28. See, for example, Alexei Miller (2003) *The Ukrainian Question: The Russian Empire and Nationalism in the Nineteenth Century* (Budapest: New York: Central European University Press); Veronika Wendland (2010), 'Imperiale, koloniale und postkoloniale Blicke auf die Peripherien des Habsburgerreiches', in Claudia Kraft and Alf Lüdtke (eds.), *Kolonialgeschichten: Regionale Perspektiven auf ein globales Phänomen* (Frankfurt am Main: Campus Verlag), 215–35.
29. From the vast literature on this topic, see especially Maria Janion (2006) *Niesamowita Słowiańszczyzna: fantazmaty literatury* [Amazing Slavdom: The Literary Imagination] (Kraków: Wydawnictwo Literackie) and Jaroslav Hrycak (2004) *Strast' za nacionalizmom* [Passion for Nationalism] (Kyiv: Krytyka), especially the chapters 'I my v Jevropi?' [We in Europe?] (pp. 24–36) and 'Istorija vid Placnyč' [History on Friday] (pp. 309–24). For a general overview see Alexander Maxwell (ed.) (2011) *The East–West Discourse: Symbolic Geography and Its Consequences* (Oxford, Frankfurt am Main: Peter Lang).
30. The term *antemurale* is mostly linked to Poland but can be found as a self-identification throughout Central Europe, from Estonia through Ukraine to Kosovo. See, for example, Chantal Delsol, Michel Mastowski and Joanna Nowicki (eds.) (2002) *Mythes et symboles politiques en Europe centrale* (Paris: Presses Universitaires de France); for Ukraine see the project of Lilyya Berezhnaya, *Die ukrainische Bastion' – Vormauer Europas und antemurale christianitatis. Nationalisierung eines Mythos*, <http://www.uni-muenster.de/Religion-und-Politik/forschung/projekte/b15.html>.
31. Paradigmatic here is Jan Kieniewicz (2008) 'Polski los w Imperium Rosyjskim jako sytuacja kolonialna' [Polish fate in the Russian Empire as a colonial situation], in idem (ed.) *Ekspanzia, kolonializm, cywilizacja* [Expansion, colonialism, civilization] (Warszawa: DiG), 244–262, or the collection of articles in idem (ed.) (2009) *Silent Intelligentsia. A Study of Chivisational Oppression* (Warsaw: Institute of Interdisciplinary Studies 'Artes Liberales', University of Warsaw).
32. Janusz Korek (ed.) (2007) *From Sovietology to Postcoloniality: Poland and Ukraine From a Postcolonial Perspective* (Stockholm: Södertörn Academic Studies 32). For critical discussion of differences between postcolonialism and the particularities of post-partition (1793–1918) and post-1945 Poland (1945–89), see Hanna Gosk (2008) 'Polskie opowieści w dyskurs postkolonialny ujęte' [Polish stories framed in postcolonial discourse], in idem and Bożena Karwowska (eds.) (*Nie)obecnosc: Pominięcia i przemilczenia w narracjach XX wieku* [Presence/Absence: Omissions and Concealments in narrations of the twentieth century] (Warszawa: Bibliop), 75–88.
33. Maria Janion (2004) 'Rozstac się z Polską?' [To part with Poland?], *Gazeta Wyborcza*, 02./03.10.2004, 14–16, here 16.
34. See, for example, Pieter M. Judson (1993) 'Inventing Germans: class, nationality and colonial fantasy at the margins of the Habsburg Monarchy', *Social Analysis*, 33, 47–67; Danuta Sosnowska (2008) *Imna Galicja* [The other Galicia] (Warszawa: Bibliop).
35. Izabela Surynt (2008) 'Postcolonial studies and the "Second World": twentieth-century German national-colonial constructs', *Werkwinkel*, 3/1, 61–87.
36. Jozef Špetko (1986) 'Ublizovanie – mýtus a syndrom' [Rapprochement – myth and syndrome], *Premeny*, 3, 3–13.
37. Johannes Feichtinger, Ursula Prutsch and Moritz Csáky (2003), 'Vorwort', in idem (eds.) *Habsburg Postcolonial: Machtstrukturen und kollektives Gedächtnis* (Innsbruck: Studien Verlag), 11.
