

The Modern American Research Multiversity:
European Universities Trailblazed American Exceptionalism and Ushered in the Innovation Age

Brian Zhou

Senior Division

Historical Paper

Historical Paper Word Count: 2500

Process Paper Word Count: 500

Process Paper

I've been fascinated by European history, especially the dynastic struggles and intrigue of European courts. Although initially interested in how the emerging frontier of credit financed the UK to beat Napoleon and his Continental System, I realized that I lacked significant primary and secondary literature for my thesis and searched for new ideas.

When I presented at the Association for Advancement in AI's annual conference in the winter, I was shocked that the audience was all university professors and students. As a student researcher from TJHSST, a science magnet school, I wondered why this was the case, and what developments led us to our modern research system. I began exploring what developments allowed American universities to dominate academia when they were founded centuries after European universities.

To explore this study, I accessed journals provided by TJHSST and supplemented by my dual enrollment at George Mason University. The tie-in to the annual theme was clear: research universities are the driving force that pushed the unknown frontiers of science and what was possible. University professors were the minds behind the Manhattan Project, American law schools educated generations of Congressional and courtroom leadership, and American business schools cased the next entrepreneurial tycoons. Beyond innovation, the evolution of the university system continues to push the frontiers of how research is conducted and supported.

I found a variety of diverse sources, including research papers, university charters, primary accounts, and books that answered my question. American universities that drove innovation derived their models of operation from the Prussian Humboldtian Reforms. These reforms were groundbreaking, as they enshrined important educational values into K-12 and

university education and promoted research and discovery as the priorities of a university instead of teaching, something that no European university dared to do before.

However, as I did deeper research, I gained a new lens to evaluate the journey of the university. Instead of one singular end-all-be-all reform, universities emerged from a millennium of debates, conflicts, and wars that created a secular, humanistic, and free-thinking environment for universities to conduct ground-breaking research. The first texts studied, secularization of the Thirty Years' War, the devastation Prussia endured in the Napoleonic Wars, and the scholastic diasporas from the Byzantines and Huguenots necessitated crucial reforms to universities and laid the framework for American research universities. Each development pushed the frontier of global education. I wanted my paper and appendices to tell the same story and timeline of each development and reform by journeying through landmark events to show how universities evolved.

After the district competition, I realized that debate rages over the efficacy of the multiversity system and its effects on education. I hoped to share differing perspectives and explore current challenges facing the multiversity, so I reached out to interview a Ph.D. candidate and lecturer at Oklahoma University to gain new insights.

I chose to write an in-depth historical paper to summarize my findings; after all, what better way to convey the critical role of universities in research than with a research paper?

“Now, I am become Death, the destroyer of worlds.”

- J. Robert Oppenheimer, director of the Manhattan Project¹

British Prime Minister Winston Churchill gave many speeches across American universities and often commented on the education of students in Great Britain and America. At the University of Miami in 1946, he remarked that American graduates “numbered not by the million but by the 10 million”, statistics unheard of for Great Britain.² Three years later at MIT, he lamented that Great Britain had no university comparable to MIT:

Industrial production depends on technology[...] the Americans[...] have realized this and created institutions for the advanced training of large numbers of high-grade engineers to translate the advantages of pure science into industrial technique– it is for that reason that their output per head and constant standard of life are so high.³

Churchill’s analysis proved correct. America’s power as the reigning global hegemon is built on the back of American research that pushed the endless frontier of scientific discoveries.⁴ This research enabled the US to leverage its large population to maintain a productive manufacturing base while developing the most advanced technologies.

At the heart and soul of American innovation and progress were the American research universities. Researchers at UC Berkeley discovered 16/118 elements on the periodic table,⁵ engineers at UPenn developed the first computer ENIAC,⁶ and the founder of Harvard Medical

¹ National Broadcasting Company Encyclopaedia Britannica Films Inc and Films Incorporated dirs. 1965. *The Decision to Drop the Bomb*. National Broadcasting Co. Released by Films Incorporated.

² Sofen, Brendan. 2016. “An Uneducated Man Speaking His Mind: Winston Churchill and American Universities.” International Churchill Society.

<https://winstonchurchill.org/publications/finest-hour/finest-hour-171/winston-churchill-and-american-universities/>.

³ “InfiniteMIT | Sir Winston Churchill at MIT – 1949 Mid-Century Convocation Speech.” n.d. MIT.

<https://infinite.mit.edu/video/sir-winston-churchill-mit-%E2%80%93-1949-mid-century-convocation-speech>.

⁴ Crow, Michael M, and William B Dabars. “A New Model for the American Research University.” *Issues in Science and Technology*, July 1, 2022. <https://issues.org/a-new-model-for-the-american-research-university/>.

⁵ Chao, Julie, and Glenn Roberts. 2019. “16 Elements: Berkeley Lab's Contributions to the Periodic Table.” News Center. <https://newscenter.lbl.gov/2019/01/28/16-elements-berkeley-labs-contributions-to-the-periodic-table/>.

⁶ Richey, Kevin W. n.d. “ENIAC at Penn Engineering.” Penn Engineering. <https://www.seas.upenn.edu/about/history-heritage/eniac/>.

School introduced the smallpox vaccine to the US.⁷ Universities drove advancement by aggregating vast quantities of funding, researchers, and labs together to work on groundbreaking papers and developments that drove American progress in new frontiers of science.

These pivotal institutions have European roots to thank. A millennium of warfare and scholarship created secular and free-thinking institutions that elevated schools of humanistic thought. Prussian intellectual reforms necessitated by military defeats expanded access to primary education and laid the framework of the modern research university. Fledgling American universities reached across the Atlantic and adopted European teachings, shaping American higher education.

Ultimately, the adoption of European models paved the way to research institutions that furthered innovation and discovery. New American reforms allowed American universities to relentlessly push the final frontier of innovation, dominate higher education, leapfrog competitors in prestige, and even surpass the old European universities to seize the mantle as the driving force behind global innovation.

Origins of the University

European education throughout history is marked by a series of rises and falls. As political powers such as the western Roman Empire underwent collapse, education collapsed with it. The Dark Ages were ushered in.⁸ Centuries later, Charlemagne reestablished institutions of learning on the continent, founding the Palace School and inviting the Anglo-Saxon scholar Alcuin to lead his new courts of learning.⁹ The Carolingian Renaissance revived studying Latin

⁷ “Timeline of Discovery | Harvard Medical School.” n.d. Harvard Medical School. <https://hms.harvard.edu/about-hms/history-hms/timeline-discovery>.

⁸ Markham, J. David. n.d. “The Revolution, Napoleon, and Education.” The Napoleon Series. https://www.napoleon-series.org/research/society/c_education.html#3.

⁹ Farrington, Frederic E. 2010. *French Secondary Schools: An Account Of The Origin, Development And Present Organization Of Secondary Education In France*. N.p.: Kessinger Publishing, LLC.

scripture in city schools and monasteries.¹⁰ Charlemagne's schools focused on understanding religious texts and preserving Latin manuscripts; this required learning secular grammar and communication.¹¹ Education was safeguarded by the elite as a treasure that led to spiritual understanding and truth.¹² Thus, elites treated works with a reverential attitude and restricted education to the elite and clergy.

Charlemagne's reforms paved the path for the first European universities, including the disputed¹³ University of Bologna in 1088, Oxford in 1096,¹⁴ and the University of Paris in 1208.¹⁵ These universities trained students in medicine, law, and theology at undergraduate and graduate levels¹⁶ but shifted to a broader exploration of knowledge to generate general benefits for society. Instead of academics teaching neo-academics, universities instructed the elite in a general education.¹⁷ Universities proliferated when disagreements divided faculty, such as when Cambridge split from Oxford in 1209 over differing opinions on the church.¹⁸ Political leaders chartered new universities.¹⁹ The Holy Roman Emperor Frederick II founded the University of Naples to train administrators and lawyers to counter the University of Bologna, which educated the rival Lombard League.²⁰ Monarchs quickly recognized the importance of sponsoring university education.

¹⁰ Johnson, Hannah. 2022. "How the Carolingian dynasty changed how we read." Europeana. <https://www.europeana.eu/en/blog/how-the-carolingian-dynasty-changed-how-we-read>.

¹¹ Contreni, John J. 2014. "Learning for God: Education in the Carolingian Age." *The Journal of Medieval Latin* 24:88-129.

¹² McKitterick, Rosamond. 2009. *The Carolingians and the Written Word*. N.p.: Cambridge University Press.

¹³ Ridder-Symoens, Hilde d., ed. 2013. *A History of the University in Europe: Volume 1, Universities in the Middle Ages*. N.p.: Cambridge University Press.

¹⁴ "History." n.d. University of Oxford. <http://www.ox.ac.uk/about/organisation/history>.

¹⁵ Ridder-Symoens 2013, p. 6

¹⁶ Rudy, Willis. 1984. *The universities of Europe, 1100-1914: a history*. N.p.: Fairleigh Dickinson University Press.

¹⁷ Ridder-Symoens, Hilde d., ed. 2013. *A History of the University in Europe: Volume 2, Universities in Early Modern Europe (1500–1800)*. N.p.: Cambridge University Press.

¹⁸ Anderson, Ross. 2009. "Cambridge University – the Unauthorised History." <https://www.cl.cam.ac.uk/~rja14/unauthorised.html>

¹⁹ Appendix A.

²⁰ Rudy 1984, p. 27-28

The Renaissance and the Scientific Revolution

European scholars were never confined to one city-state or another²¹ and traveled between different cities and universities to learn,²² spreading new advancements as they were discovered. External factors catalyzed migrations in academia as scholars were forced to move. The fall of Constantinople in 1453 started the migration of Byzantine scholars and academics to Italy,²³ bringing Greek knowledge and texts that laid the framework of the Renaissance.²⁴ Forty years later, the brutal Italian Wars (1494-1559) forced Renaissance scholars to flee to neighboring kingdoms, spreading the Renaissance across the continent.²⁵

The Renaissance introduced a new school of thought into education. Out was the antiquated Middle Ages study of Scholasticism; in came the liberal arts, or the *studia humanitatis*.²⁶ Humanist scholars filled positions in universities across Europe and transformed the way their fields were studied and taught.²⁷ In medicine, humanists reexamined the antiquated textbooks of Galen and introduced new studies on anatomy and medicine.²⁸ Scholars rediscovered and analyzed the works of Pagan Roman scholars like Livy and Cicero, building the modern field of history²⁹ and philosophy.³⁰ These studies deemphasized the importance of

²¹ Valzania, Andrea. "The stranger. Two essays on exile." (2014): 249-250.

