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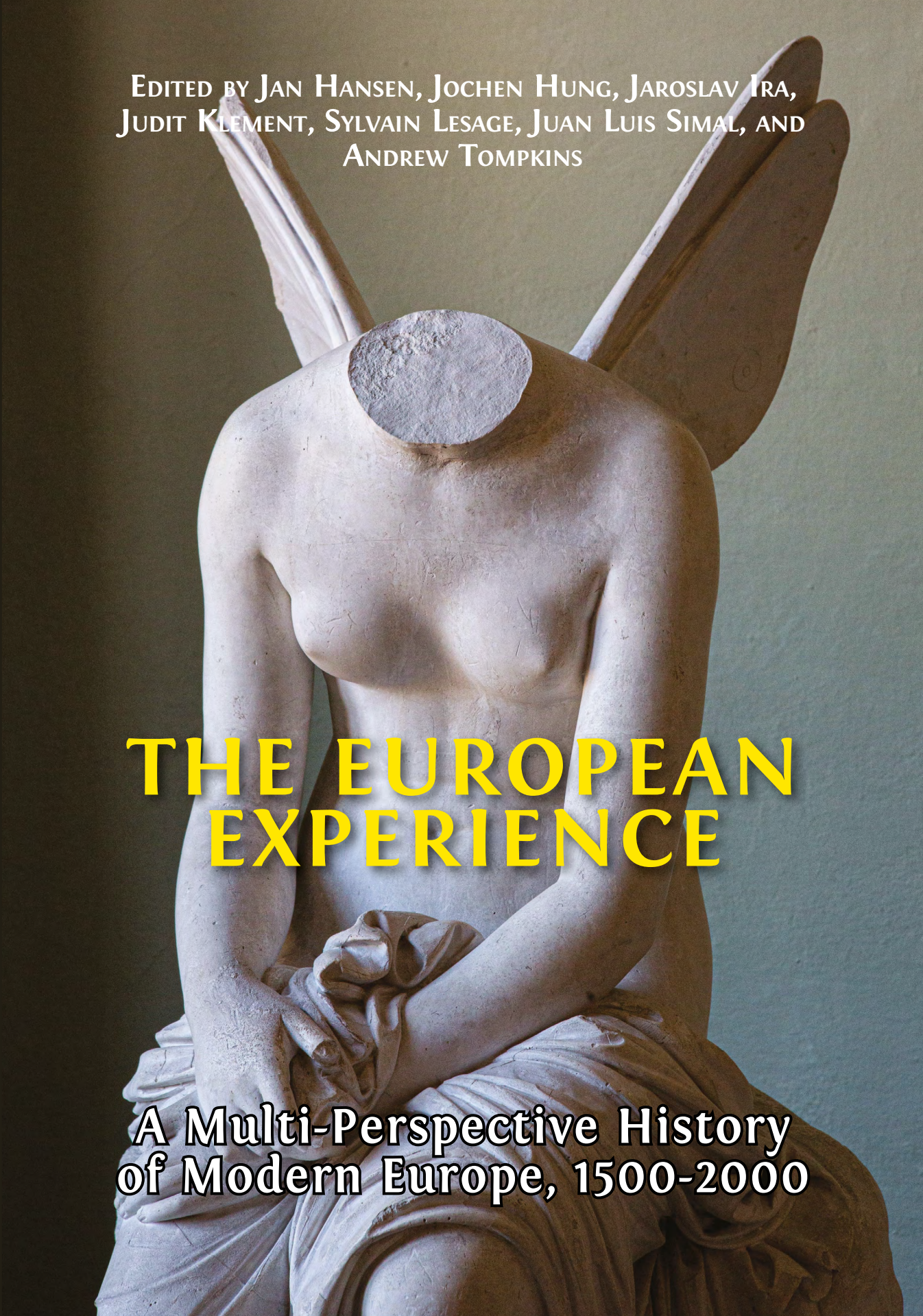

The European Experience

A Multi-Perspective History of Modern Europe, 1500-2000

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Jan Hansen, Jochen Hung, Jaroslav Ira, Judit Klement, Sylvain Lesage, Juan Luis Simal and Andrew Tompkins (eds), *The European Experience: A Multi-Perspective History of Modern Europe*. Cambridge, UK: Open Book Publishers, 2023, https://doi.org/10.11647/OBP.0323

Digital material and resources associated with this volume are available at https://doi.org/10.11647/OBP.0323#resources

This book is one of the outcomes of the Erasmus+ Strategic Partnership "Teaching European History in the 21st Century", which ran from 2019-2022 and was funded by the European Commission under the Erasmus+ Key Action 2 (Cooperation for innovation and the exchange of good practices).