38. Christiane Zintzen (ed.) (1999) *Die österreichisch-ungarische Monarchie in Wort und Bild. Aus dem Komprinzenwerk des Erzherzog Rudolf* (Cologne, Weimar, Vienna: Böhlau-Verlag); Regina Bendix (2003) 'Ethnology, cultural refraction, and the dynamics of difference in the Kronprinzenwerk', in Nancy M. Wingfield (ed.) (2003) *Creating the Other: Ethnic Conflict and Nationalism in Habsburg Central Europe* (New York/Oxford: Berghahn Books), 149–66.
39. Serhii Ploky (2005) *Unmaking Imperial Russia: Mykhailo Hrushevsky and the Writing of Ukrainian History* (Buffalo, NY: University of Toronto Press).
40. Izabela Surynt (2004) *Das 'ferne', 'unheimliche' Land: Gustav Freytags Polen* (Dresden: Thelen Verlag).
41. Brigitte Fuchs (2003) 'Rasse', 'Volk', 'Geschlecht': Anthropologische Diskurse in Österreich, 1850–1960 (Frankfurt am Main: Campus Verlag).
42. Mykola Riabchuk (2000) *Vid Malorosiji do Ukrainy: paradoksy zapizniloho nacije tvorenija* [From 'Little Russia' to Ukraine: Paradoxes of Delayed Nation Formation] (Kyiv: Krytyka).
43. See, for example, Alina Cata (1989) *Asymilacja Żydów w Królestwie Polskim 1864–1897: postawy, konflikt, stereotypy* [Assimilation of Jews in the Kingdom of Poland 1864–1897: attitudes, conflicts, stereotypes] (Warsaw: Państwowy Instytut Wydawniczy); Michal Frankl (2007) *Emanipace od Žida. Český antisemitismus na konci 19. Století* [Emancipation from the Jews. Czech anti-Semitism at the end of the nineteenth century] (Praha: Paseka); Steven Beller (1989) *Vienna and the Jews 1867–1938. A Cultural History* (Cambridge: Cambridge University Press); Klaus Hödl (2006) *Wiener Juden, Jüdische Wiener: Identität, Gedächtnis und Performanz im 19. Jahrhundert* (Innsbruck, Vienna: Studien-Verlag). For examples of the impact of Jewish assimilation on science, see John Efron (1994) *Defenders of the Race: Jewish Doctors in Fin-de-Siècle Europe* (New Haven and London: Yale University Press), 141–53; Veronika Lipphardt (2008) *Biologie der Juden: Jüdische Wissenschaftler über 'Rasse' und Vererbung 1900–1935* (Göttingen: Vandenhoeck & Ruprecht).

44. The stronger claim by Carol Harrison and Ann Johnson that 'Research on nationalism has largely ignored the nexus between science and national identity' applies, if at all, only to the literature in English. Carol E. Harrison and Ann Johnson (2009) 'Introduction: science and national identity', in idem (eds.), *National Identity: The Role of Science and Technology* (Osiris, new series, vol. 24) (Chicago: University of Chicago Press), 4.