²² Schachner, Nathan. 1939. "The Mediaeval Universities." *History* 24, no. 95 (December): 262-264.

²³ Vacalopolous, Apostolos. 1966. "The Exodus of Scholars from Byzantium in the Fifteenth Century." *Journal of World History* 10, no. 1 (1): 463.

²⁴ Dominiczak, Marek H. 2015. "Migration and Culture." *Clinical Chemistry* 61, no. 8 (August): 1120-1121. [10.1373/clinchem.2014.236984](https://doi.org/10.1373/clinchem.2014.236984).

²⁵ Lagasse, Paul. "Italian Wars." In *The Columbia Electronic Encyclopedia*. Columbia University Press, 2023.

²⁶ Bernardes, José L. 2019. "How the Renaissance Shaped Liberal Arts Education." BookBrowse. <https://www.bookbrowse.com/blogs/editor/index.cfm/2019/1/3/How-the-Renaissance-Shaped-Liberal-Arts-Education>.

²⁷ Grendler, Paul F. "The Universities of the Renaissance and Reformation." *Renaissance Quarterly* 57, no. 1 (2004): 1-42. <http://www.jstor.org/stable/1262373>.

²⁸ Siraisi, Nancy G. "Medicine and the Renaissance World of Learning." *Bulletin of the History of Medicine* 78, no. 1 (2004): 1-36. <http://www.jstor.org/stable/44447951>.

²⁹ Phillips, Matthew. 2013. "Historia et Memoria | Historical quotes and explanations | Page 15." Concordia University Faculty and Staff. <https://wp.cune.edu/matthewphillips/page/15/?cat=-1>.

³⁰ Marsh, David. "Cicero in the Renaissance." In *The Cambridge Companion to Cicero*, edited by Catherine Steel, 306-17. Cambridge Companions to Literature. Cambridge: Cambridge University Press, 2013. doi:10.1017/CCO9781139048750.020.

theology and pushed universities to adopt a humanistic model for education that emphasized pursuing knowledge and self-improvement over dedication to God.³¹

Under this new framework, revolutionary topics and ideas that would have been censored were given a platform to be debated and interpreted. The Scientific Revolution swept away old Grecian-era theories and thought; academics including Copernicus, Newton, and Boyle established modern scientific fields including astronomy, chemistry, physics, and calculus.³²

Religious Wars and the Protestant Reformation

Humanist universities laid the groundwork for the radical Protestant Reformation. German historian Bernd Moeller argued that “without Humanism, there would be no Reformation.”³³

Martin Luther was a humanist and a professor at the University of Wittenberg,³⁴ where he published his infamous *Ninety-five Theses*.³⁵ Luther’s distaste towards the sale of indulgences around Wittenberg motivated him to research and propose his disputation: a common European scholastic method used to open public debate on new proposals or ideas.³⁶ His writing caught on. Luther’s colleagues became ardent supporters of the Protestant Reformation and spread his teachings to generations of students beyond his death.³⁷ Ultimately, the Protestant Reformation

³¹ Bernardes 2019

³² Osler, Margaret J, Steven G Brush, and J. Brookes Spencer. “Scientific Revolution.” In *Britannica*, 2019. <https://www.britannica.com/science/Scientific-Revolution/Optics>.

³³ Moeller, Bernd. "Die deutschen Humanisten und die Anfänge der Reformation." *Zeitschrift für Kirchengeschichte* 70 (1959):46-61.

³⁴ McKim, Donald K., and Cambridge University Press, eds. 2003. *The Cambridge Companion to Martin Luther*. N.p.: Cambridge University Press.

³⁵ Appendix B.

³⁶ Grendler 2004, p. 15

³⁷ Grendler 2004, p. 18

triggered multiple wars over religion including the Eighty Years' War and the Thirty Years' War which ended in an inconclusive Peace of Westphalia.³⁸

The wars and Reformation had a significant effect on religion and state-building, as the wars substantially weakened the Catholic Church. Protestant states secularized church and state to form the concept of a modern nation-state.³⁹ States like England, the Netherlands, Sweden, Denmark, and Prussia benefited from the increased centralization that the Reformation provided them. The seizure of church properties and disappearance of religious jobs meant that Protestant graduates began working in secular fields. Protestant universities quickly adapted their now-secular instruction to reflect this economic shift.⁴⁰

The wars had a devastating toll on the population and economy of the German states. It was the most destructive European conflict to date; an approximated 20% of all Europeans perished during the Thirty Years' War. As the brunt of the warfare was waged inside the Holy Roman Empire, German towns and cities lost upwards of 90% of their population.⁴¹ The Electorate of Brandenburg-Prussia, which switched sides three times before the war concluded, received important territorial gains in Pomerania,⁴² but its flip-flopping involvement devastated the realm: most of the population either died or fled once the dust settled⁴³.

³⁸ Onnekink, Dr D. 2013. *War and Religion After Westphalia, 1648–1713*. Edited by Dr D. Onnekink. N.p.: Ashgate Publishing Limited.

³⁹ Farr, Jason. 2005. "POINT: THE WESTPHALIA LEGACY AND THE MODERN NATION-STATE." *International Social Science Review* 80 (3/4): 156-159. <https://www.jstor.org/stable/41887235>.

⁴⁰ Cantoni, Davide, Dittmar, Jeremiah E. and Yuchtman, Noam (2017) *Reallocation and secularization: the economic consequences of the Protestant Reformation*. CEP Discussion Papers (CEPDP1483). Centre for Economic Performance, London School of Economics and Political Science, London, UK.

⁴¹ Kamen, Henry. "The Economic and Social Consequences of the Thirty Years' War." *Past & Present* 39 (April 1968): 44–61. <https://doi.org/https://www.jstor.org/stable/649855>.

⁴² Wilson, Peter H. "The Thirty Years War." *Historically Speaking* 8, no. 1 (2006): 24–26. <https://doi.org/10.1353/hsp.2006.0010>.

⁴³ Appendix C.

Prussia and the Greats

After the Peace of Westphalia, Frederick William ascended to the throne of Brandenburg-Prussia. Frederick William secured the independence of the Prussian duchy from Poland-Lithuania. Most importantly, the Great Elector rebuilt Prussia after the Thirty Years' War. William invited persecuted French Huguenots to repopulate the realm with the 1685 Edict of Potsdam,⁴⁴ who brought technologies and knowledge that boosted Prussia's industry and curriculum.⁴⁶

Three successions later, Frederick II the Great mandated compulsory primary schooling—the first of its kind, but the funding appropriated was a mere fraction of what was needed.⁴⁷ Prussia was an “army with a state” with a growing professional army and an already-educated officer class.⁴⁸ The booming classes of merchants and army nobles utilized the *Realschules* and *gymnasiums*, secondary and university preparatory schools that educated the Prussian elites.

More importantly, Frederick the Great embraced the French Enlightenment and provided state support for education, intending to make Berlin a center of Enlightenment.⁴⁹ The lack of other universities and the devastation of Berlin offered the Huguenots the opportunity to establish a new university that could avoid the censors that universities in Paris and London had. The ability to provide controversial perspectives that would otherwise have been censored⁵⁰

⁴⁴ Glozier, Matthew. *War, Religion and Service: Huguenot Soldiering, 1685-1713*. Routledge, 2007.

⁴⁵ Appendix D.

⁴⁶ Hornung, Erik. “Immigration and the Diffusion of Technology: The Huguenot Diaspora in Prussia.” *American Economic Review* 104, no. 1 (2014): 84–122. <https://doi.org/10.1257/aer.104.1.84>.

⁴⁷ Horn, Melton James Van. *Absolutism and the Eighteenth-Century Origins of Compulsory Schooling in Prussia and Austria*. Cambridge: Cambridge University Press, 2003.

⁴⁸ Palmer, R. R. “4. Frederick the Great, Guibert, Biilow: From Dynastic to National War.” *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, 1986, 91–120. <https://doi.org/10.1515/9781400835461-006>.

⁴⁹ Cheryl Lynn Smeall, Susan Elizabeth Dalton, and Valentin Boss. “How to Become a Renowned Writer: Francesco Algarotti (1712-1764) and the Uses of Networking in Eighteenth-Century Europe.” eScholarship@McGill. McGill University, January 1, 1970. <https://escholarship.mcgill.ca/concern/theses/3n204322z>.

⁵⁰ Aarsleff, Hans. “The Berlin Academy under Frederick the Great.” *History of the Human Sciences* 2, no. 2 (1989): 193–206. <https://doi.org/10.1177/095269518900200203>.

started the Prussian tradition of embracing academic freedom, allowing the new university to thrive with scientific minds like Leibniz and Kant.⁵¹

The French Revolution, Humboldt, and the Prussian Reforms

From the French Revolution came two competing forms of university systems, the French *Grande école* and the Prussian *Königsberger Schulplan*. The French écoles were renowned for producing the highest-quality scientists and engineers thanks to the specialized instruction that the écoles provided.⁵² However, the utter defeat Prussia experienced during the War of the Fourth Coalition in 1806 necessitated new reforms.⁵³ While military minds like Clausewitz, Gneisenau, and Scharnhorst reformed the military, a defeated Prussia expanded access to primary and secondary education to all Prussians. Although disputes over his full influence are documented,⁵⁴ the Prussian education advisor Wilhelm von Humboldt is credited with the birth of the German university system. He re-shaped the universities of old, writing that:

The University teacher is thus no longer a teacher and the student is no longer a pupil. Instead the student conducts research on his own behalf and the professor supervises his research and supports him in it.

While the French funneled prospective students into rigid conformist institutions, the Prussians embraced the freedom and unpredictability of research.⁵⁵ Prussians no longer just valued the pursuit of knowledge; they valued the pursuit of research.

⁵¹ Aarsleff 1989, p. 199

⁵² The Cambridge Economic History of Europe. United Kingdom: Cambridge University Press, 2008.

⁵³ Rothblatt, Sheldon, and Bjorn Wittrock. 1994. "The European and American University Since 1800." *Bulletin of Science, Technology & Society* 14, no. 4 (August). <https://doi.org/10.1177/027046769401400429>.

⁵⁴ Morozov Oleg, *Wilhelm Von Humboldt and Berlin University: A New Look at the Origin of the Humboldt Myth* (Higher School of Economics Research Paper No. WP BRP 134/HUM/2016), <https://ssrn.com/abstract=2856268>

⁵⁵ Kern, Heinrich. "Humboldt's Educational Ideal and Modern Academic Education." http://www.drc.uns.ac.rs/presentations/05_DS/03-Prof.Dr.HeinrichKern.pdf.