ISBN Paperback: 978-1-80064-870-8
ISBN Hardback: 978-1-80064-871-5
ISBN Digital (PDF): 978-1-80064-872-2
ISBN Digital ebook (epub): 978-1-80064-873-9
ISBN Digital ebook (azw3): 978-1-80064-874-6
ISBN XML: 978-1-80064-875-3
ISBN HTML: 978-1-80064-876-0
DOI: 10.11647/OBP.0323

Cover image: Wilhelm Gunkel, *Fly Angel Fly* (2019). Cover design by Katy Saunders

4.3.3 Education and Knowledge Transfer in Contemporary History (1900–2000)

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Introduction

Research and education in Europe underwent enormous, dynamic, and drastic changes during the twentieth century. The educational and scientific system was closely connected to economic, political, and cultural developments and was impacted massively by two World Wars and the rise of totalitarian ideologies. The so-called massification of education that had already started to evolve in earlier centuries was a basic trend in most parts of Europe, albeit with many differences between timing and regions. The number of pupils and students grew, as did the number and size of schools, technical colleges, and universities. While in 1800 there were only around 100,000 students registered, today around 20 million students are studying at European universities. Furthermore, education and research advanced greatly in terms of professionalisation, differentiation, and specialisation during the twentieth century. New disciplines with specific methods and theories emerged and were integrated into universities and other institutions. In the nineteenth century, transnational cooperation had already become an integral part of science, culture and education. This trend proved to be unstoppable despite the turmoil of the World Wars, and continued throughout ideological conflicts. It led to a common European research and education area being established as the century came to a close. This chapter takes a closer look at these developments by following a chronological approach.

The Early Twentieth Century

At the turn of the nineteenth century, European scientific exchange was flourishing. Attending international congresses had become as much an

 https://doi.org/10.11647/OBP.0323.48

integral part of academic life as memberships in international scientific associations. Technical innovations fostered transnational exchanges, with infrastructures such as railroads, steamships, and telegraph poles making it possible for academic and cultural circles to establish contacts with foreign colleagues. Technical universities and research laboratories were established and led to a professionalisation of scientific research and education in natural and technical sciences.

With the outbreak of the First World War, transnational exchange in culture, science, and education came to a temporary halt. The initial war euphoria in European societies produced a collective mentality, called *Burgfrieden* in Germany and *union sacrée* in France. Scientists often showed solidarity with the political and military ambitions of their respective nations. Professors dissolved their cooperation with colleagues from universities in enemy countries. Numerous researchers returned the honours and prizes they had received abroad, and research administrators excluded colleagues from enemy countries from their academies and associations. In return, researchers supported national war objectives with their specialist knowledge. Engineers, chemists, and physicists in particular supported national military interests through war-related research. The German chemist Fritz Haber, for example, enabled through his research the use of the poison gases chlorine and phosgene as weapons of war. The war was also supported by humanities scholars and cultural workers. German artists and writers signed, for example, the so-called 'Manifesto of the Ninety-Three', in which they declared unity between the German military and German intellectuals. The First World War thus also became a war of brains.

Even if international cooperation in science, culture, and education experienced a renaissance in the interwar period, the nationalist *esprit* continued to affect the mindsets of many intellectuals. For example, the reorganisation of international scientific cooperation in the newly founded International Research Council (IRC) after the First World War excluded German and Austrian scientists. Even scientists from countries that were neutral during the war—such as the Scandinavian countries, the Netherlands, Spain, and Switzerland—were only reluctantly admitted as members of the IRC. The lines of conflict of the First World War were thus maintained. Nevertheless, many countries hoped for prestige and a better standing through international appearances. For example, the engineer and inventor Leon Theremin, who constructed the first motion detector in Russia and the world's first electronic musical instrument, the *theremin*, was staged as a symbol for the genius of Soviet scientific life. In the 1920s, Theremin toured the USSR, Central and Western Europe, and the USA performing with his musical instrument in front of crowds, illustrating the power of Soviet physics.