45. For references to literature on linguists and language studies, see the chapter by Jan Surman in this volume. On ethnology, see Andrew Zimmermann (2001) *Anthropology and Anti-Humanism in Imperial Germany* (Chicago: University of Chicago Press); H. Glenn Penny and Matti Bunzl (eds.), (2003) *Worldly Provincialism: German Anthropology in the Age of Empire* (Ann Arbor: University of Michigan Press); Karl Putschan (2008) *Die Wissenschaften vom Menschen' auf Wiener Boden (1870–1959): Die Anthropologische Gesellschaft und die anthropologischen Disziplinen im Fokus von Wissenschaftsgeschichte, Wissenschafts- und Verdingungspolitik* (Vienna: Böhlau); Irene Ranzmayer (forthcoming) *Die Anthropologische Gesellschaft in Wien und die akademische Etablierung anthropologischer Disziplinen an der Universität Wien, 1870–1930* (Vienna: Böhlau). On archaeology and prehistory, see Paul Graves-Brown (ed.) (1996) *Cultural Identity and Archaeology: The Construction of European Communities* (London: Routledge); Heiko Steuer (2001) *Eine hervorragende nationale Wissenschaft: Deutsche Prähistoriker zwischen 1900 und 1995* (Berlin: De Gruyter). On history, see, for example, Stefan Berger (1997) *The Search for Normality: National Identity and Historical Consciousness in Germany since 1800* (Providence, RI: Brown University Press); Eckhardt Fuchs and Benedikt Stuchey (2002) *Across Cultural Borders: Historiography in Global Perspective* (London: Rowman and Littlefield); Christoph Conrad and Sebastian Conrad (eds.) (2002) *Die Nation schreiben: Geschichtswissenschaft im internationalen Vergleich* (Göttingen: Vandenhoeck & Ruprecht); Hans-Peter Hye, Brigitte Mazohl and Jan Paul Niederkorn (eds.) (2009), *Nationalgeschichte als Artefakt: Zum Paradigma Nationalstaat in den Historiographien Deutschlands, Italiens und Österreichs* (Vienna: Böhlau). For recent studies on history and historians in Eastern Central Europe, see Pavel Kolár (2008) *Geschichtswissenschaft in Zentraleuropa: Die Universitäten Prag, Wien und Berlin um 1900*, 2 Halbbände (Leipzig: Leipzig University Press); Monika Baár (2010), *Historians and Nationalism in East-Central Europe in the Nineteenth Century* (New York: Oxford University Press).
46. This traditional view, which uncritically reproduces hopes of the era in question and tells only one side of the story, is nicely reflected in the statement that in the age of nationalism the sciences 'functioned as some kind of universal language – a bond or bridge between nations and not a bar', Hans Hauge (1996) 'Nationalizing science', in Roger Chartier and Pietro Corsi (eds.), *Sciences et langages en Europe* (Paris: Éditions de l'École des Hautes études en sciences sociales) 159–68, here 160.
47. For a brief general discussion, see Mitchell G. Ash (2000) 'Internationalisierung und Entnationalisierung der Wissenschaften im 19. und 20. Jahrhundert – Österreichischer Zeithistorikertag 1999' (Innsbruck: Studien-Verlag), 4–12. For earlier literature on scientific internationalism, see Brigitte Schroeder-Gudenus (1990) 'Nationalism and Internationalism', in Robert C. Olby, George N. Cantor, J.R.R. Christie and M.J.S. Hodge (eds.) *Companion to the History of Modern Science* (London: Routledge), 909–19; Elisabeth Crawford (1992) *Nationalism and Internationalism in Science, 1880–1939 – Four Studies of the Nobel Population* (Cambridge: Cambridge University Press).
48. Lorraine Daston and Peter Galison (2007) *Objectivity* (Cambridge, MA: Zone Books).
49. Ralph Jessen and Jakob Vogel (2002) 'Einleitung: Die Naturwissenschaften und die Nation', in idem (eds.), *Wissenschaft und Nation in der europäischen Geschichte* (Frankfurt am Main: Campus Verlag), 7–37, here 18.
50. Ludmilla Jordanova (1998) 'Science and nationhood: cultures of imagined communities' in Geoffrey Cubitt (ed.) *Imagining Nations* (Manchester: University of Manchester Press), 192–211; idem (1996) 'Science and national identity', in Roger Chartier and Pietro Corsi (eds.), *Sciences et langages en Europe*, 221–31; David Edgerton (2003) 'Science in the United Kingdom: a study in the nationalisation of science', in Dominique Peetre and John Krigge (eds.) *Companion to Science in the Twentieth Century* (London: Routledge), 759–75; Harrison and Johnson (eds.) *National Identity: The Role of Science and Technology*, raises some of the relevant issues, but is devoted mainly to developments in the twentieth century and especially to post-colonial science.
51. Tatjana Buklijas and Emese Lafferton (2007) 'Science, medicine and nationalism in the Habsburg Empire from the 1840s to 1918', *Studies in History and Philosophy of Biological and Biomedical Sciences*, 38/4, 679–86.
52. *Ibid.*, 685.
53. Emese Lafferton (2007) 'The Magyar moustache: the faces of Hungarian state formation, 1867–1918', *Studies in History and Philosophy of Biological and Biomedical Science*, 38/4, 706–32.