Prussian Values in America and the Multiversity

The Humboltian model won. The University of Berlin was seen as the model of a modern university for the next two centuries.⁵⁶ In America, Thomas Jefferson's University of Virginia was rooted in promoting Humboldtian exploration.⁵⁷ Henry Tappan, the first President of the University of Michigan, rooted his university and Michigan's public education system in the Prussian model, which he considered to be the finest in the world.⁵⁸ The University of California system would be so rooted in German traditions that it refused to even offer dorms, a staple of the British model, for eight decades.⁵⁹

While the frameworks for the research university had been laid, scientific breakthroughs would not begin in earnest until the 1920s. American higher education ended at the undergraduate level; Yale was the first to offer a graduate degree in 1847,⁶⁰ but the development of full-on graduate schools did not begin in earnest until land-grant schools, the first to receive major public funding, like MIT (1861) and Cornell (1865) drove new academic pursuits in specialized areas like agricultural and industrial studies.⁶¹ Universities like Hopkins (1876) and Chicago (1890) emerged with specialized graduate programs and saw rapid enrollment growth.⁶² Seeing their enrollment numbers, the Ivy League played catch-up, creating competition on a scale the European universities never experienced. Competition meant that emerging graduate

⁵⁶ Mueller-Vollmer, Kurt, and Markus Messling. "Wilhelm Von Humboldt." Stanford Encyclopedia of Philosophy. Stanford University, May 24, 2022. <https://plato.stanford.edu/entries/wilhelm-humboldt/>.

⁵⁷ Douglass, John Aubrey. "The Rise of the Publics - Gspp.berkeley.edu." Berkley Public Policy.

https://gspp.berkeley.edu/assets/uploads/research/pdf/2rops.cshe_1.2018.douglass_riseofthepublicu_2.12.2018.pdf

⁵⁸ Collier, Irwin. "Michigan. Prussian University as the Model for Higher Education. Tappan, 1852-53." *Economics in the Rear-View Mirror*, July 19, 2017.

<https://www.irwincollier.com/michigan-prussian-university-as-the-model-of-higher-education-tappan-1852-53/>.

⁵⁹ Kerr, Clark. "Traditions at Berkeley." Essay. In *The Gold and the Blue, Volume One: A Personal Memoir of the University of California, 1949-1967, Academic Triumphs*, 93-96. University of California Press, 2001.

⁶⁰ "Happy Birthday to the Oldest American Graduate School." YaleNews, September 12, 2011.

<https://news.yale.edu/1997/04/21/happy-birthday-oldest-american-graduate-school>.

⁶¹ Martin, Ben R, and Henry Etzkowitz. "The Origin and Evolution of the University Species." Sussex Research Online : Sussex Research Online, January 1, 1970. <http://sro.sussex.ac.uk/id/eprint/19557>.

⁶² Winckler, Georg. "THE US SYSTEM: BREADTH AND EXCELLENCE." Essay. In *Prospects and Future Tasks of Universities: Digitalization - Internationalization - Differentiation*, 295-97. Zurich: Lit Verlag, 2017.

schools concentrated in 250 universities compared to 1200 that spanned Europe, creating larger competitive programs.⁶³

Universities caught the tailwind of favorable economic and demographic growth that allowed them to drastically expand enrollment, generating greater revenues that were reinvested into the blooming research university.⁶⁴ Columbia underwent a hiring spree that quadrupled their faculty,⁶⁵ while engineering programs at Penn and Cornell saw a tripling in their applicant pools.⁶⁶ Carnegie, Mellon, Duke, Vanderbilt, and other titans of industry made vast endowments to found new universities to compete with the others. Universities had greater national reach, a rapidly growing demand for education, and a growing budget to provide it.⁶⁷

Thus entered the *multiversity*, a university that was the sum of disjoint parts, educating a rapidly-growing undergraduate base in the broader liberal arts while pursuing rational, scientific inquiry in graduate schools under the same banner.⁶⁸ The greatest undergraduate schools now prepared graduates to enter graduate schools.⁶⁹ Later economic modeling demonstrated that the competitive, specialized, and concentrated American universities were key to overtaking European universities.⁷⁰

⁶³ Winckler 2017, p. 297

⁶⁴ Geiger, Roger L. *To Advance Knowledge: The Growth of American Research Universities, 1900-1940*. London: Taylor and Francis, 2017.

⁶⁵ Geiger 2017, p. 12

⁶⁶ Geiger 2017, p. 14

⁶⁷ Appendix E.

⁶⁸ Geiger 2017, p. 16

⁶⁹ Geiger 2017, p. 19

⁷⁰ MacLeod, W. Bentley, and Miguel Urquiola. "Why Does the United States Have the Best Research Universities? Incentives, Resources, and Virtuous Circles." *Journal of Economic Perspectives* 35, no. 1 (2021): 185–206. <https://doi.org/10.1257/jep.35.1.185>.

American Multiversity

The growing success of American research universities was self-reinforcing for the US. Over the century, English became the *lingua franca* of the academic and scientific world. International students flocked to America, the best environment to conduct research.⁷¹ Academic talent stayed in America, attracting new international scholars.⁷² Research universities and their faculty composed the key scientific minds behind the Manhattan Project⁷³ as part of a state which leveraged the enormous academic power of universities in hybrid public-private partnerships to build the American state.⁷⁴ Without the close integration of the government and the American university, America would not have won the scientific race with Germany.⁷⁵ Universities specialized, becoming world-class in different fields. American universities offered new majors as fields rapidly emerged,⁷⁶ providing researchers an edge compared to slower European universities.⁷⁷ Stanford anchored entrepreneurship in the nascent Silicon Valley.⁷⁸ Dropouts like Zuckerberg and Gates leveraged universities to build their products, while Page and Brin conceptualized Google and modern search while at Stanford's doctoral program.⁷⁹

However, multiversities have been a work in progress. Before expanding and the graduate schools at Yale,⁸⁰ former Yale President James Angell noted in 1927:

⁷¹ Appendix F.

⁷² MARGINSON, SIMON. Review of *THE ANGLO-AMERICAN UNIVERSITY AT ITS GLOBAL HIGH TIDE*, by Derek Bok, Roger King, Svava Bjarnason, Kenneth Edwards, Michael Gibbons, Yoni Ryan, Michael Shattock, and Robert Stevens. *Minerva* 44, no. 1 (2006): 65–87. <http://www.jstor.org/stable/41821343>.

⁷³ Reed, Bruce Cameron. *Manhattan Project: The Story of the Century*. Cham, Switzerland: Springer, 2020.

⁷⁴ Weiss, Linda. *America Inc.?: Innovation and Enterprise in the National Security State*. Ithaca, NY: Cornell University Press, 2014.

⁷⁵ Conceição Pedro. *Knowledge for Inclusive Development: 2nd International Conference on Technology Policy and Innovation That Was Held in Lisbon, August 3-5, 1998*. Westport, Conn: Quorum Books, 2002.

⁷⁶ Appendix G.

⁷⁷ Conceição 1998, p. 38

⁷⁸ Adams, Stephen B. "Stanford and Silicon Valley: Lessons on Becoming a High-Tech Region." *California Management Review* 48, no. 1 (2005): 29–51. <https://doi.org/10.2307/41166326>.

⁷⁹ Brin, Sergey, and Lawrence Page. "The anatomy of a large-scale hypertextual web search engine." *Computer networks and ISDN systems* 30, no. 1-7 (1998): 107-117.

⁸⁰ Schiff, Judith. "Resources on Yale History: A Brief History of Yale." Yale University Library . Accessed April 20, 2023. <https://guides.library.yale.edu/yalehistory>.

Departmentalization of American universities by[...] professional schools[...] has deprived the institutions of teamplay and integration. The remedy lies in a more intimate correlation of all departments.

Critics contend that research universities make it harder for students to learn and keep great non-research teachers. However, there can be middle ground. In an interview with Jonathan Wolff,⁸¹ a Ph.D. candidate and lecturer at Oklahoma University, Wolff said:

[Favoring research] isn't necessarily an issue, as this gives students a chance to learn from people who are highly-engaged and active scholars. That may not work for everyone, though, which is why liberal arts colleges and teaching institutions exist. There should be a college for everyone.

However, Wolff does agree that there are flaws that can be improved. Researchers and professors must scramble to seek external funding and grants for their research, burdening them to seek as many avenues of funding as possible. Enrollment at top universities is at an all-time low, excluding critical talent.⁸² The competition of tenure that grew the American universities is failing: adjunct professors and lecturers are overworked and underpaid,⁸³ funding is harder to get,⁸⁵ and graduate students across the country are striking to unionize for better conditions and

⁸¹ Zhou, Brian. Interview with Jonathan Wolff on American Higher Education. Personal, April 8, 2023.

⁸² Crow, Michael.

⁸³ Fredrickson, Caroline. "There Is No Excuse for How Universities Treat Adjuncts." The Atlantic. Atlantic Media Company, June 15, 2020.

<https://www.theatlantic.com/business/archive/2015/09/higher-education-college-adjunct-professor-salary/404461/>.

⁸⁴ LA Times Editorial Board. "Editorial: Colleges' Overreliance on Adjunct Faculty Is Bad for Students, Instructors and Academic Freedom." Los Angeles Times. Los Angeles Times, November 28, 2021.

<https://www.latimes.com/opinion/story/2021-11-28/editorial-colleges-overreliance-on-adjunct-faculty-is-bad-for-students-instructors-and-academic-freedom>.

⁸⁵ Cole, Jonathan R. "Research Universities Are America's Factories of Discovery." The Atlantic. Atlantic Media Company, September 20, 2016.

<https://www.theatlantic.com/education/archive/2016/09/the-triumph-of-americas-research-university/500798/>.

⁸⁶ Crow, Michael.

wages for their research.⁸⁷⁸⁸⁹ Solutions are possible, but will require new approaches and new reforms.

Conclusion

American universities were built on a millennium of European reforms that created a secular, research-centered university. However, the delayed development of graduate programs in America created a unique combination of the liberal arts in undergraduate education along with Humboltian study at the graduate level. Competition and self-reinforcing growth through American reforms ultimately allowed American multiversities to surpass their European counterparts.⁹⁰ Although more can be done to address current challenges, the Multiversity is still a crucial component to America's scientific and humanistic hegemony.

⁸⁷ Nietzel, Michael T. "As Grad Student Unionizing Effort Grows, Universities Raise Stipends, Benefits." *Forbes Magazine*, December 19, 2022. <https://www.forbes.com/sites/michaelt Nietzel/2022/12/16/as-grad-student-unionizing-effort-grows-universities-raise-stipends-benefits/?sh=b36b9692af63>.