Fig. 1: Corbis Bettmann, "Leon Theremin demonstrating his instrument" (1927), Public Domain, Wikimedia, https://commons.wikimedia.org/wiki/File:Termen_demonstrating_Termenvox.jpg.

The dynamics of forced migration began to affect the academic world. This crystallised after the 1917 Russian Revolution, which drove a wave of emigration of artists and scientists from Russia to Western European capitals (such as Prague, Berlin and Paris) up until the mid-1920s. One landmark of this 'brain drain' was the action taken in 1922–1923 by the so-called philosopher's steamboats, which transported over 200 leading intellectuals who had been expelled from Soviet Russia due to their ideological backgrounds.

The Second World War and Post-war Europe

The totalitarian ideology of National Socialism and the Second World War unleashed by its adherents led to an existential crisis not only for international cooperation, but for the entire European educational, research, and cultural sphere. During the war, academic cooperation in Europe could scarcely be maintained. Although international scientific events were held in areas occupied by the Nazis, these were primarily held for propaganda purposes. For example, Werner Heisenberg, a German nuclear physicist and 1932 Nobel Prize winner, was sent during the war to the occupied territories to propagate a positive image of German culture under the Nazi regime. The consequences for universities were enormous. Still, they tended to be more drastic for the universities of Eastern and Southern Europe than for those in Western and Northern Europe. In France under the Vichy regime, non-Jewish students and teachers were able to follow an apparently normal university

life as long as they did not openly resist the Nazis and their ideology. Some secured the continuation of their research activities by cooperating with Nazi authorities. Others continued to work in silence and ignored abuses by Nazis and Nazi collaborators in their milieu. In much of Central and Eastern Europe, Nazis systematically destroyed scientific and research institutions. Numerous university members were murdered, while others fled, leaving behind their homeland, family, language and culture.

After the end of the Second World War, Europe's universities, schools, and cultural institutions were mostly re-established within nationally-oriented education and cultural systems. Additionally, there was also a renewed dynamic of internationalisation. The revival of internationalism after the end of the Second World War was notably expressed in the form of large-scale research projects that were jointly financed by the governments of several countries. In Western Europe, the European Organisation for Nuclear Research (CERN) was founded in 1952 and the European Space Research Organisation (ESRO) in 1964. These are two of many examples where governments pooled their resources in order to jointly develop stature in costly fields of research. Post-war internationalisation also took on a dynamic that had been almost unknown until then: after 1945, governments set up plenty of new international organisations which fostered European and international policies in the fields of education, science, and culture.. In Western Europe, under the circumstances of economic integration and east-west conflict, governments founded a number of organisations in which science and education policies were debated, including the Council of Europe, the Western European Union, NATO and the OECD. Thus they established a global infrastructure for international policymaking in education, culture, and science, marking a contrast with the period before and after the First World War. In addition to these governmental organisations, multilateral cultural and educational initiatives were launched in the process of Europe's political unification. Although these bodies emerged under the influence of governments, they soon claimed non-governmental status for themselves. This is exemplified by the College of Europe in Bruges, which was established in 1950 as an independent graduate school for areas of emerging European integration, or by the European Cultural Foundation, founded in 1954 on the initiative of the Swiss philosopher Denis de Rougemont.

After 1945, the socialist countries in Europe's east mostly took Soviet education as a role model and adapted it in their own ways. In general, all forms and levels of education were state-owned and free of charge. The uniform elementary education from eight to ten years led into three options of secondary education, two of which provided an opportunity to apply for higher educational options. Schools offering vocational education was less socially prestigious. Russian was taught as the first foreign language all over

Eastern Europe. Extracurricular activities were intense and expected to focus on the ideological and political education of young people. The church was deprived of its role in education, except in Poland. Unlike in Western Europe, university studies in Eastern Europe remained a privilege for the few. There was a system of two-tier entrance exams and only the best were admitted to universities, though children from socially privileged families who earned poor grades were admitted to universities by political patronage. The so-called Friends' Associations between nations (for instance the Soviet-Hungarian or the Soviet-German Friends' Association, referring to East Germany) were supported as an early form of intercultural public diplomacy, establishing international contacts between representatives of the sciences, arts, sports, industries, and culture in general.