54. On the reception of Darwinism in Hungary, see also Sándor Sóos (2008) 'The scientific reception of Darwin's work in nineteenth-century Hungary' and Katalin Mund (2008), 'The reception of Darwin in nineteenth-century Hungarian society', in Eva-Marie Engels and Thomas F. Glick (eds.) *The Reception of Charles Darwin in Europe*, vol. 2 (London: Continuum), 430–40 and 441–62, respectively.
55. Marius Turda (2007) 'Race, politics and nationalist Darwinism in Hungary, 1880–1918', *Ab Imperio*, 139–64; Marius Turda and Paul J. Weindling (eds.) *Blood and Homeland: Eugemics and Racial Nationalism in Central and Southeastern Europe, 1900–1940* (Budapest: CEU Press); Marius Turda (2010) *Modernism and Eugemics* (Basingstoke: Palgrave Macmillan); idem (2011) *Health, Hygiene and Eugemics in Southeastern Europe to 1945* (Budapest: CEU Press).
56. For literature on this topic see the chapter by Jan Surman in this volume.
57. Such multiple linkages are not as surprising as they may seem from a current perspective. The vast array of disciplines and specialties within disciplines now taken for granted was not yet in place anywhere in Europe in the early nineteenth century. See Rudolf Stichweh (1984) *Zur Entstehung des Systems moderner Disziplinen: Physik in Deutschland 1740–1890* (Frankfurt am Main: Suhrkamp); idem (1994) *Wissenschaft, Universität Profession: Soziologische Analysen* (Frankfurt am Main: Suhrkamp); Mitchell G. Ash (1999) 'Die Wissenschaften in der Geschichte der Moderne (Antrittsvorlesung am Institut für Geschichte der Universität Wien, 2. April 1998)', *Österreichische Zeitschrift für Geschichtswissenschaften*, 10, 105–29, English abstract on p. 131.
58. See Olga A. Valkova (2002) 'Wissenschaftssprache und Nationalsprache Konflikte unter russischen Naturwissenschaftlern in der Mitte des 19. Jahrhunderts', in Jessen and Vogel (eds.) *Wissenschaft und Nation*, 59–79; see also the papers by Jan Surman and Soňa Štrbáňová in this volume.
59. William Brock (1992) *The Chemical Tree: A History of Chemistry* (New York: W.W. Norton), 87.

60. See the chapter by Jan Surman in this volume.
61. On the priority dispute over the liquefaction of oxygen, see Zdzisław Wojtaszek et al. (1990) *Karol Olszewski (Zeszyty Naukowe Uniwersytetu Jagiellońskiego)*, 899; *Uniwersytatski lagelloniace Acta Chimica fasc. 33* (Warszawa, Kraków: Państwowe Wydawnictwo Naukowe), 86–98. On Mendeleev's periodic table see Michael D. Gordin (forthcoming) 'The textbook case of a priority dispute: D.I. Mendeleev, Lothar Meyer, and the periodic system', in Jessica Riskin and Mario Biagioli (eds.), *Nature Engaged: Science in Practice from the Renaissance to the Present* (New York: Palgrave Macmillan).
62. See, for example, Svante Lindquist (ed.) (1993) *Center on the Periphery, Historical Aspects of 20th-Century Swedish Physics* (Canton, MA: Science History Publications); Louise Hecht (2005) 'The beginning of modern Jewish historiography: Prague – A center on the periphery', *Jewish History*, 19, 347–73.
63. David N. Livingstone (2003) *Putting Science in its Place: Geographies of Scientific Knowledge* (Chicago: University of Chicago Press). See also the studies of the reception of Darwinism in Hungary cited above (note 53).
64. See A. Suresh Canagarajah (2002) *A Geopolitics of Academic Writing* (Pittsburgh: University of Pittsburgh Press).
65. See <http://147.156.155.104/?q=node/3> (last accessed 21.12.2010). In the description of participating projects the word 'periphery' is sometimes used with inverted commas and sometimes not.