⁸⁸ University, Stanford. "A Message on Graduate Student Unionization." *Stanford Report*. Stanford, April 7, 2023. <https://news.stanford.edu/report/2023/04/07/message-graduate-student-unionization/>.

⁸⁹ Roeder, David. "University of Chicago Graduate Student Workers Unionize." *Times*. *Chicago Sun-Times*, March 17, 2023. <https://chicago.suntimes.com/education/2023/3/17/23645593/graduate-students-unionize-university-chicago-teaching-research>.

⁹⁰ Appendix H.

Appendix A



This map shows the growth and spread of the first universities in Western Europe from the first universities in the 1000s (Oxford and Bologna) up until the 1400s. Over the course of four centuries, nearly every dense urban area of Western Europe would have a university, although Scandinavia and Germany lacked a significant presence of universities.

Ridder-Symoens, Hilde d., ed. 2013. *A History of the University in Europe: Volume 1, Universities in the Middle Ages*. N.p.: Cambridge University Press.

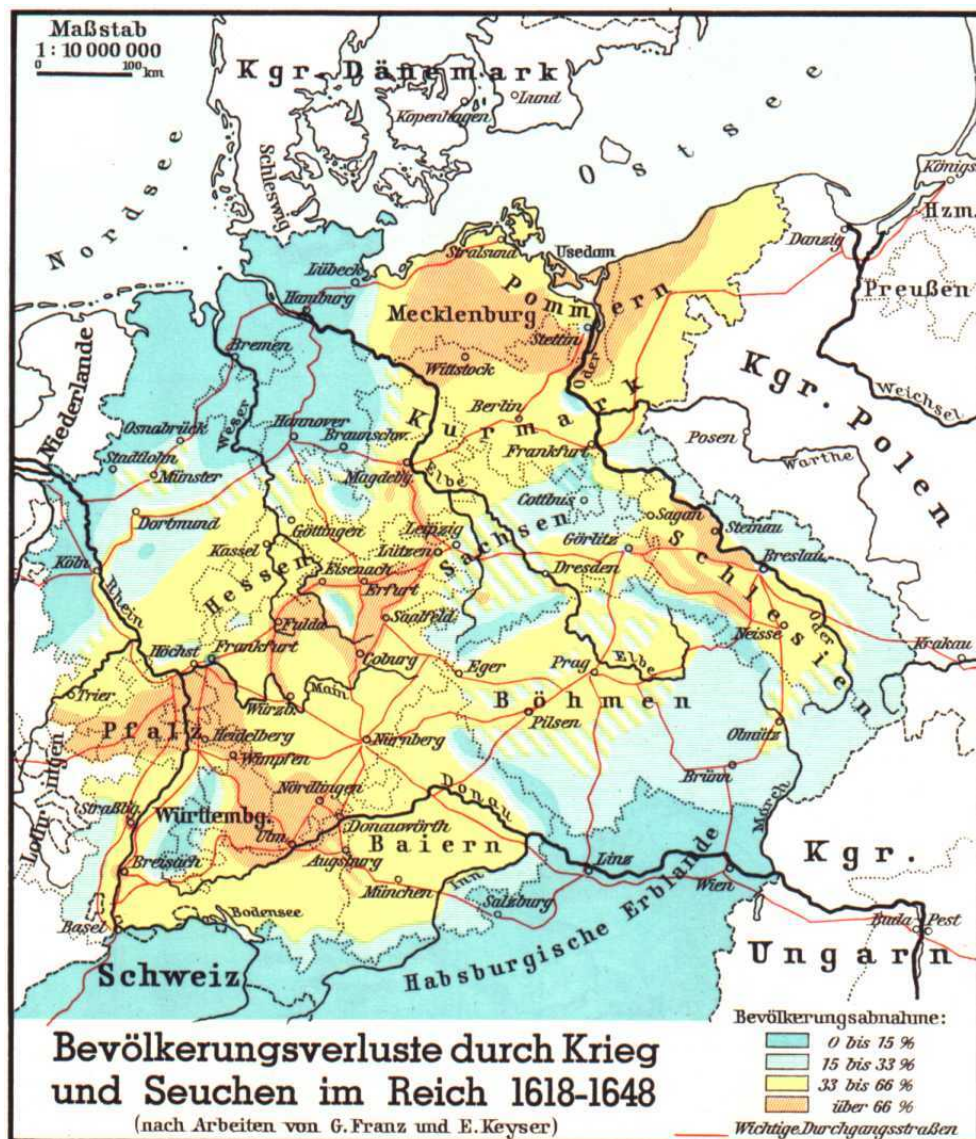
Appendix B



This painting depicts Martin Luther putting nailing his 95 Theses on the door, depicting the rabble of the clergy, laymen, and academics surrounding him. The painting captures the moment that the Protestant Reformation begins, borne from Luther's academic fruition and pursuit.

Hübner, Julius. "Luther Schlägt Die 95 Thesen An." *WEBMUSEUM Julius Hübner*, 1878.
http://www.julius-huebner.de/DE/1878_luther_schlagt_die_thesen_an_-_julius_hubner.html.

Appendix C



This map displays the extent of the sheer devastation that regions of the Holy Roman Empire experience after the Thirty Years' War. While the Austrian core and the region of Hanover emerged relatively unscathed, almost all of central Germany had lost more than 33 percent of its population. Every region of Brandenburg-Prussia lost more than 33 percent of its population, and

Prussian recovery would take decades to achieve.

Franz, G., and E. Keyser. "Population Losses Due to War and Disease in the Empire 1618-1648." 2011. Map. *Gifex*. https://www.gifex.com/fullsize-en/2011-05-23-13734/Population_losses_due_to_war_and_disease_in_the_Empire_1618_1648.html.

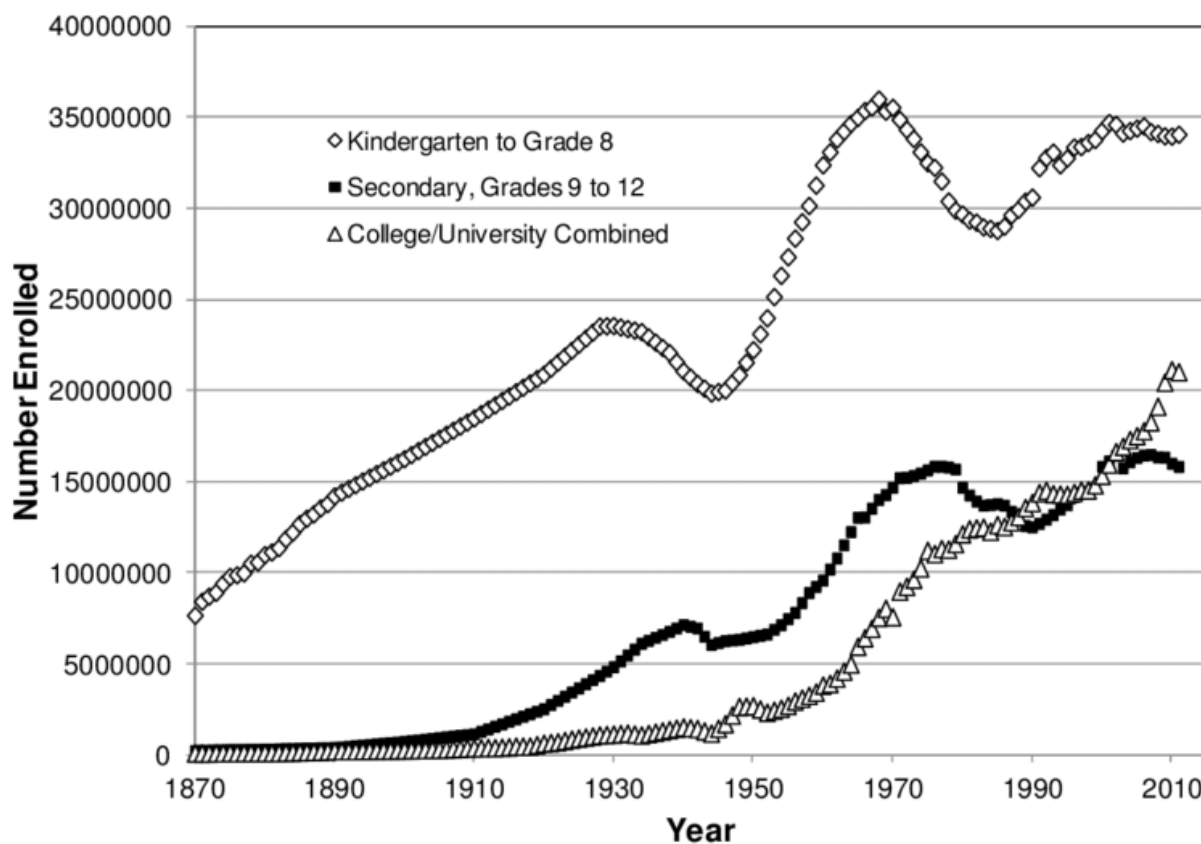
Appendix D



This map details the immigration of persecuted French Huguenots throughout Europe. Because of persecution in France including the Saint Bartholomew’s Day Massacre, nearly a quarter of the continental Protestant population were forced to flee France. The settling Huguenotes helped repopulate the devastating Prussian losses from the Thirty Years’ War.

“Emigration of French Protestants to the Countries of Refuge (Late 17th Century).” n.d. Musée Virtuel Du Protestantisme. <https://museeprotestant.org/de/notice/die-hugenottische-fluchtbewegung/>.