In the Eastern Bloc, the organs of the state enforced strict controls over the humanities, fearing the genesis of uncontrolled ideas. But the phenomenon of *samizdat*—home-made publications that were illegally handed over from person to person in uncensored formats—shows that human thought could not be controlled, even if it was a question of life or death. Centralisation of and state control over knowledge transfer gave a distinctive shape to scientific life in Eastern Europe. On the one hand, science became a battlefield for political issues, since the findings of all fields of academic research were meant to support state ideology. On the other hand, the idea of knowledge held great prestige in socialist societies. Most parents wanted their children to become well-educated and knowledgeable grown-ups. Secondary and higher education were positioned as routes to ascend social hierarchies.

Regarding the mobilisation of scientific exchange, travelling abroad was a delicate issue in all socialist countries. It was not enough for scholars to have obvious academic merits—it was also necessary to be politically reliable. Not only did citizens lack the right to organise trips on their own, they also lacked the savings to finance them. It was forbidden by law to have foreign currency at home. If someone was assigned a visit to a Western country, it also meant that their superior was required to guarantee that the employee would return back home. Otherwise, the superior would get into legal trouble. Political criticism and opposition to state ideology started to show up in the sciences during the 1960s, the most important representative of this shift being the physicist Andrei Sakharov, winner of the Nobel Peace Prize in 1975. During the Cold War, cooperation between east and west remained limited. However, a rapprochement between actors from the western and eastern parts of Europe, blocked by the so-called 'Iron Curtain', gradually became possible from the end of the 1950s, during the Khrushchev period. This possibility was later marked by the incipient Helsinki Process of the early 1970s, which led to the formation of the OSCE. Travelling abroad was a great privilege, even

within the socialist camp. Individually organised professional trips were not allowed—they were possible only via appointment by the workplace (known as the system of *komandirovka*).

The Late Twentieth Century and Steps towards a United Europe

Since the end of the nineteenth century, many European universities took on increasing numbers of students. This was a trend that accelerated in Western Europe after the end of First World War, eventually leading to a fundamental transformation of its universities from the 1960s onwards. Previously, universities had usually addressed only a small minority of a population, making them something of an elite institution. As student numbers grew, they transformed into mass institutions. Although the student body has been further growing from the 1960s onwards, the financial resources in the education sector have increased only slightly or remained unchanged in proportion to rising student numbers. This has led to generally poorer educational conditions and growing dissatisfaction among the increasingly diverse composition of the student and teaching body. The massification of higher education and its consequences were some of many forces that drove protests around the year of 1968, which led to demands for the democratisation of society in general and the educational system in particular. However, proposals for a 'group university' in Western European countries such as Germany and the Netherlands, which would correspond rights to defined status groups (students, academic staff, non-academic staff and professors), were usually rejected after a few years. The massification of the educational sector was also countered by educational offerings via new technologies. Distance learning and online universities, as well as video platforms, produced new forms of knowledge transfer. The nation-state framework for science, culture and education was thus transformed by alternative forms of knowledge transfer that were virtually independent of statehood.

The development of industrial research from the 1960s onwards is in fact part of much longer processes, on the scale of the 'long' twentieth century. In Germany, the creation of the Physikalisch-Technische Reichstanstalt in 1887 was inspired by the German electrical industry, which expressed a growing need for precise measuring instruments. This institutional innovation was notably imitated in Great Britain with the National Physical Laboratory (1900), and in France with the establishment of a testing laboratory at the Conservatoire national des arts et métiers (1901). At the same time, the first in-house research structures were developed in Europe in large companies. The period leading up to the First World War and the conflict itself expedited

the institutionalisation of industrial research. The founding of the Kaiser Wilhelm Gesellschaft in Germany (1911), for example, made it possible to intensify collaboration between industrialists and scientists. During the war, the creation in Britain of the Department of Scientific and Industrial Research (1915–1916) was part of the same movement, lasting until after the Second World War. The Second World War, whose outcome demonstrated the importance of scientific mobilisation in times of conflict, was followed by a strengthening of ties between science and industry. In Germany, for example, the Fraunhofer Society (1949) was charged with funding applied research.