66. Crawford, *Nationalism*, pp. 37, 87; Gary B. Cohen (1996) *Education and Middle-class Society in Imperial Austria 1848–1918* (West Lafayette, IN: Purdue University Press). For an example of the impact see Lenka Vodáčková-Pokorná (2006) *Die Prager Germanistik nach 1882: Mit besonderer Berücksichtigung der bis 1900 an die Universität berufenen Persönlichkeiten* (Frankfurt am Main: Peter Lang), esp. 67–73.
67. On the Cracow Academies see Renato Mazzolini (1995) 'Nationale Wissenschaftsakademien im Europa des 19. Jahrhunderts', in Lothar Jordan and Bernd Kortländer (eds.), *Nationale Grenzen und internationaler Austausch: Studien zum Kultur- und Wissenschaftstransfer in Europa* (Tübingen: Mohr), 245–60. For literature on the Academies of Sciences in Budapest and Prague, see the chapters by Gábor Palló and Soňa Štrbáňová in this volume. In contrast, the Imperial Academy of Sciences in Vienna (founded in 1847 and only later called 'Austrian') can be regarded as part of an effort towards the construction of an imperial 'nation' that was redoubled in the neo-absolutist era (see below).
68. A possible confusion of concepts should be mentioned here. In Czech, Polish and Ukrainian the concepts nationalism and patriotism have different connotations; while the first is negative and conceptually near to chauvinism, patriotism is positive. On this point see Porter, *When Nationalism Began to Hate* (cit. note 7). For recent discussion of this terminology in Polish, see Krzysztof Jaskulowski (2009) *Nacjonalizm bez narodów: Nacjonalizm w koncepcjach anglosaskich nauk społecznych* [Nationalism Without Nations. Nationalism in anglophone social sciences] (Wrocław: Wydawnictwo Uniwersytetu Wrocławskiego).
69. Hermann Helmholz (1862) 'On the relations of natural science to science in general', in idem (1995) *Science and Culture: Popular and Philosophical Essays*, ed. David Cahán (Chicago: University of Chicago Press), 76–95, here 92.
70. *Ibid.* See also Ash 'Die Wissenschaften'; Mitchell G. Ash (2002), 'Wissenschaft und Politik als Ressourcen für einander', in Rüdiger vom Bruch and Brigitte Kaderas (eds.), *Wissenschaften und Wissenschaftspolitik: Bestandsaufnahmen zu Formationen, Brüchen und Kontinuitäten im Deutschland des 20. Jahrhunderts* (Stuttgart: Steiner), 32–51.
71. Nationalistic divisions in the sciences and the mobilization of scientists for war and propaganda during the First World War are well studied topics. For literature in German see, for example, Jürgen and Wolfgang Ungern-Sternberg (1996) *Der Aufzug An die Kulturwelt! Das Manifest der 93 und die Anfänge der Kriegspropaganda im Ersten Weltkrieg* (Stuttgart: Steiner); Stefan L. Wolff (2001) 'Physiker im "Krieg der Geister"' (Arbeitspapiere des Münchener Zentrums für Wissenschafts- und Technikgeschichte, Munich).
72. See, for example, Jana Mandlerová (1969) 'K zahraničnim cestám učitelů vysokých škol v českých zemích (1888–1918)' [Travels abroad by university teachers in the Czech Lands (1888–1918)], *Dějiny věd a techniky*, 4, 232–46; Maria Julia Nedza (1973) *Politika stipendijnalna Akademii Umjetnosti w latach 1878–1920: Fundacje Gdęzowskiego, Pileckiego i Oskawskiego*. [The stipends policy of the Academy of Sciences and Arts 1878–1920: The endowments of Gdęzowski, Pilecki and Oskawski] (Wrocław: Zakład Narodowy im. Ossolińskich).
73. Julian Dybiec (2005) 'Prześladowca i nauczyciel. Niemcy w nauce i kulturze polskiej 1795–1918' [Oppressor and Teacher. Germans in Polish science and culture 1795–1918], in Bogusław Dopart, Jacek Popiel and Marian Stala (eds.) *Literatura, kulturoznawstwo, uniwersytet. Księga ofiarowana Franciszkowi Ziejce w 65. rocznicę urodzin* [Literature, cultural sciences, university. Festschrift for Franciszek Ziejka in honor of his 65th birthday] (Kraków: Universitas), 455–68; see also the chapter by Tibor Frank in this volume.