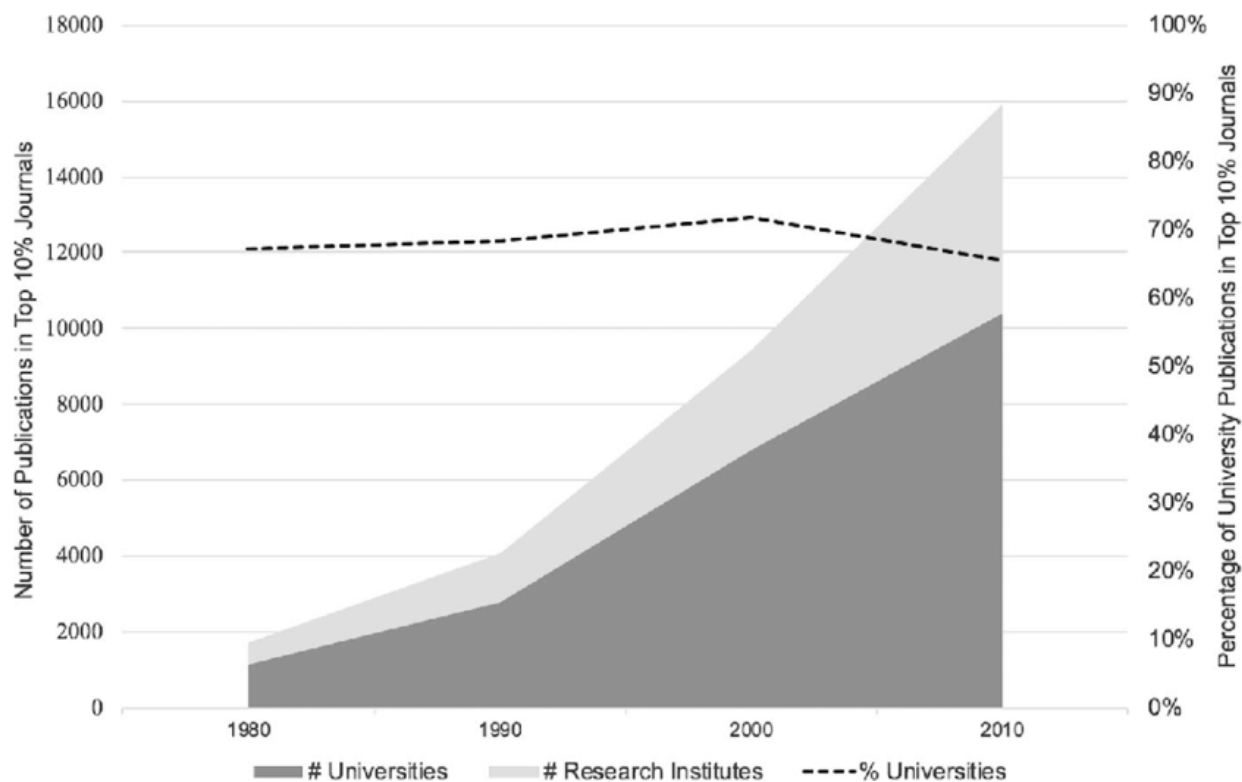
Appendix E



This chart shows the rapid expansion of American university systems beginning in the 1890s as American education rapidly grew in enrollment. Since the 1890s, nearly every single year would see a rise in student enrollment at undergraduate and graduate colleges.

Campbell, Daniel E, and Hongfang Lu. *Emergy Evaluation of Formal Education in the United States: 1870 to 2011*. July 2014. *ResearchGate*.
https://www.researchgate.net/figure/Annual-enrollment-in-the-elementary-secondary-and-college-university-subsystems-of-the_fig4_267152774.

Appendix F



This chart shows the percentage trend of German university publications in the top 10% of academic journals since 1930. German university systems steadily grew and expanded their influence and share of the world’s most important research and journals, but had long been surpassed by more competitive American universities. American reforms had surpassed

Humboldt’s foundation.

Dusdal, Jennifer, Justin J. Powell, David P. Baker, Yuan Chih Fu, Yahya Shamekhi, and Manfred Stock. “University vs. Research Institute? the Dual Pillars of German Science Production, 1950–2010.” *Minerva* 58, no. 3 (2020): 319–42. <https://doi.org/10.1007/s11024-019-09393-2>.

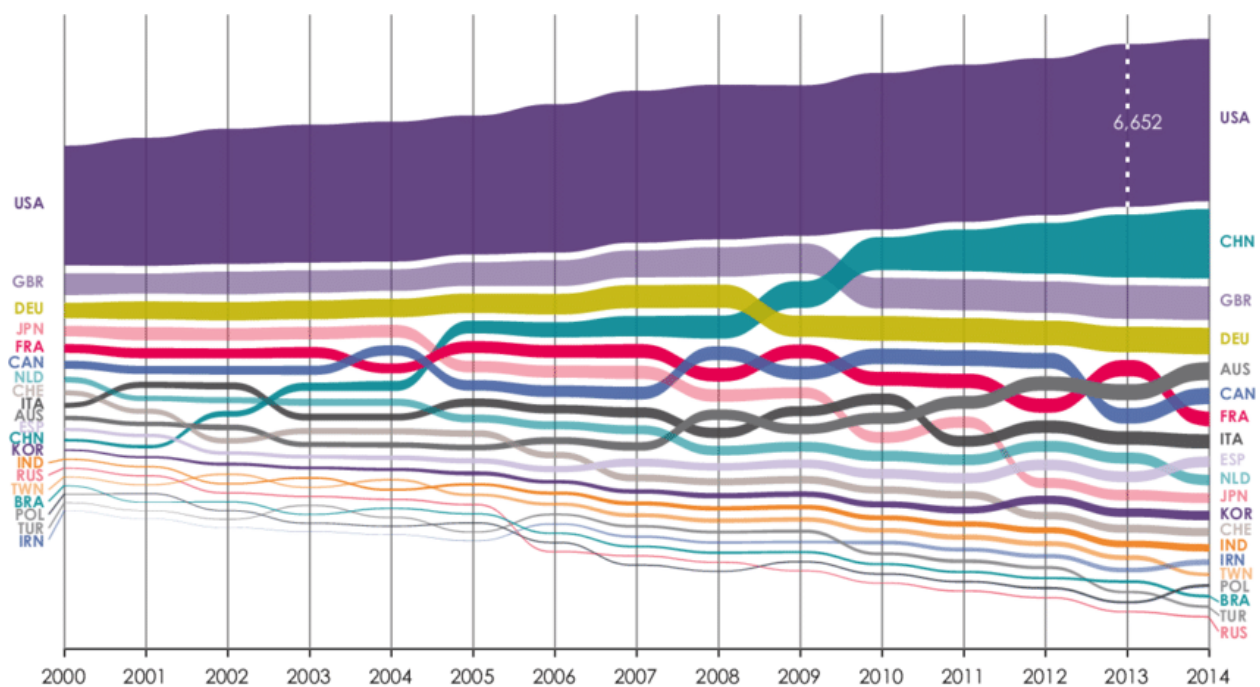
Appendix G



This image shows the first computer scientists developing the first electric computer in the Moore School of Electrical Engineering at the University of Pennsylvania. This computer was commissioned for and utilized by the war effort in cooperation with the University, and the University was one of the first to offer computer science as a major and study.

Richey, Kevin W. n.d. "ENIAC at Penn Engineering." Penn Engineering.
<https://www.seas.upenn.edu/about/history-heritage/eniac/>.

Appendix H



This graph shows the share of American research output in the top 1% of all publications over the past decade. America continues to lead the world in high-impact research, most of which is conducted at the university and funded by the government.

Maddi, Abdelghani. "Number of Publications in the Top 1% Most-Cited, Top 20 Producing ..." ResearchGate. https://www.researchgate.net/figure/Number-of-publications-in-the-top-1-most-cited-top-20-producing-countries-2000-14_fig9_333972683.

Annotated Bibliography

PRIMARY SOURCES:

Adams, Stephen B. “Stanford and Silicon Valley: Lessons on Becoming a High-Tech Region.” *California Management Review* 48, no. 1 (2005): 29–51.

<https://doi.org/10.2307/41166326>.

This essay describes the development of Silicon Valley and how Stanford played a role as an educational anchor in developing the economic presence of Silicon Valley. I used this source to learn more about the emerging entrepreneurship and urban growth that various universities enabled across the United States, an example of which includes the University of North Carolina Chapel Hill and Duke University in Durham, NC.

Brin, Sergey, and Lawrence Page. "The anatomy of a large-scale hypertextual web search engine." *Computer networks and ISDN systems* 30, no. 1-7 (1998): 107-117.

Sergey Brin and Larry Page’s groundbreaking research on PageRank changed the way we searched on the internet. I used this resource to explore Stanford’s role in hosting the research and origins of the demo version of Google (google.stanford.edu).

Chao, Julie, and Glenn Roberts. 2019. “16 Elements: Berkeley Lab's Contributions to the Periodic Table.” News Center.

<https://newscenter.lbl.gov/2019/01/28/16-elements-berkeley-labs-contributions-to-the-periodic-table/>.

The Berkeley Lab celebrated its 150th anniversary of the lab itself by exploring the sixteen elements and 630 isotopes that the lab had discovered. I used this source to highlight the sheer quantity of innovations that a singular university lab produced and better understand how Berkeley shaped discoveries in chemistry and physics.

Cole, Jonathan R. “Research Universities Are America's Factories of Discovery.” *The Atlantic*. Atlantic Media Company, September 20, 2016.

<https://www.theatlantic.com/education/archive/2016/09/the-triumph-of-americas-research-university/500798/>.

This news article from 2016 includes the opinion that research universities have been critical to American research and innovation, even in areas that consumers and Americans would not expect. However, the article cautions that funding is eroding, restrictions are being placed on visas for attracting talent, and public sentiment is shifting against the research university. I used this article to share a new perspective and highlight some of the modern challenges that American universities are facing.

Collier, Irwin. “Michigan. Prussian University as the Model for Higher Education. Tappan, 1852-53.” *Economics in the Rear-View Mirror*, July 19, 2017.

<https://www.irwincollier.com/michigan-prussian-university-as-the-model-of-higher-education-tappan-1852-53/>.

This website cataloged many of the quotes and opinions of the first president of the University of Michigan, including his notable remark that the Constitution of Michigan’s education reforms and universities was based on the Prussian model. I used this primary source to understand and convey how notable political and academic figures who shaped American education saw and used the Prussian model of education.

Conceição Pedro. *Knowledge for Inclusive Development: 2nd International Conference on Technology Policy and Innovation That Was Held in Lisbon, August 3-5, 1998*.

Westport, Conn: Quorum Books, 2002.

Conceição’s book looks at contemporaries of the WWII era and explores the crucial role that American universities played to maintain American technological superiority against the Germans in WWII. I used this book to better understand how American universities won the scientific war with Germany and argue that America’s universities generated better breakthroughs because of their close ties to the American public sector and rapid adaptability in emerging disciplines.

Crow, Michael M, and William B Dabars. “A New Model for the American Research University.” *Issues in Science and Technology*, July 1, 2022.

<https://issues.org/a-new-model-for-the-american-research-university/>.

Although other sources argue that competition and selective applicants led to more competitive and better performing research universities, Crow’s opinion takes a differing stance by arguing that current competition at the highest level, such as the Ivy League, is harming the American university system. I used this source to highlight his potential suggestions to fix the issue of accessibility, such as through Crow’s proposed Arizona State University solution to declining accessibility.