By the 1960s, however, a new dynamic was established as a result of the space race and the Sputnik 'shock'. The creation of the OECD in 1961 provided an opportunity for coordination across Western European states aimed at promoting industrial research. National ambitions to connect science and industry led to the creation of the Ministry of Technology in Great Britain (1965) and the Agence nationale de valorisation de la recherche in France (1967). The economic crisis of the 1970s, the emergence of Japan as a technological power, and the development of new technologies (information technology, biotechnology) would later encourage European economic powers to strengthen, on a transatlantic scale, the links between science and industry. With the support of the OECD, the European Industrial Management Association was created in 1965 on the model of the US Industrial Research Institute (1938). This institution brought together major European companies on matters of research and development, and helped establish new links with the academic world. In this new context, new forms of collaboration were established between universities and economic players. Technopoles were developed, such as the Sophia Antipolis Technology Park (1969) and the Cambridge Science Park (1970). In addition, companies reoriented their activities: Solvay, for example, turned from 1977 towards the biochemical industry. One of the major features of this period was the globalisation of research and development, which corresponded to the globalisation of trade. Today, large multinational companies structure their industrial research on a world scale and must manage their collaborations with the academic world at the same level.

The professionalisation of university management in this period seemed to become as inescapable as the growing importance of administrative tasks in the academy. Ideas from New Public Management have found their way into many educational institutions. Neoliberal elements have steadily grown in the fields of science, education, and culture—in Western Europe since the 1970s and in Eastern Europe since the 1990s. Economic theories and practices of corporate governance have deeply affected researchers, educationists, and cultural workers, in the European sphere as well as internationally. This has

been the impact of mechanisms behind European funding schemes such as the European Research Framework Programmes, which have existed since 1984 to promote cross-border research and development. In order to receive funding, applications must be written, expert opinions must be prepared by third parties, a ranking of the applications is made, and the research must then be evaluated for future application processes. Thus, the logic of competition has prevailed in higher education.

In addition, a debate on student mobility and the standardisation of courses and degrees gradually emerged in the late-twentieth century and led, for instance, to the implementation of the ERASMUS programme, which has co-financed the mobility of students and young researchers in Europe since the 1980s. The so-called Bologna Process (1999 onwards), through which European ministers of education and science have sought to create a single European Higher Education Area by ensuring the comparability of higher-education qualifications, was another outcome of this debate.

Conclusion

Europe in the twentieth century was characterised by a general expansion of education and knowledge transfer and, as a consequence, by the spread of educational and academic institutions. Broadly speaking, elementary education became available for almost all Europeans in the first half of the century. Secondary education became a desirable level of study after the Second World War, and the need for higher education started to expand on a broad scale from the 1960s onward. Higher education gradually lost its elite character, except for some outstanding universities. Academic knowledge transfer via congresses and conferences became ubiquitous, while memberships of vocational and scientific associations proliferated, both in national and international frames. Though the content of education was often determined and controlled by state authorities, for most of this period academic freedom and the autonomy of universities' freedom were not questioned—at least in Western democracies.

A different development was evident in the young USSR, where members of the upper classes could not gain access to higher education or to any intellectual jobs. This schema spread across socialist countries after the Second World War. But in parallel to the oppression of the traditional middle and upper classes in the socialist bloc, a broader range of society was granted access to knowledge. Financial situations were difficult for most citizens of socialist countries, apart from the *nomenklatura*, and there was strict ideological control by the state over intellectual life. But this also resulted in an important and remarkable growth of real knowledge. When the Iron Curtain became more permeable, the knowledge from the two parts of Europe met, along with

their respective practices and attitudes towards knowledge, and in some cases these were fruitful encounters. The effects of these differences still prevail and continue to enrich European intellectual life.

Discussion questions

1. In which ways was education in the twentieth century shaped by ideologies?
2. Which role did the Cold War play in the development of education and knowledge transfer in Europe?
3. In which ways is your university education today different from the twentieth century?

Suggested reading

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