74. Lewis Beyenson (1993) *Civilizing Mission: Exact Sciences and Colonial Expansion 1830–1940* (Baltimore: Johns Hopkins University Press); Richard Drayton (2000) *Nature's Government: Science, Imperial Britain and the 'Improvement' of the World* (New Haven, CT: Yale University Press); Roy MacLeod (ed.) (2000) *Nature and Empire: Science and the Colonial Enterprise* (Oxford, vol. 15. Chicago: University of Chicago Press); Kapil Raj (2006) *Relocating Modern Science: Circulation and the Construction of Knowledge in South Asia and Europe, 1650–1900* (New York: Palgrave Macmillan).
75. See, for example, Christian Marchetti (2007) 'Scientists with guns: on the ethnographic exploration of the Balkans by Austria-Hungarian scientists before and during World War I', *Ab Imperio*, 1, 165–90.
76. Marianne Klemm (ed.) (2009) 'Wissenschaft und Kolonialismus', *Wiener Zeitschrift zur Geschichte der Neuzeit*, 9/1.
77. Walter Sauer (ed.) (2002) *K. und k. kolonial. Habsburgermonarchie und europäische Herrschaft in Afrika* (Vienna: Böhlau Verlag); Christa Riedl-Dorn (ed.) (2010) *Novara – das Vernichtnis* (Vienna: Böhlau Verlag); Ursula Rack (2010) *Sozialhistorische Studie zur Polarforschung anhand von deutschen und österreich-ungarischen Polarexpeditionen zwischen 1868–1939* (Berichte zur Polar- und Meeresforschung, 618, Bremerhaven).
78. Jan Surman (2009) 'Imperial knowledge? Die Wissenschaften in der späten Habsburg-Monarchie zwischen Kolonialismus, Nationalismus und Imperialismus', *Wiener Zeitschrift zur Geschichte der Neuzeit*, 9/2, 119–33.
79. On the role of mapping see, for example, Peter M. Judson (1996) 'Frontiers, islands, forests, stones: mapping the geography of a German identity in the Habsburg Monarchy, 1848–1900', in Patricia Yeager (ed.) *The Geography of Identity* (Ann Arbor: University of Michigan Press), 382–406; Irina Popova (2003) 'Representing national territory: cartography and nationalism in Hungary 1700–1848', in Nancy M. Wingfield (ed.), *Creating the Other: Ethnic Conflict and Nationalism in Habsburg Central Europe* (Oxford and New York: Berghahn Books), 20–38. For more

- general perspectives see Robert Kaiser (2001) 'Geography', in *The Encyclopedia of Nationalism*, volume 1 (San Diego: Academic Press), 315–33; David Guggeuti and Daniel Speich (2002) *Topographien der Nation: Politik, topographische Ordnung und Landschaft im 19. Jahrhundert* (Zurich: Chronos); James R. Akerman (ed.) (2009) *Imperial Map: Cartography and the Mastery of Empire* (Chicago: University of Chicago Press). On the role of data-gathering networks in Habsburg-era geology see the chapter by Marianne Klemun in this volume. On the Empire's central institute for meteorology and seismology see Christa Hammerl, Wolfgang Lenhardt, Reinhold Steinacker and Peter Steinhäuser (eds.) (2001) *Die Zentralanstalt für Meteorologie und Geodynamik 1851–2001: 150 Jahre Meteorologie und Geophysik in Österreich* (Graz: Leykam). On the creation of data-gathering and reporting networks and the circulation of knowledge in climatology see Deborah R. Coen (2006) 'Scaling down: The "Austrian" climate between Empire and Republic', in James Rodger Fleming, Vladimir Jankovic and Deborah R. Coen (eds.) *Intimate University: Local and Global Themes in the History of Weather and Climate* (Sagamore Beach: Science History Publications), 115–40; Deborah R. Coen (2010) 'Climate and circulation in Imperial Austria', *The Journal of Modern History*, 82, 839–75. In certain respects these correspondence networks and survey projects are comparable with those in the US – also a land-based empire – at roughly the same time. See Daniel Goldstein (1985) "'Yours for science": The Smithsonian Institution's correspondents and the shape of the scientific community in nineteenth-century America', *Isis*, 85, 573–99; Robert V. Bruce (1987) *The Launching of American Science 1846–1876* (Ithaca, NY: Cornell University Press).