Douglass, John Aubrey. “The Rise of the Publics - Gspp.berkeley.edu.” Berkley Public Policy.

https://gspp.berkeley.edu/assets/uploads/research/pdf/2rops.cshe_.1.2018.douglass_.riseofthepublicu_.2.12.2018.pdf

Ironically, a Berkeley research paper highlighted the importance of Humboldt’s reforms in the first American universities. This paper included a citation from Thomas Jefferson’s standards for state education and conditions to create his new University of Virginia, which stipulated the introduction of the Humboldtian idea of free inquiry. I used this source to highlight the important role that leading minds like the Founding Fathers played in grafting the Prussian model of education into state governments and universities.

Fredrickson, Caroline. “There Is No Excuse for How Universities Treat Adjuncts.” The Atlantic. Atlantic Media Company, June 15, 2020.

<https://www.theatlantic.com/business/archive/2015/09/higher-education-college-adjunct-professor-salary/404461/>.

Fredrickson’s op-ed highlights an important ongoing issue for non-tenured professors. Although non-tenured professors and lecturers are the ones educating students, they often face the worst pay, often below the poverty line, with pressures to enter research and output papers as well. I chose to highlight this op-ed to demonstrate a growing challenge that the Multiversity system is currently facing with university faculty and pay.

Hübner, Julius. “Luther Schlägt Die 95 Thesen An.” *WEBMUSEUM Julius Hübner*, 1878.

http://www.julius-huebner.de/DE/1878_luther_schlagt_die_thesen_an_-_julius_huebner.html.

This painting depicts a pivotal moment in European history. It encapsulates the decades of chaos and turmoil that would follow with the initial action of Luther posting his 95 Theses on the door and opening up for discussion and debate. I used this painting to highlight the very academic roots that the Protestant Reformation came from.

Kerr, Clark. “Traditions at Berkeley.” Essay. In *The Gold and the Blue, Volume One: A Personal Memoir of the University of California, 1949–1967, Academic Triumphs*, 93–96. University of California Press, 2001.

Clark Kerr was the first chancellor of the University of California, Berkeley, after the expansion of the University of California system necessitated multiple campuses. In his memoir, Kerr provides context on the sheer depth of influence that the Prussian model held on Berkeley, to the extent that they refused to even provide student dorms until British influences came in. I used this resource to understand and demonstrate how American institutions continued to uphold Prussian models of education well beyond their initial adoption.

LA Times Editorial Board. “Editorial: Colleges' Overreliance on Adjunct Faculty Is Bad for Students, Instructors and Academic Freedom.” Los Angeles Times. Los Angeles Times, November 28, 2021.

<https://www.latimes.com/opinion/story/2021-11-28/editorial-colleges-overreliance-on-adjunct-faculty-is-bad-for-students-instructors-and-academic-freedom>.

The editorial by the LA Times highlights a crucial ongoing issue that challenges the academic freedoms core to American research universities. I used this article to highlight how shifting profit incentives by universities and the lack of protections and pay for adjunct professors has the potential to crucially damage the academic freedom that makes American research universities innovative.

Morozov Oleg, *Wilhelm Von Humboldt and Berlin University: A New Look at the Origin of the Humboldt Myth* (Higher School of Economics Research Paper No. WP BRP 134/HUM/2016), <https://ssrn.com/abstract=2856268>

A work critical of the Humboldt legacy in higher education, Morozov provides primary sources to argue against Humboldt’s influence and posit that his contribution to higher education was smaller than other academics argue. I used these sources to gain an understanding of the situation at the time and nuance my work by shifting it away from the person implementing the changes and instead to the changes that were implemented.

National Broadcasting Company Encyclopaedia Britannica Films Inc and Films

Incorporated dirs. 1965. *The Decision to Drop the Bomb*. National Broadcasting Co. Released by Films Incorporated.

Of all of the scientific innovations of the past century, none carry the same destructive power as the words Oppenheimer spoke after the first nuclear test. I used this source to convey what Oppenheimer must have thought when he raced with German scientists to usher in a new nuclear age.

Nietzel, Michael T. “As Grad Student Unionizing Effort Grows, Universities Raise Stipends, Benefits.” Forbes. Forbes Magazine, December 19, 2022.

<https://www.forbes.com/sites/michaelt Nietzel/2022/12/16/as-grad-student-unionizing-effort-grows-universities-raise-stipends-benefits/?sh=b36b9692af63>.

Nietzel reports on the response that universities are having to a rapidly spreading movement of unionization efforts by faculty and graduate students at research universities. As the fight continues today, I included this article to highlight just how important the graduate students are to the research that universities conduct, and what the administrations are trying to do to stave off efforts for unionization.

Phillips, Matthew. 2013. “Historia et Memoria | Historical quotes and explanations | Page 15.” Concordia University Faculty and Staff.

<https://wp.cune.edu/matthewphillips/page/15/?cat=-1>.

Humanist scholar and academic Pier Paolo Vergerio wrote in his treatise on education that “philosophy is liberal because its study makes men free.” This source provided me with a contemporary opinion on emerging humanist studies and explanations for why fields like history became so rapidly embraced throughout Europe.

Richey, Kevin W. n.d. “ENIAC at Penn Engineering.” Penn Engineering.

<https://www.seas.upenn.edu/about/history-heritage/eniac/>.

The page of the University of Pennsylvania shared its own highlights of the invention of the ENIAC. Commissioned by the Army, the technologies developed and people used were crucial to the post-war efforts and modern computing. I chose to share this as both an image and text to develop the idea of the private-public university collaboration.

Roeder, David. “University of Chicago Graduate Student Workers Unionize.” Times. Chicago Sun-Times, March 17, 2023.

<https://chicago.suntimes.com/education/2023/3/17/23645593/graduate-students-unionize-university-chicago-teaching-research>.

As part of an ongoing movement across the nation, Roeder reports on the students at UChicago as part of an ongoing wave of unions forming for graduate schools across the country. I included this to highlight some of the issues that graduate students are facing in their work, as well as to demonstrate the national scope of the unions forming.

Rothblatt, Sheldon, and Bjorn Wittrock. 1994. “The European and American University Since 1800.” *Bulletin of Science, Technology & Society* 14, no. 4 (August).

<https://doi.org/10.1177/027046769401400429>.

Rothblatt’s paper describes the evolution of European and American Universities over time. I used this paper to gain a better understanding of the early origins of the European university, especially of how Prussian reforms were able to change the education system in Germany and Europe.

Schiff, Judith. “Resources on Yale History: A Brief History of Yale.” Yale University Library . Accessed April 20, 2023. <https://guides.library.yale.edu/yalehistory>.

This library resource highlights the time of Yale President James Rowland Angell, who is credited with the growth and expansion of Yale’s undergraduate and graduate programs. I chose to use this primary source to highlight the perspective of a university president’s concerns with the growing Multiversity system, and also the steps that he took to remedy the challenges of a Multiversity by encouraging interdisciplinary collaboration and thought between graduate programs.

Sofen, Brendan. 2016. “An Uneducated Man Speaking His Mind: Winston Churchill and American Universities.” International Churchill Society.

<https://winstonchurchill.org/publications/finest-hour/finest-hour-171/winston-churchill-and-american-universities/>.

This compilation of Churchill’s four speeches at universities across America highlighted how the leaders of other countries thought of the American university system. Churchill remarked with regret how he skipped his own university education, and how the United Kingdom lagged behind the United States in university graduates. I used this source to introduce my argument and highlight how important other world leaders saw research and academics as a key to global power.

University, Stanford. “A Message on Graduate Student Unionization.” Stanford Report. Stanford, April 7, 2023.

<https://news.stanford.edu/report/2023/04/07/message-graduate-student-unionization/>.

As part of an ongoing movement across the nation, I wanted to highlight how university administrations were responding to votes to unionize at their university. I included this to highlight not only the national scope of the unionization wave, but also how universities like Stanford responded by stressing their continued control over academic appointments and research standards.

“Happy Birthday to the Oldest American Graduate School.” YaleNews, September 12, 2011.

<https://news.yale.edu/1997/04/21/happy-birthday-oldest-american-graduate-school>.

Yale celebrated the establishment of the first graduate school in America in 1997, the 150-year anniversary of the first post-graduate program being offered in 1847. However, even then, it remained a department of the larger Yale College. I shared this information to convey the timing of when graduate programs emerged and characterize the evolution of American universities into their final form as a multiversity.

Zhou, Brian. Interview with Jonathan Wolff on American Higher Education. Personal, April 8, 2023.

After the district competition, I wanted to include additional diverse perspectives on current issues that American research universities face. I reached out to Mr. Wolff, a current Ph.D. candidate in political science at Oklahoma University, and a current lecturer. His perspective was invaluable, as he was both part of the University’s research wing and also taught courses, which allowed me to address criticism and shed light on flaws of research universities. Although we spoke for hours about how R1 universities operate, time constraints meant that only a limited portion of this interview could be included.

“InfiniteMIT | Sir Winston Churchill at MIT – 1949 Mid-Century Convocation Speech.”

n.d. MIT.

<https://infinite.mit.edu/video/sir-winston-churchill-mit-%E2%80%93-1949-mid-century-convocation-speech>.

While not Churchill’s Iron Curtain speech at Fulton, his speech at the Massachusetts Institute of Technology highlighted a pressing concern that he saw for his home country. Churchill remarked with awe of the scientists that were trained at MIT and lamented that the United Kingdom lacked the ability to advance the innovation that was key to economic productivity and development. I used his quote to supplement his speech at the University of Miami to highlight the practical reasons why world leaders like Churchill were envious of the American university.

“Timeline of Discovery | Harvard Medical School.” n.d. Harvard Medical School.

<https://hms.harvard.edu/about-hms/history-hms/timeline-discovery>.

I am not a medicine or biology student, but when researching the impact of research universities on medicine, Harvard Medical School presented a timeline highlighting some of the most important discoveries in modern medicine. Whether it was the first heart valve surgery, MRI scans, or the circadian rhythm, it was clear that HMS and other medical schools have been key to American innovation. Thus, I included this source to highlight the sheer breadth of innovation at HMS.

SECONDARY SOURCES:

Aarsleff, Hans. “The Berlin Academy under Frederick the Great.” *History of the Human*

***Sciences* 2, no. 2 (1989): 193–206. <https://doi.org/10.1177/095269518900200203>.**

This journal article details the evolution of the Berlin universities under Frederick the Great. I learned how the French Huguenots and the French Enlightenment influenced the development of these universities, but also how the Berlin universities differed in the academic freedom and blank check afforded to them by Frederick the Great. I used this evidence to develop the argument that the defining difference in the new Prussian universities was their academic freedom.