80. On the Imperial and Royal Natural History Museum in Vienna see Christa Riedl-Dorn (1998) *Das Haus der Wunder: Zur Geschichte des Naturhistorischen Museums in Wien* (Vienna: Holzhausen).
81. Marlies Rattler (2007) *Museum – Spiegel der Nation? Zugänge zur historischen Museologie am Beispiel der Genese von Landes- und Nationalmuseen in der Habsburgermonarchie* (Vienna: Böhlau).
82. Earlier versions of most of these chapters were presented at the third international conference of the European Society for the History of Science in Vienna, 10–12 September 2008, and at the XXIII International Congress for History of Science and Technology in Budapest, 28 July – 2 August, 2009.
83. Gábor Palló also discusses this issue with respect to the younger Eötvös in his chapter.
84. See the works by Kolar and Baár (cited above, note 45).
85. Marie Curie European Reintegration Grants.
86. See, for example, the scholarship Powroty/homing (now Homing plus) offered by the Foundation for Polish Science/ Fundacja na Rzecz Nauki Polskiej, http://www.fnp.org.pl/programmes/overview_of_programmes/grants_and_scholarships/homing_programme; http://www.fnp.org.pl/programmes/overview_of_programmes/grants_and_scholarships/homing_plus_programme. The Austrian Science Foundation also had a Schrödinger Rückkehrprogramm, which was abolished in 2003. See Katharina Warta (2006) *Evaluation of the FWF Mobility Programs Erwin Schrödinger and Lise Meitner* (Vienna: Technopolis Forschungs- und Beratungsgesellschaft mbH), http://www.fwf.ac.at/de/downloads/pdf/fwf_mobility_report.pdf.
87. For studies of such practices see for example, Pnina Abir-Am and Clark Elliot (eds.) (1999) *Commemorative Practices in Science: Historical Perspectives on the Politics of Collective Memory* (Osiris, vol. 14, Chicago: University of Chicago Press).
88. The history of science is hardly immune from this trend. Posters accompanying plenary lectures at the International Congress of History of Science and Technology in Budapest in the summer of 2009 followed much the same pattern, depicting important contributions of Hungarian scientists and technicians and thus continuing a long-standing pattern of commemoration-oriented historiography, with no analysis or contextualization whatever.
89. *Big Bang will open the Copernicus Science Centre*, online: http://www.naukaw-polsce.pap.pl/palio/html/run?Instance=cms.naukapl.pap.pl&_PageID=1&ss=szablou.depesza&dz=szablou.depesza&dep=376783&data=&lang=&_Checksum=1312044493.
90. One can find Comenius on the Czech 200 krona banknote, as well as Tomáš Masaryk and historian František Palacký on other notes. Ukrainian banknotes are emblazoned with portraits of the eighteenth-century philosopher and poet Grigoriy Savvich Skorovoda/ Hryhoriy Savych Skorovoda (500 hryven), the highest banknote, introduced in 2006) and Mykhailo Hrushevskyy (50 hryven), both members of the Kiev-Mohyla Academy. Polish złoty notes used to depict, apart from Copernicus, the chemist Maria Skłodowska Curie (= Marie Curie Skłodowska) and the eighteenth-century philosopher and geologist Stanisław Szasz. On Slovenia's banknotes (before the introduction of the euro) Carniolan-born Janez Vajkard Valvasor, Fellow of The Royal Society (20 tolar) and astronomer Jurij Bartolomej Vega/Georg Freiherr von Vega (50 tolar) were commemorated. In Slovakia the linguist Anton Bernoldk was honoured in this manner. Also before the introduction of the euro, Austria depicted the physicist Erwin Schrödinger (1000 Schilling) and economist Eugen Ritter von Böhm-Bawerk (100 Schilling), as well as sociologist Rosa Mayreder and psychoanalyst Sigmund Freud, who were excluded from the professional scientific community in their lifetimes.