Anderson, Ross. 2009. “Cambridge University – the Unauthorised History.”

<https://www.cl.cam.ac.uk/~rja14/unauthorised.html#:~:text=We%20were%20founded%2C%20eight%20hundred,the%20next%20Archbishop%20of%20Canterbury>.

This website by a Cambridge professor offered an abridged timeline of the history of Cambridge University to further my understanding. I used this timeline to support the claim that new universities, like Cambridge, began emerging from other universities due to political and scholastic disputes between academics at the university.

Bernardes, José L. 2019. “How the Renaissance Shaped Liberal Arts Education.”

BookBrowse.

<https://www.bookbrowse.com/blogs/editor/index.cfm/2019/1/3/How-the-Renaissance-Shaped-Liberal-Arts-Education>.

A review of the book *Leonardo Da Vinci* by Walter Isaacson, this website analyzes the rise of Humanist thought throughout the Renaissance. I used this website as a jumping-off point to find primary sources from Humanist scholars and explore how the Renaissance developed European values of literacy and rhetoric.

Campbell, Daniel E, and Hongfang Lu. *Emergy Evaluation of Formal Education in the*

***United States: 1870 to 2011*. July 2014. *ResearchGate*.**

https://www.researchgate.net/figure/Annual-enrollment-in-the-elementary-secondary-and-college-university-subsystems-of-the_fig4_267152774.

This figure provided an important visualization of how American education grew since 1870, which allowed me to better understand how education enrollment figures across America changed over time.

Cantoni, Davide, Dittmar, Jeremiah E. and Yuchtman, Noam (2017) *Reallocation and secularization: the economic consequences of the Protestant Reformation*. CEP Discussion Papers (CEPDP1483). Centre for Economic Performance, London School of Economics and Political Science, London, UK.

This economic working paper offers an interesting perspective on how the Protestant Reformation shaped the role of religion in the economy. While the majority of the analysis of the Protestant Reformation focuses on either, Cantoni's paper offers an important perspective that argues that the Reformation secularized Protestant economies and resulted in an important shift in education and economic policies. I used this in my paper to highlight the important ramifications that desecularizing the economy had on enrollment and education.

Cheryl Lynn Smeall, Susan Elizabeth Dalton, and Valentin Boss. "How to Become a Renowned Writer: Francesco Algarotti (1712-1764) and the Uses of Networking in Eighteenth-Century Europe." eScholarship@McGill. McGill University, January 1, 1970. <https://escholarship.mcgill.ca/concern/theses/3n204322z>.

Francesco Algarotti was a writer who demonstrates the important role that networks played for scholars traveling between European courts, as was customary for European academics. While I used this to demonstrate Frederick the Great's efforts to recruit important scholars for his growing Enlightenment court, it demonstrates an earlier argument that scholars tended to rely more on their networks and connections to travel rather than staying rigid and put at an institution.

Contreni, John J. 2014. "Learning for God: Education in the Carolingian Age." *The Journal of Medieval Latin* 24:88-129.

Contreni's paper helped fill gaps in my knowledge related to the Carolingian Age. The paper covers the development of Carolingian education and characterizes the environment where people began learning in Charlemagne's realm.

Dominiczak, Marek H. 2015. "Migration and Culture." *Clinical Chemistry* 61, no. 8 (August): 1120-1121. 10.1373/clinchem.2014.236984.

Dominiczak's journal article highlights some of the most important migrations for European scholasticism. It provides a timeline for the emergence of Byzantine and Greek scholars in Italy, as well as the subsequent move of Italian scholars to the rest of the continent. In my paper, I use his work to further my argument that forced migration was critical to catalyzing new renaissances of academic thought and scholarship.

Dusdal, Jennifer, Justin J. Powell, David P. Baker, Yuan Chih Fu, Yahya Shamekhi, and

Manfred Stock. "University vs. Research Institute? the Dual Pillars of German Science Production, 1950–2010." *Minerva* 58, no. 3 (2020): 319–42.

<https://doi.org/10.1007/s11024-019-09393-2>.

This infographic highlights the catch-up of German universities and their competition with research institutes. These universities lacked the same dominance of research American universities enjoyed in the United States.

Farr, Jason. 2005. "POINT: THE WESTPHALIA LEGACY AND THE MODERN

NATION-STATE." *International Social Science Review* 80 (3/4): 156-159.

<https://www.jstor.org/stable/41887235>.

Farr's paper highlights the interlude that the Westphalian System provided for countries to rebuild after the Thirty Years' War. In my paper, I included the development of the concept of sovereignty and the relative peace that shielded major powers from a war on the size of the Thirty Years' War, allowing Prussia to rebuild and reform the state.

Farrington, Frederic E. 2010. *French Secondary Schools: An Account Of The Origin,*

***Development And Present Organization Of Secondary Education In France*. N.p.:**

Kessinger Publishing, LLC.

Farrington's book is an in-depth analysis of the complete history of French education, starting with Charlemagne. It provided me with important context to frame the entirety of my argument related to the German/Prussian system of education, and I used it to characterize early education in Charlemagne's realm, conducted through the decentralized city schools and monasteries.

Franz, G., and E. Keyser. "Population Losses Due to War and Disease in the Empire

1618-1648." 2011. Map. *GifeX*.

https://www.gifex.com/fullsize-en/2011-05-23-13734/Population_losses_due_to_war_and_disease_in_the_Empire_1618_1648.html.

This work is a map highlighting the sheer extent of population losses that the Holy Roman Empire endured after the Thirty Years' War. I used it in an appendix to provide important context into the complete devastation that the German regions faced, and was only comparable to the devastation that the Soviet Union faced during World War II.

Geiger, Roger L. *To Advance Knowledge: The Growth of American Research Universities,*

1900-1940. London: Taylor and Francis, 2017.

Geiger's work is regarded by historians as the preeminent work on the growth of the American research university. It covers and explains the development of first the multiversity, then the many multitudes of positive demographic and induced government actions that grew the research university from singular colleges to world-class scientific labs pushing the boundaries of science in just under four decades. I cite many parts of this work, including the development of faculty, expansion of universities and colleges, and the positive investments of Gilded Age entrepreneurs and government to develop the vast American university.

Glozier, Matthew. *War, Religion and Service: Huguenot Soldiering, 1685-1713. Routledge,*

2007.

Glozier's book covers the important role that the Huguenots played in European history. As the most concentrated and largest group of Protestants in a single realm, their diaspora was crucial for other Protestant states to diffuse the Enlightenment and emerge as powers. I cite the edicts that Frederick Willhelm used to attract fleeing Huguenots to Brandenburg-Prussia.

Grendler, Paul F. "The Universities of the Renaissance and Reformation." *Renaissance*

***Quarterly* 57, no. 1 (2004): 1–42. <http://www.jstor.org/stable/1262373>.**

Grendler's article highlights the intertwined role that universities played in the Renaissance and the Reformation. I utilize the timeline and description of the very first events of the Protestant Reformation to support my argument that Martin Luther's 95 Theses were driven and furthered by his academic background.

Horn, Melton James Van. *Absolutism and the Eighteenth-Century Origins of Compulsory*

Schooling in Prussia and Austria. Cambridge: Cambridge University Press, 2003.

Melton's book offers a timeline for the development and institution of the first education laws across Europe. An important nuance that I cite is that although Prussia was the first to implement mandatory primary schooling, the funding that the Prussian state provided was marginal compared to the funding dedicated to the military, which allowed the Austrians to catch up with their own education reforms.

Hornung, Erik. "Immigration and the Diffusion of Technology: The Huguenot Diaspora in Prussia." *American Economic Review* 104, no. 1 (2014): 84–122.

<https://doi.org/10.1257/aer.104.1.84>.

Hornung's journal article provides an economic perspective of the Huguenot diaspora. It provides an analysis of the long-term ramifications on productivity in the regions where Huguenots settled. I used this long-term understanding to establish what reforms the Huguenots partook in to help reshape and rebuild the Prussian state.

Johnson, Hannah. 2022. "How the Carolingian dynasty changed how we read." *Europeana*.

<https://www.europeana.eu/en/blog/how-the-carolingian-dynasty-changed-how-we-read>.

Johnson's online article provides important context for how the Carolingian Era provided the non secular tools that we use in academia today. I mention the development of grammar and punctuation which helped scholars learn from and interpret the religious works of the time.

Kamen, Henry. "The Economic and Social Consequences of the Thirty Years' War." *Past &*

***Present* 39 (April 1968): 44–61. <https://doi.org/https://www.jstor.org/stable/649855>.**

Kamen's journal article highlights the utter destruction that cities and towns in the Holy Roman Empire faced after the war. I utilize this article to highlight how the devastation ravaged the already splintered and declining German states, necessitating reforms and change among all the states to recover the broader region.

Kern, Heinrich. "Humboldt's Educational Ideal and Modern Academic Education."

http://www.drc.uns.ac.rs/presentations/05_DS/03-Prof.Dr.HeinrichKern.pdf.

Kern's talk at a modern German conference sheds light on how modern German policymakers and academics view the Humboldtian reforms. It highlights how the modern German state is struggling to play catch-up and adapt new reforms to attract competitive academic scholarship, but I cite the descriptors that Kern uses to characterize the Humboldt reforms.

Lagasse, Paul. “Italian Wars.” In *The Columbia Electronic Encyclopedia*. Columbia University Press, 2023.

Lagasse’s encyclopedia entry for the Italian Wars highlights the beginning of another ‘great migration’ of European scholars. When introducing Lagasse, I used the entry to highlight how the war drove scholars who had learned and prospered under the Greeks and Byzantines to upend themselves and share their knowledge with the rest of continental Europe.

MacLeod, W. Bentley, and Miguel Urquiola. “Why Does the United States Have the Best Research Universities? Incentives, Resources, and Virtuous Circles.” *Journal of Economic Perspectives* 35, no. 1 (2021): 185–206.

<https://doi.org/10.1257/jep.35.1.185>.

MacLeod and his coauthors study the emergence of American universities using agent-based modeling and economic incentives. Importantly, he finds that the late 1800s and specialized universities created self-reinforcing conditions that made schools concentrate faculty and student talent, replacing smaller American colleges with larger competitive universities. I used this paper to explain the difference in the magnitude of success between American universities and their Prussian inspirations.

MARGINSON, SIMON. Review of *THE ANGLO-AMERICAN UNIVERSITY AT ITS GLOBAL HIGH TIDE*, by Derek Bok, Roger King, Svava Bjarnason, Kenneth Edwards, Michael Gibbons, Yoni Ryan, Michael Shattock, and Robert Stevens.

***Minerva* 44, no. 1 (2006): 65–87. <http://www.jstor.org/stable/41821343>.**

Marginson’s review of what he describes as the high tide of the Anglo-American university offers a new understanding of how the university underlies government and military action as a core piece to hegemony and economic growth. A common theme of all the works I have read on the subject, I utilize the narrative provided by Marginson that American universities had a feedback loop of positive pull factors to attract new scholars, building the crucial role that universities played in global and American innovation.

Markham, J. David. n.d. “The Revolution, Napoleon, and Education.” *The Napoleon Series*. https://www.napoleon-series.org/research/society/c_education.html#3.

Markham’s big-picture overview of the development of French education throughout the millennia provided a commentary on the broader history of education in Europe, which I

cite to characterize the rises and falls of education as well as the very slow development of the European university.

Marsh, David. "Cicero in the Renaissance." In *The Cambridge Companion to Cicero*, edited by Catherine Steel, 306–17. Cambridge Companions to Literature. Cambridge: Cambridge University Press, 2013. doi:10.1017/CCO9781139048750.020.

Marsh provides an important characterization on how the Renaissance rehabilitated and reintroduced works by Cicero and other Pagan authors. While Cicero had been studied before, scholars utilized summarized short forms of the text instead of using their own interpretations. I cite that the Renaissance built the modern field of history and shifted history away from religion, as scholars began analyzing and translating the nonreligious works of Cicero to better understand the past.

Martin, Ben R, and Henry Etzkowitz. "The Origin and Evolution of the University Species." Sussex Research Online : Sussex Research Online, January 1, 1970. <http://sro.sussex.ac.uk/id/eprint/19557>.

Martin introduces another form of the university: the land grant university. Schools like MIT and Cornell were founded to provide intensely technical education. I cite this work to highlight some of the push factors that motivated old schools like the Ivy League to expand into technical and graduate education, including land grant schools attracting large amounts of prospective students from across their region.

McKim, Donald K., and Cambridge University Press, eds. 2003. *The Cambridge Companion to Martin Luther*. N.p.: Cambridge University Press.

The McKim book provided me with an understanding of Martin Luther's background as a scholar, monk, and professor. I branched out into other sources about Luther from this book and utilized it to provide background details about Luther in the paper.

McKitterick, Rosamond. 2009. *The Carolingians and the Written Word*. N.p.: Cambridge University Press.

While other sources characterized the development of grammar and punctuation in the Carolingian courts, McKitterick explains the reasoning behind why writing and literacy became crucial for the Carolingian realm, including the need to interpret and understand Frankish Salic Law. I use this to further the argument of education expanding literacy for administrative and theological study in the Carolingian realm.

Moeller, Bernd. "Die deutschen Humanisten und die Anfänge der Reformation."

***Zeitschrift für Kirchengeschichte* 70 (1959):46-61.**

The famous German theologian Bernd Moeller dedicated much of his life to studying the Protestant Reformation, of which he would conclude that without Humanistic thought, there would have been no Reformation. I use his quote to establish a general consensus among German academics on the connection that Humanism had with the Reformation.

Mueller-Vollmer, Kurt, and Markus Messling. "Wilhelm Von Humboldt." Stanford

***Encyclopedia of Philosophy*. Stanford University, May 24, 2022.**

<https://plato.stanford.edu/entries/wilhelm-humboldt/>.

The Stanford Encyclopedia provides a full picture of the life of Wilhelm Humboldt, from his pursuit of linguistics and philosophy to his brief stint convincing the Austrians to join the Grand Coalition against Napoleon. I utilize the source to understand more of Humboldt's legacy and to establish the success of his policies and reforms for modern research.

Osler, Margaret J, Steven G Brush, and J. Brookes Spencer. "Scientific Revolution." In

***Britannica*, 2019. <https://www.britannica.com/science/Scientific-Revolution/Optics>.**

Britannica provides an overview of the moving parts of the Scientific Revolution, explaining the various fields and scientists that were leading the charge in the first expansion of scientific thought. I display the complete breadth of inquiry that the Renaissance and academic freedom allowed for, especially in British universities which composed the majority of scientists of the Scientific Revolution.

Palmer, R. R. "4. Frederick the Great, Guibert, Biilow: From Dynastic to National War."

***Makers of Modern Strategy from Machiavelli to the Nuclear Age*, 1986, 91–120.**

<https://doi.org/10.1515/9781400835461-006>.

Palmer's book offers a glimpse into the non-academic reforms in conscription and grand strategy undergoing the Prussian state. After all, the Prussians were "an army with a state". However, even military officers needed to be educated, so I cited the source to make the argument that the landed military elites were often the ones utilizing the Prussian education system the most.

Reed, Bruce Cameron. *Manhattan Project: The Story of the Century*. Cham, Switzerland:

Springer, 2020.

Reed's book provides an expert analysis on how groundbreaking the Manhattan Project was for geopolitics and scientific innovation. Crucially, I cite where it highlights the sheer importance that university minds played in the development of the project. Berkeley would, after all, be contracted by the government to lead the Manhattan Project when other avenues closed and non-university institutes failed to deliver.

Ridder-Symoens, Hilde d., ed. 2013. *A History of the University in Europe: Volume 1, Universities in the Middle Ages*. N.p.: Cambridge University Press.

The four-volume History of the University in Europe is a masterwork that I dedicated weeks to reading and understanding. In its volumes, it depicts the continued narrative and story of the development of the European university. I use the first volume to write about how universities operated in the Middle Ages and describe what the first Universities embodied and looked like.

Ridder-Symoens, Hilde d., ed. 2013. *A History of the University in Europe: Volume 2, Universities in Early Modern Europe (1500–1800)*. N.p.: Cambridge University Press.

Symoens' second volume highlights important changes in the ways that universities taught. I discuss how Middle-Age universities often resulted in university professors teaching academics in a perpetual feedback loop that was hard to break. However, post-medieval European elites soon realized the importance of a good education to further rhetoric and knowledge, and education soon shifted to the broader elite.

Rudy, Willis. 1984. *The universities of Europe, 1100-1914: a history*. N.p.: Fairleigh Dickinson University Press.

The Universities of Europe offers another comprehensive literature compilation of the expanding role and development of the European universities. I read this book to gain a better understanding of how graduate schools specifically evolved over the millennium.

Schachner, Nathan. 1939. "The Mediaeval Universities." *History* 24, no. 95 (December): 262-264.

Schachner's journal article in History provided me with a reference for the migration and movement of European scholars in medieval times. From the work, I gained an understanding of how universities operated with frequent migration and put forth the argument that these migrations positively benefited institutions by moving knowledge and ideas between cities in a time of low communication and reach.

Siraisi, Nancy G. "Medicine and the Renaissance World of Learning." *Bulletin of the History of Medicine* 78, no. 1 (2004): 1–36. <http://www.jstor.org/stable/44447951>.

Galen is a Roman physician now known for his complete inaccuracies on human anatomy, which while excusable for Roman times, continued to remain in practice by scholars who did not question his texts for centuries. Siraisi's work provides an excellent characterization of the conditions which finally allowed Renaissance scholars to reject his anatomical understandings and offer new, more accurate theories for the field of medicine.

The Cambridge Economic History of Europe. United Kingdom: Cambridge University Press, 2008.

This book offered an insight into the economic development around the Napoleonic wars, which I used to provide a foil for the Prussian education system and explain the necessity of the Prussian reformations to counter the French university system.

Vacalopolous, Apostolos. 1966. "The Exodus of Scholars from Byzantium in the Fifteenth Century." *Journal of World History* 10, no. 1 (1): 463.

Vacalopolous's journal article briefed me on the loss of knowledge that came with the fall of Byzantium but also emphasized the sheer amount of knowledge and scholars that were forced to migrate after Constantinople's fall. In the paper, I convey the sheer severity of the exodus which eclipsed the movements of singular scholars to spread knowledge.

Valzania, Andrea. "The stranger. Two essays on exile." (2014): 249-250.

Valzania explores the exiles and movement patterns of intellectuals and the urban populace. Whether by choice or by necessity, these movement patterns provide a baseline understanding of how European migration and movement functioned in a time period of immensely low reach even in a singular realm.

Weiss, Linda. *America Inc.?: Innovation and Enterprise in the National Security State*.

Ithaca, NY: Cornell University Press, 2014.

Linda Weiss' critically acclaimed book puts forth the argument that the national security state drove forth innovation and enterprise that provided the capacity for the United States to pursue its academic research. Importantly, Weiss highlights the interconnected role that universities had with the national security state. Government contracts and defense procurement did go to defense corporations, but the driving force behind the innovation and development of weapons earned universities lucrative contracts and funding to further innovation and the state.

Wilson, Peter H. “The Thirty Years War.” *Historically Speaking* 8, no. 1 (2006): 24–26.

<https://doi.org/10.1353/hsp.2006.0010>.

Wilson’s journal article provided an important understanding of the military and political consequences of the Thirty Years’ War. While I use it only to explain Brandenburg-Prussia’s gains in the war, it is important to understand the broader scope that necessitated the Prussian education reforms to occur in the first place.

Winckler, Georg. “THE US SYSTEM: BREADTH AND EXCELLENCE.” Essay. In

***Prospects and Future Tasks of Universities: Digitalization - Internationalization - Differentiation*, 295–97. Zurich: Lit Verlag, 2017.**

Winckler’s entire book is a masterful work highlighting the role that universities have historically played while offering new recommendations for the future of universities in innovation. In the historical chapters, Winckler offers the analysis that older American universities and colleges were reluctant to depart from their existing small college model until the formation of schools that focused on graduate research like Hopkins and Chicago necessitated them to change. I also cite the importance that this delay and initial reluctance had, as American universities established graduate programs at a time of higher university reach and built centralized, larger, and more competitive programs.

“Emigration of French Protestants to the Countries of Refuge (Late 17th Century).” n.d.

Musée Virtuel Du Protestantisme.

<https://museeprotestant.org/de/notice/die-hugenottische-fluchtbewegung/>.

The page of the Protestant Museum provides an excellent summary of the impact that French Huguenots had on other states in the Protestant Reformation. Without the Huguenots repopulating the Prussian population at such a critical time, it is hard to say how the state would have recovered if it lacked the population and knowledge that the Huguenots brought.

“History.” n.d. University of Oxford. <http://www.ox.ac.uk/about/organisation/history>.

The Oxford web page provides a brief timeline of the university which I use to understand the history of one of the oldest European universities and characterize the decentralized classrooms and instruction of the first British university.